2007

Upper Neches Basin Highlights Report

THE TEXAS CLEAN RIVERS PROGRAM

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

ANRA

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.

ANRA is a proud participant in the annual Neches River Rendezvous.

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 eco-region 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.

Highlights of 2006

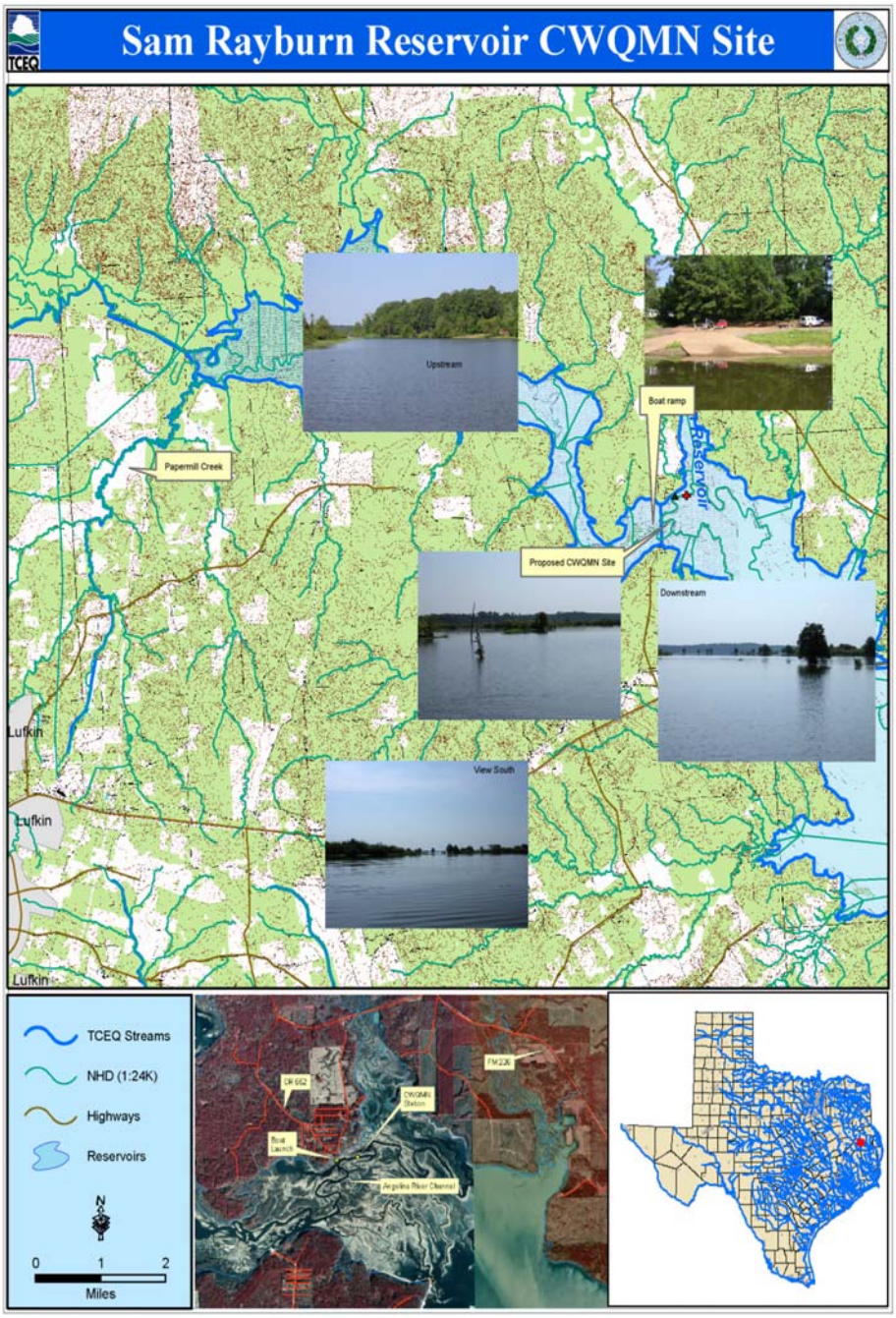
The Basin Highlights Report provides an annual update of the current water quality activities and events in the Upper Neches River Basin. The 2006 highlights included working toward the completion of two continuous water quality monitoring stations, analytical testing provided by the ANRA Laboratory Accreditation, and increased public outreach and volunteer monitoring.

Continuous Water Quality Monitoring

Beginning in FY 2006, ANRA has been involved in the planning of two separate continuous water quality monitoring stations are planned for installation during 2007. The first of these is to be installed on Lake Palestine near the City of Tyler's raw water intake. The other is planned for the upper Angelina River arm of Sam Rayburn Reservoir. ANRA staff selected a site for the permanent station and made recommendations to the TCEQ for the station location. Both stations will monitor water quality indicators on a 24 basis. The data will be available almost instantly and will aid in identifying water quality issues in those areas. Both of these monitoring stations are scheduled for installation by the end of 2007.

Caddo Lake in East Texas is home to two of the TCEQ's continuous monitoring platforms. The station collects data for weather and for water quality. On one pole are meteorological monitoring devices that measure for wind speed and direction and precipitation. Another pole holds solar panels to power the operation and a traffic box containing a data logger. All data is transmitted by radio. The water quality instrumentation is under water.

The continuous water quality monitoring station on Sam Rayburn Reservoir will be similar to this station currently in place on Caddo Lake in North East Texas.



Highlights of 2006 (continued)

Water Quality Monitoring

The FY 2006 monitoring schedule includes 30 routine and 3 intensive monitoring stations looking at concerns of elevated bacteria and nutrient levels. The City of Tyler began monitoring quarterly in FY 2004 at four stations in the basin. The TCEQ regional water quality staff have also increased their monitoring activities within the basin, particularly on Lake Palestine. The Basin Highlights Report provides an overview of all water quality monitoring activities in the basin.

ANRA Staff collecting water quality samples at Hurricane Creek near Lufkin.

ANRA's Environmental Laboratory is a full service water laboratory open to the public.

ANRA Laboratory Accreditation

During FY 2006, ANRA's Environmental Laboratory conducted all of the routine analytical testing for the Clean Rivers Program in the basin. 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. During FY 2006, ANRA hired a consultant and has been undergoing a review of their laboratory operations in preparation for the National Environmental Laboratory Accreditation Program (NELAP) adopted by the TCEQ. The ANRA Laboratory will be prepared to apply for their NELAP certification by the end of FY 2007. Additional information about the ANRA laboratory is included on page 19.

Public Outreach/ Volunteer Monitoring

During FY 2006, ANRA increased it's volunteer support for environmental water quality monitoring within the Upper Neches River Basin. New volunteers have been certified, through the Texas Watch Program. The new volunteer water monitors are conducting water quality testing on Lake Palestine and Mud Creek. More information on public outreach and the volunteer water quality monitoring program can be found on page 20.

ANRA staff conducting a volunteer monitoring training at Lake Palestine.

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 2007 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 at: http://cms.lcra.org/

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 every other month at the Sam Rayburn Reservoir, and the City of Tyler is monitoring four stations in the upper basin. All of these **Routine** 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 three **Intensive** stations which are coded with an **IS** on the FY06-07 coordinated monitoring schedule. The stations being monitored for conventional and field parameters are monitored quarterly and those being looked at for bacteria concerns are monitored 6 times per year. Typically these types of stations are monitored for only two years. At that time, a decision is made to either drop the station or add it as a *Routine* station.

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 FY06-07 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. TCEQ regional staff is currently conducting the DI monitoring events within the basin.

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, Conductivity, Flow, and Transparency. 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 (DO) is used in respiration by aquatic organisms. D.O. is an important measure of the quality of the habitat and overall health of the ecosystem. pH is a measure of the acidity of the water. Most organisms have a preferred pH range of 6 to 9. Conductivity is a good indicator of the dissolved mineral content in stream ecosystems. Temperature is also very important since many aquatic organisms are adapted to survive and prosper within specific temperature ranges. Water temperature also has a direct effect on the amount of dissolved oxygen in the water. As the temperature rises, the amount of dissolved oxygen in the water decreases. In extreme cases, this can lead to fish kills.

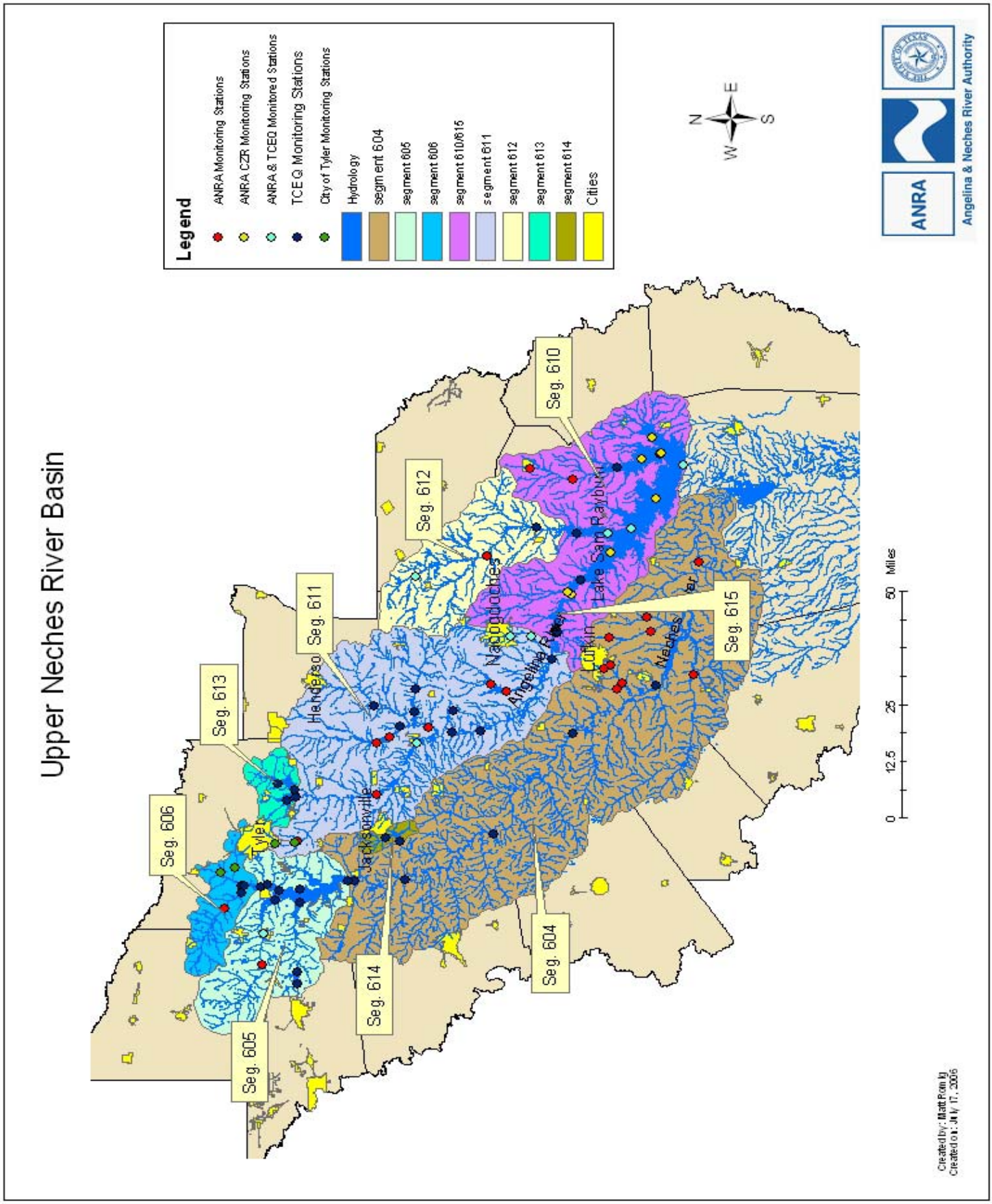
Bacteria

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. Exposure to high levels of this bacteria can lead to sickness in humans.

Conventional Parameters

Total Dissolved Solids (TDS) is a direct measurement of the dissolved mineral content. High TDS can be harmful to aquatic organisms and can restrict the beneficial use of the water. Total Suspended Solids (TSS) can adversely affect stream ecosystems by filling pools, clogging gills, and limiting the light penetration and transparency critical to aquatic flora. TDS, 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.

Total phosphorus includes phosphorus that is bound to sediment particles or inorganic compounds, which can become available in the water column. It is often the limiting nutrient for aquatic vegetation in freshwater systems. Orthophosphate measures the form of phosphorus that is readily available to aquatic organisms. Too much phosphorus can often cause excessive aquatic vegetation growth referred to as eutrophication. Eutrophication is defined as the process of enrichment of a water body due to an increase in nutrient loading. Elevated levels of Nitrate+Nitrite are good indicators of runoff from irrigation, fertilizers, and effluent waste water streams. Nitrogen is a limiting factor to algal production in many


Upper Neches River Basin
Legend
ANRA Monitoring Stations
ANRA CZR Monitoring Stations
ANRA & TCEQ Monitored Stations
TCEQ Monitoring Stations
City of Tyler Monitoring Stations
Hydrology
segment 604
segment 605
segment 606
segment 610/615
segment 611
segment 612
segment 613
segment 614
Cities
N
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ANRA
Angelina & Neches River Authority
Seg. 606
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Tyler
Jacksonville
Henderson
Nacogdoches
Angelina R.
Lake Sam Rayburn
Lufkin
Neches
0
12.5
25
50 Miles
Created by: Matt Rowley
Created on: July 17, 2006

Water Quality Assessments for the Upper Neches River Basin

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 2006 Water Quality Inventory and 303(d) List was prepared by TCEQ and was made available on March 19, 2007. After a 30 day public comment period, the report was revised and posted to the TCEQ website. The period of record for the water quality data used in the 2006 assessment (Inventory and List) is the five year period from December 1, 1999 to November 30, 2004. The data used for the assessment is acquired through the Texas Clean Rivers Program and TCEQ's Regional staff, and other quality assured sources. The 2006 Water Quality Inventory and 303(d) List are available at the following web address: http://www.tceq.state.tx.us/compliance/monitoring/water/quality/data/06twqi/twqi06.html

Surface Water Quality Standards

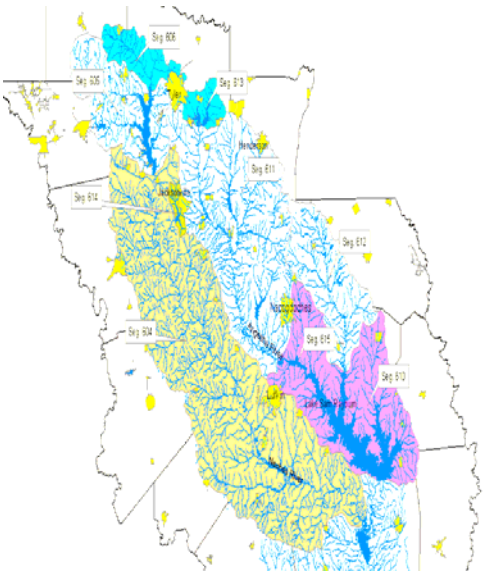
The Texas surface water quality standards are developed by the TCEQ and must be approved by the EPA. They are published in Title 30, Chapter 307 of the Texas Administrative Code. These standards serve as the foundation for managing surface water quality. A standard is a combination of a designated use 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. Additional information about the Texas Surface Water Quality Standards is available at the following web address:

http://www.tceq.state.tx.us/nav/eq/eq_swqs.html

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



ANRA Basin Highlights Report

The annual Basin Highlights Report Utilizes the latest Texas Water Quality Inventory and 303(d) List, issued by the TCEQ, to rank each water body in the basin. **The rankings in this report are based on the Draft 2006 Assessment.** TCEQ's *2006 Guidance for Assessing Texas Surface and Finished Water Quality Data* was followed for this assessment

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), while category 5c water bodies require that additional data be collected before a TMDL is scheduled. 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 2006 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 9-18 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, a segment map, 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.

Water Quality Assessments for the Upper Neches Basin (continued)

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)

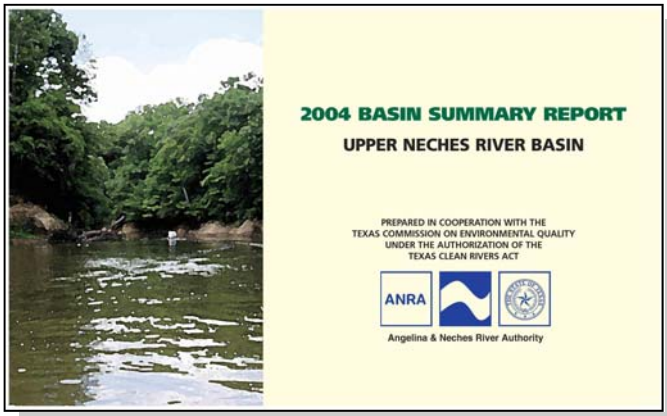
Unknown: Insufficient or no data is available to determine if any designated use is attained. (Category 3)

The following information comes directly from The Draft 2006 Water Quality Inventory and 303(d) List prepared by the TCEQ. Assessment results are discussed in the water body rankings for each segment on the following pages (9-18).

The TCEQ conducted a targeted water quality assessment for 2006 on nearly all of the water bodies previously assessed in 2004 plus assessments on additional waterbodies within the basin. In the Upper Neches Basin, 26 targeted water bodies were assessed/re-assessed in the 2006 Water Quality Inventory. The following list of classified and unclassified segments in the basin were assessed/re-assessed in 2006:

0604: Neches River Below Lake Palestine
0604A: Cedar Creek
0604B: Hurricane Creek
0604D: Piney Creek
0604M: Biloxi Creek
0605: Lake Palestine
0605A: Kickapoo Creek
0605F: Lake Athens
0606: Neches River above Lake Palestine
0606A: Prairie Creek
0610: Sam Rayburn Reservoir
0610A: Ayish Bayou
0611: Angelina River above Sam Rayburn Reservoir
0611A: East Fork Angelina River
0611B: LaNana Creek
0611C: Mud Creek
0611D: West Mud Creek
0611H: Ragsdale Creek
0611Q: Lake Nacogdoches
0611R: Lake Striker
0612: Attoyac Bayou
0612C: Pinkston Reservoir
0613: Lake Tyler/Lake Tyler East
0614: Lake Jacksonville
0615: Angelina River/ Sam Rayburn Reservoir
0615A: Papermill Creek

Beginning with 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 minimum sample size of ten.



Basin Summary Report

ANRA's Basin Summary Report is completed every five years and includes a comprehensive data review. The most recent of these reports was completed in 2004. The data is 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. The 2004 Basin Summary Report is currently available on the ANRA website: www.anra.org. The next Basin Summary Report will be completed in the summer of 2009.

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 2007, additional monitoring is being conducted in the segment. ANRA is performing intensive monitoring on Biloxi Creek southeast of Lufkin to address the bacteria impairment. Bimonthly bacteria and flow monitoring will be performed over a two year period. TCEQ Regions are conducting routine monitoring on five stations on the Neches River. The FY 2007 CRP monitoring schedule for the segment is available on page 10.

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 is not supported due to elevated *E. coli* bacteria levels..

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 is fully supported.

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.

0604A—Cedar Creek: Contact Recreation Use is not supported in all reaches of the stream due to the elevated bacteria (*E. coli*) levels. Nutrient Enrichment is a concern for ammonia-nitrogen and total nitrate+nitrite nitrogen, ortho-phosphorus and total phosphorus. It is a category 5c water body, and CRP routine monitoring will continue.

0604B—Hurricane Creek: Contact Recreation Use is not supported due to the elevated *E. coli* levels at SH 324 South of Lufkin. The water body is a category 5c and routine monitoring will continue.

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, ortho-phosphorus and total phosphorus. It is a category 5c water body and routine monitoring will continue.

0604D—Piney Creek: Aquatic Life Use is not supported due to depressed dissolved oxygen (DO) and lead in water in the lower 25 miles. The Contact Recreation Use is not supported due to elevated *E. coli* bacteria levels. It is a category 5c water body and routine/diurnal monitoring will continue.

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. The Aquatic Life Use is not supported due to depressed dissolved oxygen levels in the upper portion above CR 228 and lead in water in the lower portion below CR 228. It is a category 5c water body and routine monitoring is ongoing.

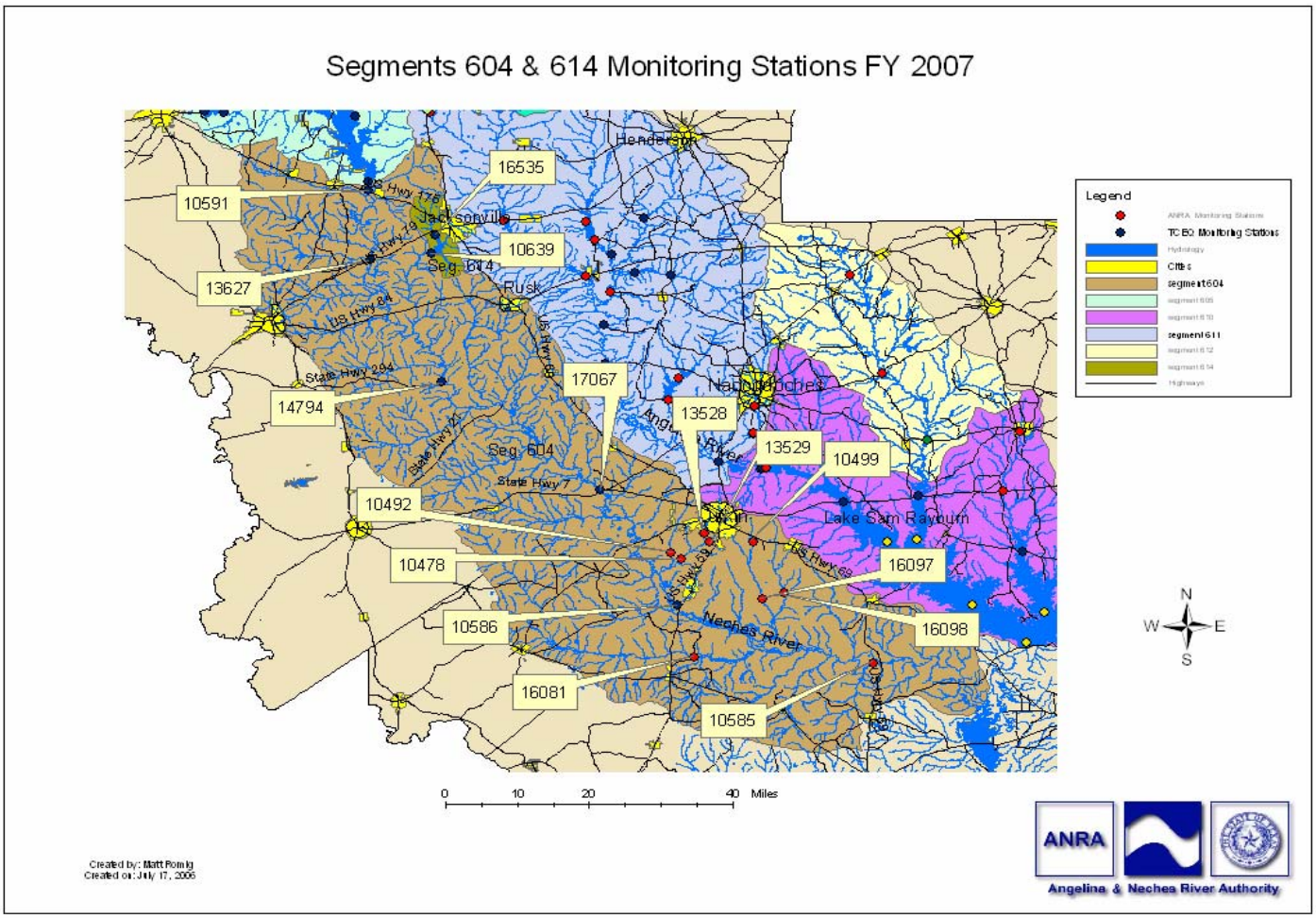
0604N—Buck Creek: The Aquatic Life Use is not supported due to elevated levels of aluminum and lead in the water. All other uses are fully supported. ANRA routine monitoring is ongoing.

0604T—Lake Ratcliff: Fish Consumption Use is not supported due to mercury in fish tissue. Other uses were not assessed. It is a category 5c water body which means additional data will be collected before a TMDL is scheduled. A statewide project to address mercury in fish tissue is planned by TCEQ.

ANRA routinely collects water quality data at Jack Creek at the FM 2497 crossing southwest of Lufkin.

Segment 604 - FY 2007 CRP Monitoring Schedule

ANRA Monitoring Stations								
Station ID	Station Description	Program Code	Monitoring Parameters					
			24 HR Monitoring	Metals Water	Conven-tional	Bacteria	Inst. Flow	Field
10478	Cedar Creek at FM 2497	RT			4	4	4	4
13528	Cedar Creek at CR 1336	RT			4	4	4	4
13529	Hurricane Creek at FM 324	RT			4	4	4	4
16081	Piney Creek at FM 1987	RT			4	4	4	4
16098	Buck Creek at FM 1818	RT			4	4	4	4
16097	Biloxi Creek at FM 1818	RT			4	4	4	4
10492	Jack Creek at FM 2497	RT			4	4	4	4
10585	Neches River at US 69	RT			4	4	4	4
10499	Biloxi Creek at Angelina CR 216	IS				6	6	



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 conducts routine monitoring on Lake Palestine. In addition, ANRA conducts routine monitoring at two stations on Kickapoo Creek near Brownsboro.

0605—Lake Palestine: The General Use category is not supported due to high pH levels in the mid-lake area. All other designated uses are fully supported including Contact Recreation and Public Water Supply Use. There is a General Use concern for high pH in the upper lake (Neches River arm). There is also a General Use concern in the upper portions of the lake for elevated levels of ammonia-nitrogen, nitrate+nitrite nitrogen, ortho–phosphorus and total phosphorus. There is an Aquatic Life Use concern for low dissolved oxygen levels in the lower portion near the dam and in the Flat Creek headwaters and sediment toxicity (Manganese) in the mid-lake region. Routine monitoring by the TCEQ is ongoing in these areas of the lake, as well as 24-hr. DI monitoring at three locations.

0605A—Kickapoo Creek: Contact Recreation Use is not supported downstream of FM 1803 due to elevated bacteria levels. The Aquatic Life Use is not supported downstream of FM 1803 due to copper in water and low DO. There is a General Use Concern for ammonia-nitrogen, ortho-phosphorus, and chlorophyll-a in the same area. This is a Category 5c water body and routine/intensive monitoring by ANRA is ongoing. (see page 12)

Additional monitoring during FY 2007 on Kickapoo Creek (pictured above) is being used to address nutrient enrichment concerns.

0605F—Lake Athens: All uses are fully supported including Aquatic Life Use, General Use, and Contact Recreation Use.

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.

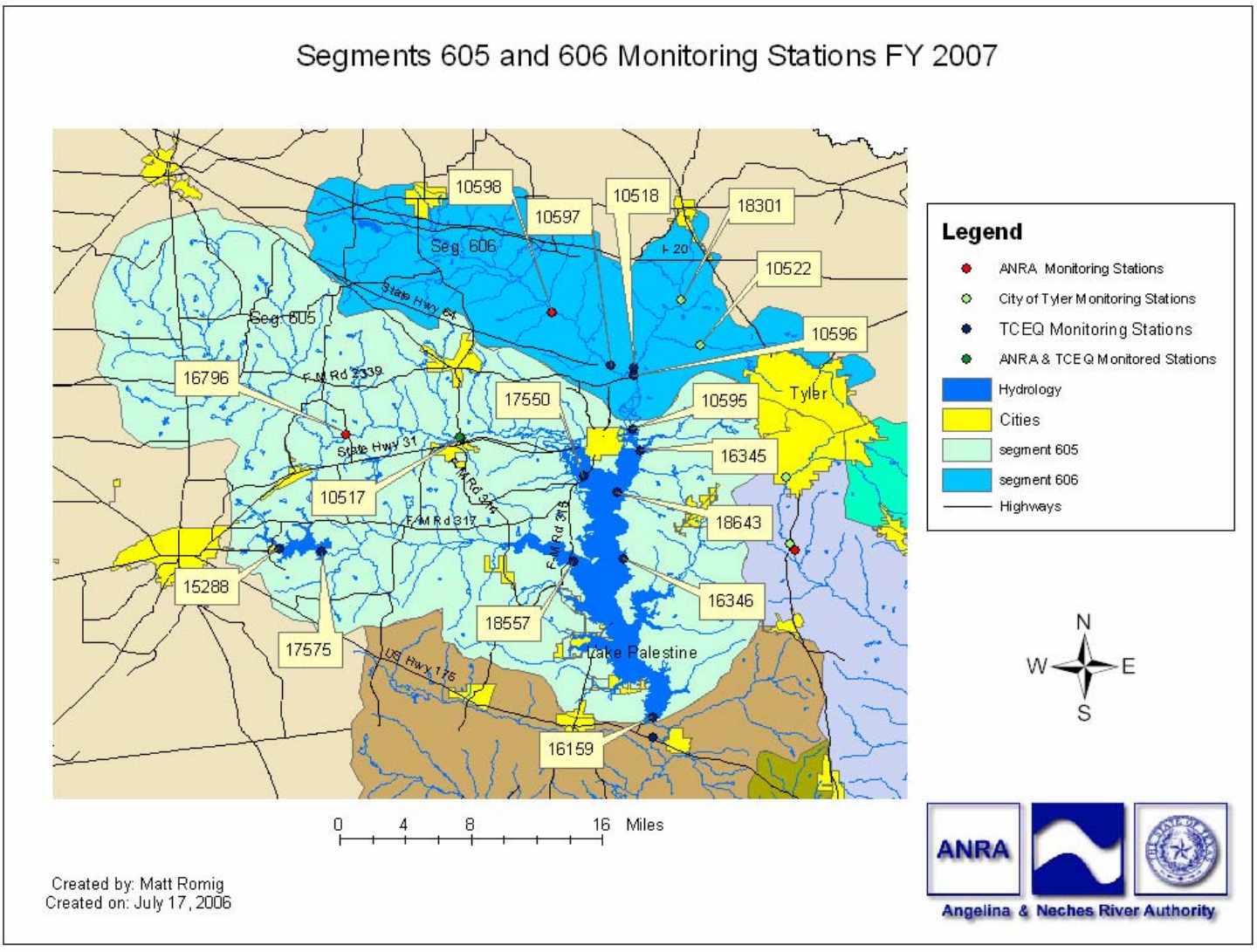
Historically, the majority of the monitoring on Segment 606 has been conducted by the TCEQ Region 5 in Tyler. During FY 2004, the City of Tyler began quarterly monitoring on two unclassified segments or tributaries in the watershed. The following routine monitoring stations were established: 10522-Black 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. During FY 2006, ANRA added a routine monitoring on this segment at Van Zandt CR 420.

0606—Neches River above Lake Palestine: The Aquatic Life Use is not supported due to depressed dissolved oxygen and zinc in water from Prairie Creek to river mile 7.0. The General Use is not supported due to low pH from Prairie Creek to the headwaters. There is also a concern for nitrate+nitrite nitrogen in the lower region. The Public Water Supply and Contact Recreation Uses are both fully supporting. This is a Category 5c water body and routine monitoring is ongoing at three stations by ANRA and the TCEQ.

0606A—Prairie Creek: The Contact Recreation Use is not supported due to elevated bacteria levels (*E. coli*) in the lower 4 miles. Prairie Creek is a Category 5c water body and routine monitoring is ongoing.

Segment 605/606 - FY 2007 CRP Monitoring Schedule

ANRA & City of Tyler Monitoring Stations								
Station ID	Station Description	Program Code	Monitoring Parameters					
			24 HR Monitoring	Metals Water	Conven-tional	Bacteria	Inst Flow	Field
10517	Kickapoo Creek at FM 314	RT			4	4	4	4
16796	Kickapoo Creek at FM 1803	IS			4	4	4	4
10598	Neches River at Van Zandt CR 420	RT			4	4	4	4
10522	Black Fork Creek upstream of Tyler WWTP	RT			4	4	4	4
18301	Prairie Creek at SH 110 (City of Tyler)	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 2007, 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 every other month and includes the same parameters as the CRP monitoring. ANRA will conduct routine and intensive monitoring on the Ayish Bayou. The intensive survey will address the historical bacteria impairment in the upper reaches of Ayish Bayou. 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. Diurnal monitoring (24-hr DO) is also scheduled for two stations in the reservoir.

0610—Sam Rayburn Reservoir: The Fish Consumption Use is not supported in all assessed areas due to mercury in fish tissue. The Aquatic Life Use is not supported due to depressed dissolved oxygen levels in the upper and mid-Angelina River arm, the lower Attoyac Bayou arm, and the upper Ayish Bayou arm. It is also not supporting for cadmium in the water in the mid-Angelina River arm near the SH 147 bridge. There is an Aquatic Life Use concern for Arsenic, Iron, and Manganese in the mid-Angelina River arm. There is also a General Use concern for elevated levels of ammonia and nitrate+nitrogen in the following areas: Main Pool near the dam, entire Angelina River arm, lower Attoyac Bayou arm, the Bear Creek arm, and the lower Ayish Bayou arm. The Contact Recreation and Public Water Supply Uses are fully supported.

0610A—Ayish Bayou: The Contact Recreation Use is not supported for bacteria in all portions of the waterbody. The Aquatic Life and General Uses are fully supported and the Fish Consumption Use was not assessed. The water body is listed as a category 5c and routine/intensive monitoring is scheduled for FY 2007. ANRA is conducting bimonthly bacteria and flow monitoring over a two year period in the upper Ayish Bayou as part of the intensive monitoring to address

Ayish Bayou near the Hwy. 103 crossing, photographed in the winter of 2006.

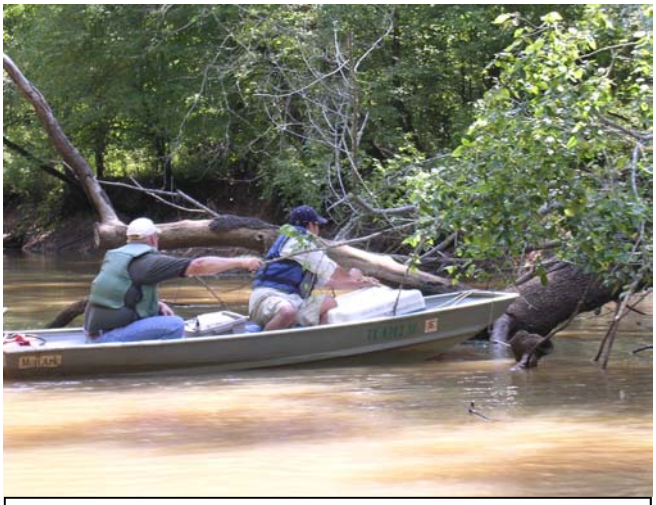
Segment 615—Angelina River/Sam Rayburn Reservoir

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.

A Continuous Water Quality Monitoring Station is scheduled to be installed in this segment before the end of FY 2007.

0615—Angelina River/Sam Rayburn Reservoir: The Aquatic Life Use is not supported due to depressed dissolved oxygen, an impaired fish community, and aluminum in the water downstream of the confluence with Paper Mill Creek. The Fish Consumption Use is not supported due to mercury in fish tissue in the segment. The Contact Recreation Use is not supported due to elevated bacteria (E. coli) levels in the entire segment. The General Use and Public Water Supply Use are fully supported. The water body is a Category 5c and routine/diurnal monitoring by the TCEQ will continue during FY 2007.

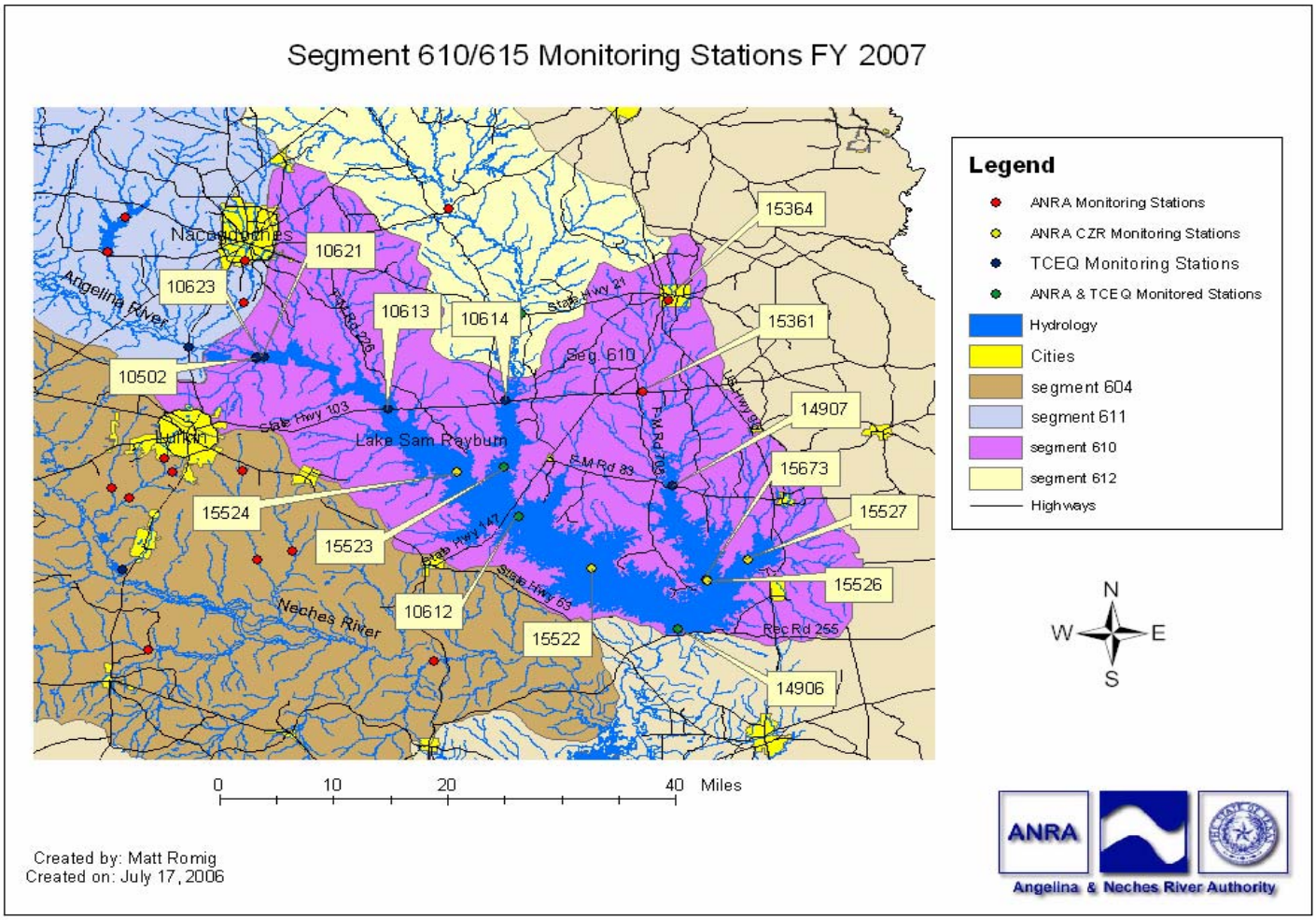
0615A—Paper Mill Creek: The Contact Recreation Use is not supported due to elevated bacteria levels. The Aquatic Life and Fish Consumption Uses are fully supported. However, an Aquatic Life Use concern exists for depressed dissolved oxygen. There is a General Use Concern for ammonia-nitrogen. Routine monitoring by the TCEQ will continue.



TCEQ staff from Region 10 in Beaumont collecting water quality data on the Angelina River near Paper Mill Creek.

Segment 610/615 FY 2007 CRP Monitoring Schedule

ANRA Monitoring Stations								
Station ID	Station Description	Program Code	Monitoring Parameters					
			24 HR Monitoring	Metals Water	Conven-tional	Bacteria	Inst. Flow	Field
15361	Ayish Bayou at SH 103	RT			4	4	4	4
15364	Ayish Bayou at SH 147	IS				6	6	
14906	Sam Rayburn Reservoir at Main Pool	RT			6	6		6
15522	Sam Rayburn Reservoir near Veach Basin	RT			6	6		6
15523	Sam Rayburn Reservoir adjacent to Alligator Cove	RT			6	6		6
15524	Sam Rayburn Reservoir near Shirley Creek	RT			6	6		6
15526	Sam Rayburn Reservoir near Needmore Point	RT			6	6		6
15527	Sam Rayburn Reservoir near Mill Creek	RT			6	6		6
15675	Sam Rayburn Reservoir at USGS Site MC	RT			6	6		6



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 2007, ANRA will continue routine monitoring on the Angelina River and five unclassified segments (La Nana Bayou, Mud Creek, W. Mud Creek, Lake Nacogdoches, and Lake Striker).

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 *E. coli* bacteria at one of the monitoring stations. The water body is a Category 5c due to the bacteria impairment and routine/diurnal monitoring will continue. (see page 16)

Lower Region (Lower boundary to FM 343 in Nacogdoches/Cherokee Co.) - The Contact Recreation Use is not supported due to elevated levels of *E. coli* bacteria. All other designated uses are fully supported. This includes the Aquatic Life, Fish Consumption, Public Water Supply, and General Uses. Routine monitoring will continue at both stations during 2007.

0611A—East Fork Angelina River: The Contact Recreation Use is not supported in one area (near Grassy Lake) based on elevated *E. coli* bacteria levels. The Aquatic Life Use is not supported due to lead in water. The General Use is fully supported and the Fish Consumption Use was not assessed due to insufficient data. It is currently a Category 5c water body and routine monitoring is ongoing at one station. In addition, monthly bacteria and flow monitoring is scheduled by TCEQ to address the bacteria impairment.

0611B—La Nana Bayou: The Contact Recreation Use is not supported due to elevated bacteria (*E. coli*) levels in all sections of the creek. The Aquatic Life Use is fully supported and the Fish Consumption Use was not assessed. The water body is a Category 5c and ANRA will continue routine monitoring at two locations (see page 16). Monthly bacteria and flow monitoring at two stations has been implemented by the TCEQ to address the bacteria impairment.

0611C—Mud Creek: The Contact Recreation Use in the lower potion of the water body is not supported due to elevated *E. coli* bacteria levels. The upper monitoring station at US Hwy. 79 fully supports the bacteria (*E. coli*) standards. The Aquatic Life Use is fully supported. The water body is a Category 5c for the bacteria impairment and routine monitoring by ANRA will continue at two locations.

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 General Use Concern for nitrate+nitrite, ortho-phosphorus, and total phosphorus below US Hwy. 69. Routine monitoring will continue during 2007 by both ANRA the City of Tyler.

0611H—Ragsdale Creek: The Aquatic Life Use is fully supported based on 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.

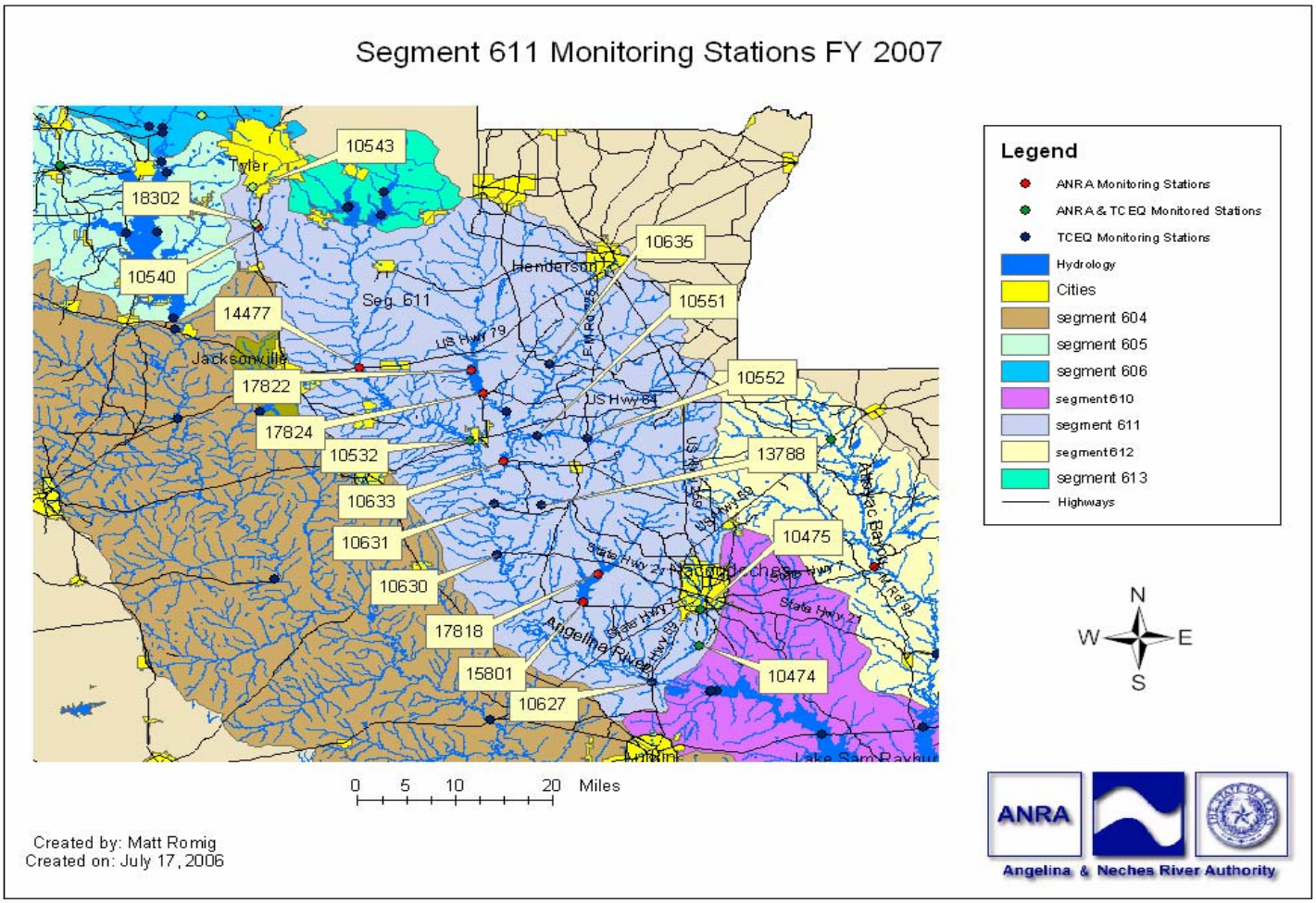
0611Q—Lake Nacogdoches: The Public Water Supply, Aquatic Life, Fish Consumption, and Contact Recreation Uses are all fully supported. However, there is a General Use concern for elevated levels of ammonia, nitrates, and ortho-phosphorus. Systematic/Routine Monitoring has been ongoing since FY 2003 and will continue in FY 2007 at two locations.

0611R—Lake Striker: The Aquatic Life and Contact Recreation Uses are fully supported but there is a General Use concern for ammonia and nitrate-nitrogen. Other uses were not assessed due to insufficient data.

ANRA staff routinely collects water quality data a two locations on Lake Striker on a quarterly basis.

Segment 611—FY 2007 CRP Monitoring Schedule

ANRA & City of Tyler Monitoring Stations								
Station ID	Station Description	Program Code	Monitoring Parameters					
			24 HR Monitoring	Metals Water	Conven-tional	Bacteria	Inst. Flow	Field
10633	Angelina River at SH 204	RT			4	4	4	4
10532	Mud Creek at US 84	RT			4	4	4	4
10540	West Mud Creek at FM 346	RT			4	4	4	4
10474	La Nana Bayou at Nac CR 526	RT			4	4	4	4
10475	La Nana Bayou at Loop 224 S	RT			4	4	4	4
14477	Mud Creek at US 79	RT			4	4	4	4
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
18302	West Mud Creek at US 69 (City of Tyler)	RT			4	4	4	4
10543	West Mud Creek at SSTP (City of Tyler)	RT			4	4	4	4



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 2007, ANRA will continue routine monitoring at two locations on the segment.

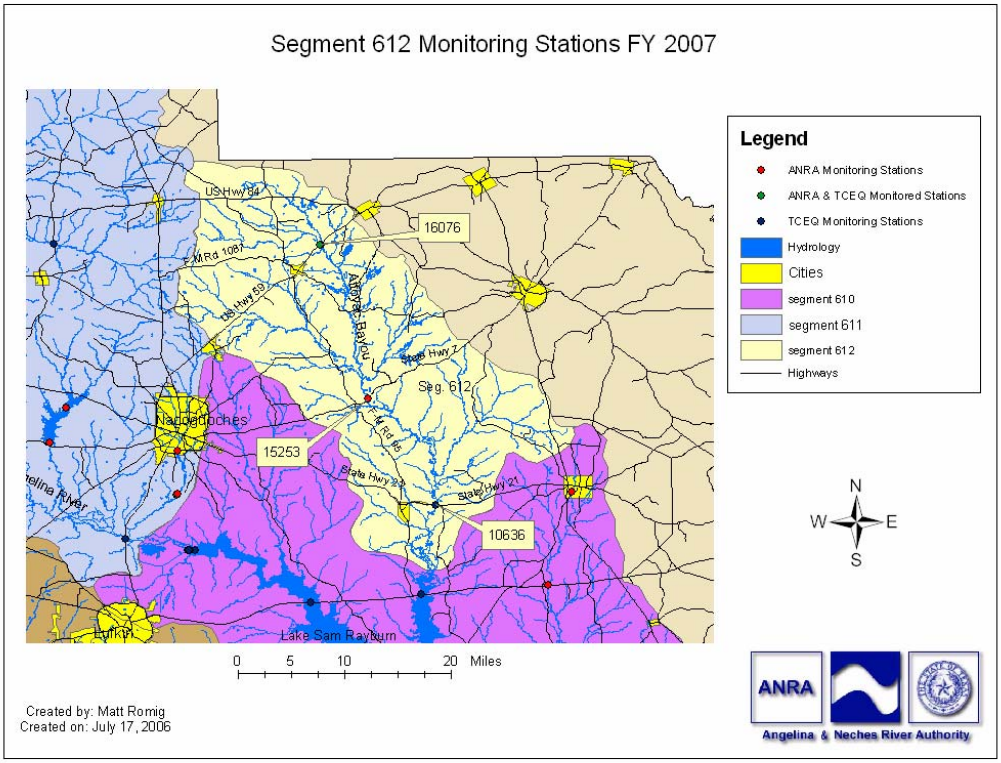
0612—Attoyac Bayou: The Contract Recreation Use is not supported in the upper and lower portions of the segment. The *E. coli* geometric mean was exceeded at both locations. All other uses are fully supported. The water body is a Category 5c and routine monitoring will continued during 2007. (see table below)

0612B—Waffelow Creek: The Aquatic Life, Contact Recreation, and Fish Consumption uses were not assessed. The unclassified water body not currently on the state's 303(d) List of impaired waterbodies.

0612C—Pinkston Reservoir: The Public Water Supply and Fish Consumption Uses are both fully supported. The Aquatic Life and Contact Recreation uses were not assessed. Monitoring is not currently scheduled for this lake, however it will be considered in future planning meetings.

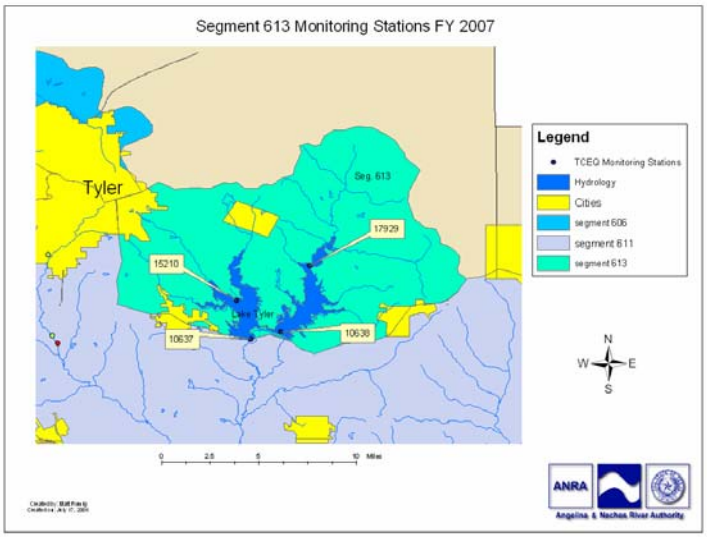
Segment 612 - FY 2007 CRP Monitoring Schedule

ANRA Monitoring Stations								
Station ID	Station Description	Program Code	Monitoring Parameters					
			24 HR Monitoring	Metals Water	Conventional	Bacteria	Inst. Flow	Field
16076	Attoyac Bayou at US 59	RT			4	4	4	4
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.

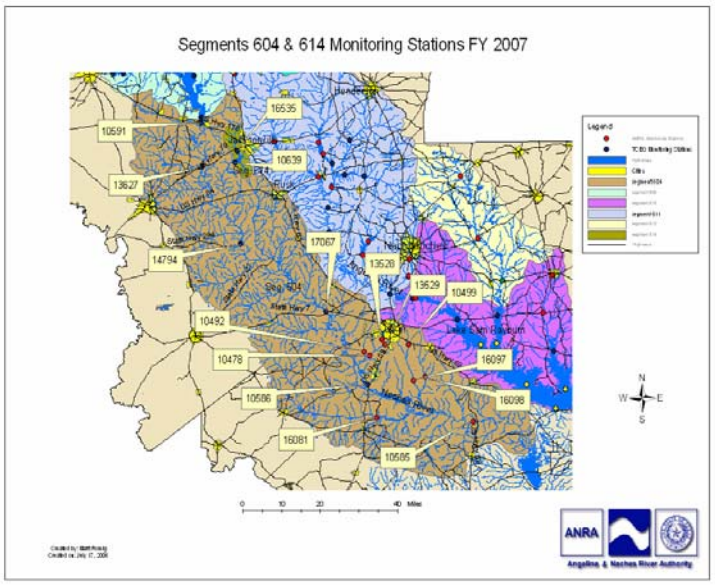


The TCEQ regional office in Tyler has continually monitored this segment. During FY 2007, routine monitoring has continued at two stations on Lake Tyler and two stations on Lake Tyler East.

0613—Lake Tyler/Lake Tyler East: All designated uses are fully supported in the segment. This includes the Aquatic Life, Public Water Supply, Contact Recreation, and General Use categories.

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 2007, routine monitoring continues 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, General, Aquatic Life, and Contact Recreation Uses are all fully supported.

Upper Neches Basin Projects

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.

An Environmental Impact Statement (EIS) is currently underway by the environmental firm, R.J. Brandes Company in conjunction with Horizon Environmental. 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 Lake Columbia Downstream Impacts Analysis was completed in Sept. 2005 by Freese & Nichols, Inc. to determine the impacts of the dam's construction and future reservoir operations on the Mud Creek floodplain. The report is available on the ANRA and TWDB website at: http://www.twdb.state.tx.us/.

Beginning in February, 2006, archeologists from Horizon Environmental Services, of Austin, Texas conducted an archeological survey of the proposed 10,000 acre reservoir site. The purpose of the survey was to search for prehistoric and historic archeological sites, native and historic cemeteries, historic standing structures, as well as other cultural resources, in order to record any cultural sites that occur within the limits of the proposed Lake Columbia reservoir.

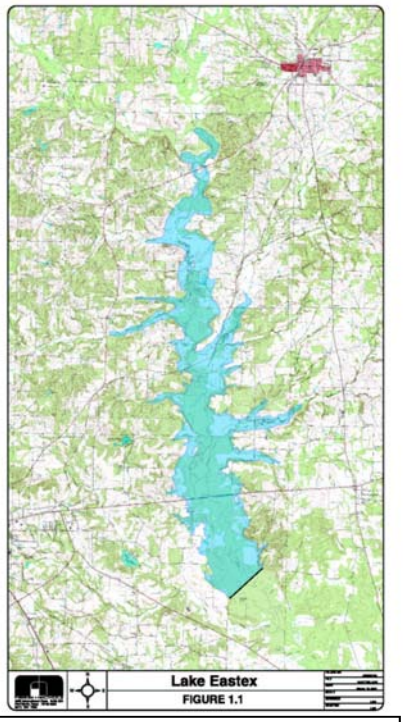
During this phase of the project, Horizon performed (1) an archeological field survey of the impoundment area, (2) a preliminary geomorphological study of the Mud Creek floodplain, (3) historical and archival research at local libraries, historical societies, and other repositories. These investigations were performed to obtain enough information for the Corps. of Engineers to characterize the kind, quality, and number of cultural resources that may be affected by construction of the proposed reservoir.

Field work was completed in May, 2006 and an interim report is being written describing the findings.

The City of Jacksonville and the Angelina & Neches River Authority have recently entered into an Interlocal Cooperation Agreement to preserve instream flows and protect water quality in Mud Creek. This agreement assures that the city will continue to release at least 80% of the wastewater stream released into Ragsdale Creek which flows into Mud Creek below the proposed dam of Lake Columbia.

Over the course of the last three years, the volume of water treated and discharged by the city's two wastewater treatment plants has averaged 2.88 million gallons per day. This agreement will guarantee the continuation of the majority of these flows and will provide a valuable and assured base line flow for this section of Mud Creek.

At its August, 2006 meeting, the ANRA Board of Directors authorized the filing of an application with the Texas Water Development Board for additional loan funding from the State Participation Fund. $5.6 million is being requested in addition to the $10 million previously committed by the TWDB in 2005. The funds would pay for surveying, appraisal, and acquisition of lands necessary to build the reservoir. No funds will be released by the TWDB until a 404 permit is issued by the Corps of Engineers, but a funding commitment will hold the funds for the Lake Columbia project.



The proposed location for Lake Columbia as shown on a topographic map.

ANRA's Environmental Laboratory

During FY 2006, 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). The ANRA Laboratory has been making the necessary adjustments to current practices and procedures and will be ready to apply for their NELAP Certification by the end of August 2007.

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 work plans, allocating resources, reviewing major reports, and identifying water quality issues in addition to other activities.

ANRA's 2006 Steering Committee Meeting.

A Steering Committee Meeting was held on July 19, 2006 at the Fredonia Hotel and Convention Center in Nacogdoches, Texas. Topics discussed included the FY 06-07 CRP work plan/ budget, the 2006 Basin Highlights 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 Clean Rivers Coordinator, Matt Romig at (936) 633-6435 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.

All of the data collected by the volunteer monitors is easily accessible via the internet using the data viewer at: http://www.texaswatch.geo.txstate.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.

Volunteer Water Quality Monitors collecting water samples on Lake Palestine.

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 water quality monitoring and related projects. For more information, please contact ANRA at (936) 632-7795 or e-mail: info@anra.org.

THE TEXAS CLEAN RIVERS PROGRAM