

Northeast Texas Municipal Water District Basin Highlights Report 2005

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Highlights Of the Cypress Creek Basin in 2004

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The Clean Rivers Program (CRP) is a water quality monitoring, assessment, and public outreach program administered by the Texas Commission on Environmental Quality (TCEQ), funded by fees collected by the State of Texas. Coordination of this program is a joint effort involving fifteen different planning agencies and encompassing twenty-three Texas river basins. Within the Cypress Creek Basin, the Northeast Texas Municipal Water District (NETMWD) coordinates the Clean Rivers Program. Program participants assisting NETMWD in planning, data collection, analysis, and reporting of water quality data include Paul Price Associates, Inc. (PPAI), the Texas Commission on Environmental Quality (TCEQ), Caddo Lake Institute (CLI), Franklin County Water District (FCWD) and Steering Committee members.

Goals of the Clean Rivers Program (CRP) include:

- ? Maintenance of basin-

wide water quality monitoring programs To encourage comprehensive and cooperative watershed planning

- ? Identification, analysis, and reporting on water quality issues and their potential causes
- ? Improvement of public participation and outreach activities relating to water quality
- ? To provide a scientific response to water quality problems

The Cypress Creek Basin is divided into five watersheds or areas, James/Black Bayou Watershed, Black Cypress Bayou Watershed, Lake O' the Pines Watershed, Little Cypress Creek Watershed, and Caddo Lake Watershed. A map showing the location of each of these watersheds can be found in this report, and additional information about each watershed is available on our website at www.netmwd.com

Rainfall and runoff were near normal throughout the Cypress Creek Basin

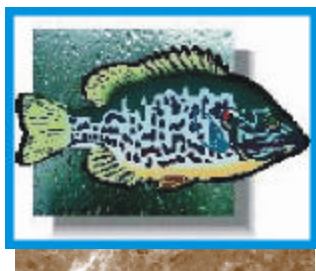
during 2004. Streamflows in Big, Little, and Black Cypress Creeks fell to their lowest levels for the year in the months of July through October. Lake O' the Pines and Caddo Lake both remained near to slightly above their normal elevations during the past year.



During 2004, additional water related projects were initiated within the Cypress Creek Basin. An instream flow analysis project intended to provide better data on the streamflows in small, ungaged watersheds was initiated. In addition, based on the results of the 2003 study of bacterial occurrence in Big Cypress Creek that showed Tankersley Creek to be a major source of fecal coliform

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Highlights Of the Cypress Creek Basin in 2004 cont.



“ The Cypress Creek Basin Summary Report, Which includes analysis of all water quality data obtained in the previous five years of monitoring, was completed in 2004”

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bacteria, an additional special study in the Tankersley Creek watershed was initiated to attempt to identify specific areas, facilities or land uses that are the major sources of bacteria.

The Northeast Texas Municipal Water District (NETMWD) has started the process of locating permanent monitoring devices in Lake O' the Pines in cooperation with the U. S. Corps of Engineers and the City of Longview. Potential benefits include more efficient operation of water treatment plants in response to changes in raw water quality, better management of taste and odor problems, and greatly increased monitoring of Lake O' the Pines water chemistry to better identify trends in improving or deteriorating quality.

Cypress Creek Basin Clean Rivers Program Stakeholders' meetings were held on March 31, and September 23, 2004. Major issues discussed during those meetings included sediment toxicity in Ellison Creek Reservoir, fish tissue contamination in Caddo Lake, and declining pH (increasing acidity) in east Texas waters. Ellison Creek Reservoir was included the first Draft 2004 303(d) list due to testing by Texas Commission on

Environmental Quality (TCEQ) that indicated chronic toxicity in sediment, presumably due to the presence of metals. Additional recent testing also found excessive levels of poly-chlorinated biphenyls (PCB's) in several of the fish tested from that water body. A representative of Lone Star Steel made a presentation about these problems, the methods and extent of the testing performed, and commented as to why they felt the listing should be reexamined. TCEQ has agreed to additional testing of toxicity in sediments and is working with the Texas Department of State Health Services to develop additional sampling of fish tissue in Ellison Creek Reservoir.

TCEQ announced the results of an extensive fish tissue-sampling program on Caddo Lake that focused on potential problems with metals, perchlorate, and dioxin originating at the Longhorn Ammunition Plant. The overall conclusion of the study was that mercury levels in edible fish tissue do not appear to have changed significantly, and remain a problem, but that Longhorn Ammunition Plant did not appear to be causing that problem or have any other significant effect on edible fish. TCEQ also studied pH levels in Caddo and other East Texas waters and

concluded that there was no evidence of declining pH levels in Caddo Lake or in the other waters included in the study.

The Cypress Creek Basin Summary Report, which includes analysis of all water quality data obtained in the previous five years of monitoring, was completed in 2004. This report found that low dissolved oxygen concentrations occur in stream and marginal reservoir habitats throughout the Cypress Creek Basin. In most locations, the low dissolved oxygen concentrations are associated with low flow conditions and with high levels of photosynthesis and respiration. Except for ammonia, nutrient concentrations in streams rarely exceeded TCEQ screening levels during the report period, but concentrations were still usually high enough to result in excessive algal growth under low flow conditions, or in impoundments. The largest nutrient amounts were observed originating from the Tankersley Creek Watershed, and to a lesser extent, from other tributary watersheds in the upper part of the basin, for example, Prairie and Lilly Creeks, and the tributaries to Lake Cypress Springs and Lake Bob Sandlin. The Southwest Wastewater Treatment Plant in Mount Pleasant,

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Highlights Of the Cypress Creek Basin in 2004 cont.

(Continued from page 2)

which processes wastewater from the Pilgrim's Pride Corporation poultry processing facility, is the source of a large part of the nitrogen and phosphorus load in Segment 0404 of Big Cypress Creek.

The upper reservoirs on Big Cypress Creek are continuing to incorporate the phosphorus loads entering them. The stations immediately downstream of Lake Bob Sandlin and Lake O' the Pines exhibit much lower total phosphorus concentrations than the inflowing waters with comparable, or lower, flows. The lack of water quality data from Twelve Mile Bayou prohibits any firm conclusions concerning nutrient incorporation in Caddo Lake, although estimated nutrient loads do not appear to be as great as those entering Lake O' the Pines.

During 2004, NETMWD received funding from the Texas State Soil and Water Conservation Board to conduct activities that follow up on the findings and recommendations of the Total Maximum Daily Load study conducted on the Lake O' the Pines Watershed which concluded in 2003. These activities include evaluations of the effectiveness of the management programs instituted at poultry production facilities and litter application sites in retaining nutrients (primarily phosphorus) on

the land, and repair or replacement of malfunctioning on-site sewage disposal facilities (septic tanks).

Despite the widespread occurrence of low dissolved oxygen concentrations and elevated nutrient levels, biological communities in streams throughout the Cypress Creek Basin continue to exhibit the structure appropriate to, or better than that expected based on the quality of the habitat at those locations. To the extent that low dissolved oxygen concentrations are associated with low flow conditions, it is likely that aquatic communities in the Cypress Creek Basin are, to some extent, adapted to tolerate conditions that occur at least occasionally during summer conditions even in minimally disturbed streams. Locally, low pH values, toxicity in water and sediments, and mercury in fish tissues appear to be phenomena associated with the lower portion of the Cypress Creek Basin, primarily Big Cypress Creek below Lake O' the Pines and Caddo Lake.

During 2004, the U.S. Army relinquished control over most of the 8,500-acre Longhorn Army Ammunition Plant to the U.S. Fish and Wildlife Service to be operated as a wildlife refuge and provide additional public primitive recreational access. The Army has dismantled miles of railroad tracks and steam pipes in

addition to the buildings, barracks and bunkers before the transfer. In addition, a total of about \$82 million was spent by the army on the cleanup of the site, which primarily included pumping and treatment of contaminated groundwater. It is estimated that an additional \$23 million is needed to complete cleanup of the site.

Recommendations to address issues include:

1. Focus on 24-hour dissolved oxygen monitoring to investigate the frequency of daily dissolved oxygen changes to help define the causes of problems.
2. Investigate the apparent increase in ammonia concentrations in Frazier Creek, a minimally disturbed stream that is an ecoregion reference.
3. Given the characteristics of the lower watershed, assess the relative importance of rainfall pH versus groundwater inflows following percolation through forest soils.
4. Continue studies to determine the sources of bacteria in the Cypress Creek Basin.



Overview Of Water Quality Monitoring Fiscal Year 2004 Monitoring within the Cypress Creek Basin



“ High Levels of nutrients can cause excessive plant growth which can lead to reduced dissolved oxygen in the waterbody, in turn this can reduce the ability of fish to survive.”

Assessment and management of water quality within the Cypress Creek Basin is dependant on appropriate and accurate data. Water quality monitoring and data collection is an integral part of the state Clean Rivers Program (CRP). Cypress Creek Basin monitoring is made possible through a cooperative program directed by Northeast Texas Municipal Water District (NETMWD).

Sampling locations within the basin contain five types of monitoring. These monitoring types include: 1) Routine, 2) Intensive/Systematic, 3) Special Study, 4) Flow and 5) Diel sampling, and are described in the paragraphs below. Each type of monitoring has its own set of parameters, which are the items measured associated with each sample.

What are the Different Water Quality Parameters?

(Please see the Monitoring Parameters Table on Page 5)

Field Parameters provide information about the physical and chemical water quality characteristics that can be measured on-site. These generally include: dissolved oxygen (DO), conductivity, pH, temperature, stream flow, flow severity, secchi disc depth, and field

observations and conditions.

What is Dissolved Oxygen and why is it Important? Dissolved oxygen (DO) indicates the amount of oxygen available in the stream. Certain minimum concentrations are needed to support aquatic life. DO can be reduced by a number of factors such as elevated water temperatures and the presence of organic substances that require oxygen for decomposition (e.g., plant debris and wastewater effluent).

Conventional Parameters are chemical and biological components in water that typically require laboratory analysis. These parameters generally include: several forms of nitrogen, phosphorus, bacteria, chlorophyll-a, total dissolved solids, and total suspended solids.

Why do we collect nutrients? To determine compliance with water quality levels set by the TCEQ to protect human health and to determine if there is an abnormal level of nutrients. High levels of nutrients can cause excessive plant growth which can lead to reduced dissolved oxygen in the waterbody, in turn this can reduce the ability of fish to survive. In addition, at certain levels nutrients are a threat to human health and can result in taste and odor problems in drinking

water.

Metal Parameters are measured to evaluate the potential for exposure to toxic concentrations of metals. Metal parameters generally include: aluminum, arsenic, chromium, copper, nickel, silver, zinc, barium, molybdenum, calcium, selenium, iron and manganese.

Biological and Habitat Evaluations are performed at stream stations that are wadeable, twice a year during the low flow period of summer. These measurements are used to evaluate the streams aquatic community composition, integrity, and appropriate aquatic life use. Included are sampling for benthic (bottom dwelling organisms), fish, and habitat characteristics. The better the water quality, the more diverse the aquatic community is expected to be, resulting in a higher evaluation score.

A detailed monitoring schedule for the Cypress Creek Basin, fiscal year 2005 is available by accessing the basin website at www.netmwd.com, and selecting Site Map, then Statewide Monitoring Schedule, and Cypress River Basin. In addition, a copy can be requested from the Northeast Texas Municipal Water District, P.O. Box 955, Hughes Springs, Texas 75656.

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Monitoring Parameters*

- Parameters analyzed at each station may vary depending on sampling entity

Field Parameters	Conventional Parameters	Metal Parameters In Water	Metal Parameters In Sediment	Biological and Habitat Evaluations
Temperature (°C) PH (Standard units) Dissolved Oxygen (mg/l) Depth Conductivity Streamflow Secchi Depth (clarity) 24 Hr Dissolved Oxygen	Total Suspended Solids (TSS) Total Dissolved Solids (TDS) Sulfate, Chloride Chlorophyll-a Ammonia-N, Pheophytin E. coli, Alkalinity-total Hardness-total Nitrate-N, Nitrite-N O-phosphate-P Total Phosphate-P Total Organic Carbon Total Kjeldahl N	Aluminum, dis. Arsenic, dis. Chromium, dis. Copper, dis. Nickel, dis. Silver, dis. Zinc, dis. Barium, dis. Molybdenum, dis. Calcium, total Selenium, total Iron, total Manganese, total	Aluminum, Arsenic Barium, Cadmium Chromium, Copper Lead, Manganese Nickel, Selenium, Silver, Zinc, Molybdenum, Mercury Total Phosphorus Total Organic Carbon Total Kjeldahl N % Grain Size Oil and Grease Acid Volatile Sulfide Solids in Sediment	Benthic Organisms (those that live near or in the stream bottom including insects, snails and worms) Nekton Organisms (fish) Physical Habitat Characteristics (flow, slope, depth, substrate, etc)

Routine station monitoring is primarily used to expand and maintain the long-term water quality database. The focus of this monitoring is to improve our ability to follow trends and to identify water quality changes in the major watersheds of the Cypress Creek Basin. Routine station locations are chosen to provide information on each of the nine classified segments (numbered 0401-0409) and Black Cypress Bayou (a major unclassified sub-basin within the Cypress Creek Basin). A map showing the location of these watersheds within the Cypress Creek Basin can be found within this report. In fiscal year 2004, there were a total of 30 routine stations monitored within the Cypress Creek Basin. Parameters sampled at these stations included metals in water, conventional and field parameters, bacteria and flow. Biological sampling occurred at one routine station during FY2004.

Intensive/Systematic

monitoring is a screening tool used to investigate areas of known concerns and detect areas of potential concern. The results of biological monitoring are a key factor in the selection of areas for potential intensive monitoring. These stations are typically placed on the smaller, unclassified streams that would not normally be evaluated in a fixed monitoring program. The monitoring schedule of this type of station is based on a five-year-cycle, with one group of stations monitored each of five years. Complete coverage of the basin is the final goal at the end of the five-year rotation. In the Cypress Creek Basin during FY2004 there were fourteen intensive/systematic stations monitored. These stations were located in segments 401 (Caddo Lake), 402 (Big Cypress Creek below Lake O' the Pines), 405 (Lake Cypress Springs), 407

(James Bayou) and 409 (Little Cypress Creek), with the majority of the sampling occurring in segment 409. Included in this sampling were metals in water, conventional parameters, bacteria, flow and field parameters. Biological evaluations were completed at six of these stations.

Special Study sampling is planned to address a specific concern or to provide additional data necessary to complete existing information. Assessment of data collected within the Cypress Creek Basin indicated an elevated level of bacteria in the Tankersley Creek area. Initiated in September 2004, the Tankersley Creek Bacterial Source Tracking Special Study was designed to determine potential bacteria sources. This study focuses on the importance of contributing

(Continued on page 6)



“Special Study sampling is planned to address a specific concern or to provide additional data necessary to complete existing information.”

Overview Of Water Quality Monitoring Fiscal Year 2004 Monitoring within the Cypress Creek Basin Cont.

non-point sources found in the tributaries of Tankersley Creek upstream of FM 127, compared with downstream location at and downstream of the Southwest Wastewater Treatment Plant. Twelve sites were sampled in this study during FY2004 for flow and field parameters.

Flow monitoring is utilized to support permitted discharger actions. Streamflows in the Cypress Creek Basin at six sites will be measured monthly upstream of selected permitted dischargers for at least 18 months. The information collected will be used to help the state establish appropriate permit limits based on site-specific characteristics.

Diel sampling involves multiple field measurements conducted over a 24 hr period, by an electronic sampling probe. This type of sampling usually includes Dissolved Oxygen (DO), temperature, conductivity and pH measurements. Diel sampling is frequently done where DO is a concern, and is conducted over a 24 hr period to eliminate potential interference from other data collection. The 24-hour minimum and maximum DO measurements are compared to the DO criteria to assign an aquatic life use. Sixteen sites were monitored for 24 hr DO during the past fiscal year.



Water Quality Data Review

The following discussion contains an overview of the water quality data available for the Cypress Creek Basin and recommendations proposed to address the identified issues. A watershed approach is used within the basin to identify and attribute water quality trends within a specific area. Watersheds as defined in this report consist of one or more segments (classified water bodies) or subwatersheds, (unclassified or tributary water bodies) which drain to a common body of water. These watersheds are grouped to reflect major changes in habitat and water quality within the basin. A map showing the watersheds within the Cypress Creek Basin is contained within this report.

Every two years, the state must assess the quality of their water and submit a report to the EPA (Environmental Protection Agency) detailing the extent to which each water body in the state meets water quality standards. The TCEQ (Texas Commission on Environmental Quality) publishes this assessment as the Texas Water Quality Inventory and 303(d) List. This document essentially has two main parts: the Texas Water Quality Inventory, which gives the status of all the waters in the state, and the 303(d) List, which identifies waters that do not meet one or more of the standards set

for their use.

The DRAFT 2004 Texas 303(d) List (November 23, 2004) currently identifies eleven bodies of water with concerns for one or more measured parameters in the Cypress Creek Basin. These include Caddo Lake (0401), Harrison Bayou (0401A), Big Cypress Creek Below Lake O' the Pines (0402), Black Cypress Bayou (0402A), Lake Daingerfield (0402D), Lake O' the Pines (0403), Big Cypress Creek Below Lake Bob Sandlin (0404), Tankersley Creek (0404B), Black Bayou (0406), James' Bayou (0407) and Little Cypress Bayou (0409).

James/Black Bayou Watershed

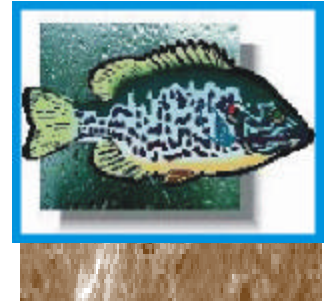
The James/Black Bayou Watershed includes the drainage basins of James Bayou (0407) and Black Bayou (0406) as well as the Paw Paw and Cross Bayous (0400). The James/Black Bayou Watershed consists mainly of forested (81%) hills, where landscapes typically are composed of wide, flat, heavily wooded bottomlands along the major streams, and sandy clay upland hills crossed by small intermittent streams. Agricultural lands total only 16.5% of the James/Black Bayou Watershed, and are much more common in Black Bayou than James Bayou. Woodlands cover at least 90% of the James

Bayou Watershed and the riparian woodland contained in this area is continuous and well developed. There are no large reservoirs located in this watershed.

There is a state superfund site at a plating facility (Double R Plating Company) above the City of Atlanta near the headwaters of Black Bayou and a federal superfund site involving a truck cleaning facility (Stewco, Inc.) near the City of Waskom in the Paw Paw Bayou subwatershed. Permitted dischargers in this watershed include six municipal treated wastewater sites and one industrial discharge site from a lumber facility. The three major population centers in this watershed, the City of Linden, the City of Atlanta and the City of Waskom all contain populations of less than 10,000.

Both Black and James Bayous are included on the Draft Texas 2004 303(d) List for depressed dissolved oxygen concentrations, and James Bayou is also listed for dissolved copper in the upper 25 miles of the segment. Trend analysis of data from the last five years shows both James Bayou and Frazier Creek exhibiting increasing concentrations of ammonia-nitrogen.

In spite of low summer dissolved oxygen episodes, aquatic life uses



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“ Large areas of the upper portion of Lake O’ the Pines and the floodplains surrounding Big Cypress Creek and its major tributaries contain widespread forested wetlands.”

Water Quality Data Review cont.

in this watershed as measured by fish and macroinvertebrate rapid biological assessments (RBA) usually meet or exceed the biological community expectations set by the ambient habitat and water quality conditions. A rapid bioassessment was conducted on Beach Creek in the James/Black Bayou Watershed in FY2004. The resulting habitat, nekton, and benthic community scores were all determined to be high. Intensive sampling at this station in 2004 included bacteria, 24 hr dissolved oxygen, flow and conventional sampling. Data received from this station had no unusual values.

Black Cypress Bayou Watershed

The Black Cypress Bayou Watershed (Segment 0402A) is located in the upper central portion of the Cypress Creek Basin. This watershed area is not a designated segment but a major perennial tributary of Big Cypress Creek, a water body that does cease flowing at times. There are no large reservoirs located in this watershed.

This watershed exhibits relatively little urban and agricultural development and is largely forested with native pines. The dominant land use is forest (74%), with agricultural use and clearing, particularly in the northwestern portion, occupying about 24% of the watershed. The few urban areas include the cities of

Hughes Springs and Avinger, both with a population of under two thousand. The only permitted dischargers located in the Black Cypress Bayou Watershed are four municipal wastewater treatment facilities.

As is common in the forest streams of the region, Black Cypress Bayou is characterized by nearly neutral pH, and low to moderate conductivity and Total Dissolved Solids. Although average dissolved oxygen concentrations are generally adequate in Black Cypress Bayou and its tributaries, aquatic life uses may be impacted where lower dissolved oxygen conditions are common. The Draft 2004 Texas Water Quality Inventory describes the status of Aquatic Life Use in Black Cypress Bayou as partially supporting due to depressed dissolved oxygen concentrations in all but the middle 13-mile section. Metals in water are a limited data use concern in the lower 15 miles of the water body and in Pruitt Lake. In addition, there is a concern with mercury in fish tissue and metals in sediments in Pruitt Lake. Although the overall human health criteria are fully supported, there is a limited consumption advisory for fish taken from this water body.

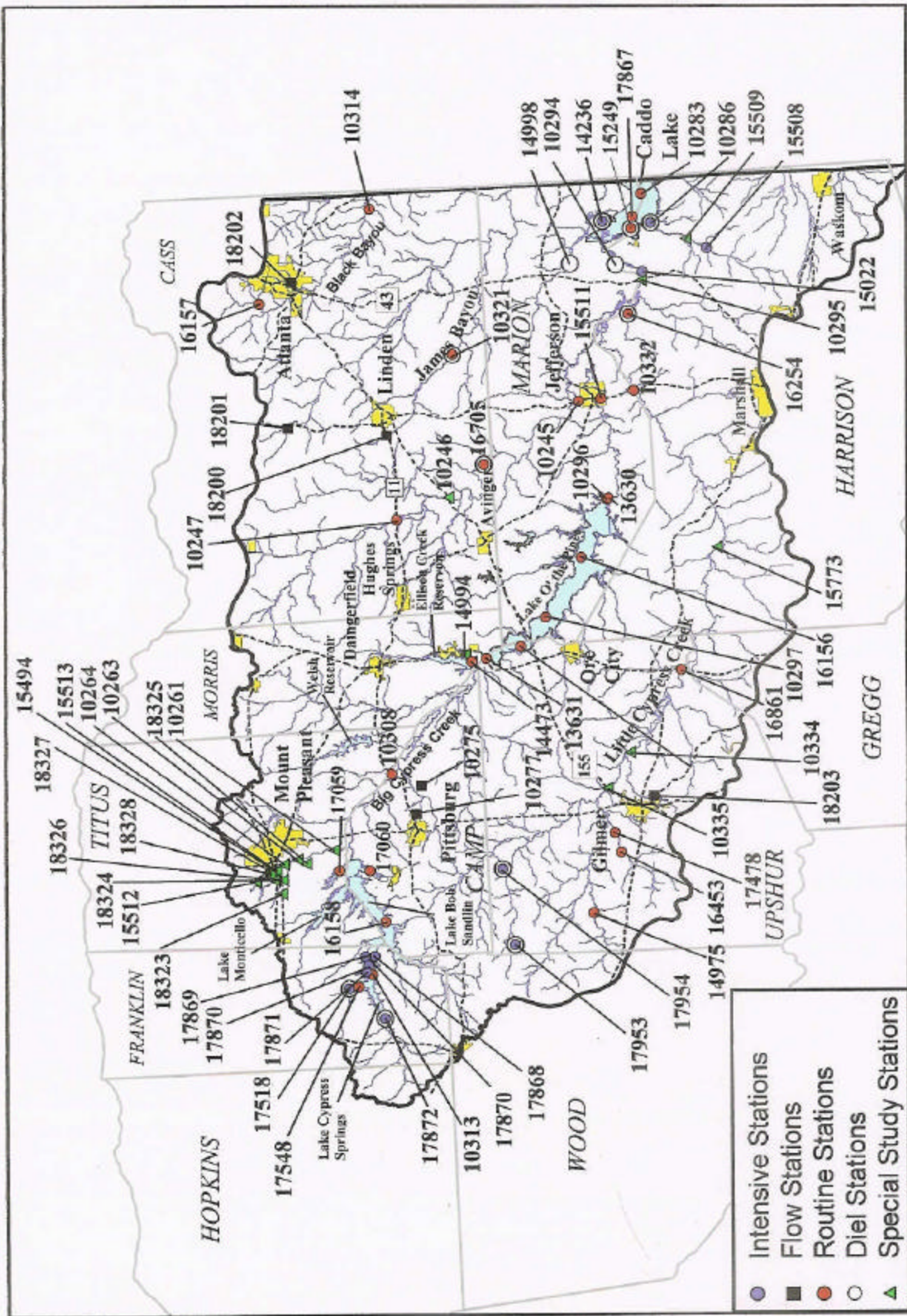
The Lake O’ the Pines Watershed encompasses Lake O’ the Pines (Segment 0403) and its immediate tributaries, the reach of Big Cypress Creek upstream to Fort Sherman Dam (Segment 0404), Lake Bob Sandlin (Segment 0408), and Lake Cypress Springs (Segment 0405), and their tributaries. Four major tributary reservoirs, Lake Monticello, Welsh Reservoir, Ellison Creek Reservoir, and Johnson Creek Reservoir, have been constructed in this watershed to provide cooling water for steam-electric generating stations.

Large areas of the upper portion of Lake O’ the Pines and the floodplains surrounding Big Cypress Creek and its major tributaries contain widespread forested wetlands. The vegetation of the watershed is marked by a conversion from the extensive agricultural clearing of the western portion of the basin to the more densely forested eastern portion. Big Cypress Creek’s extensive floodplain is marked by numerous sloughs and depressions that tend to retain water following flood events. This floodplain is heavily wooded and undisturbed relative to the nearby uplands that are extensively used for livestock grazing and hay production.

This watershed exhibits the most intensive agricultural and urban development in

Lake O’ the Pines Watershed





Cypress Creek Basin-Clean Rivers Program
All Monitoring Stations FY2005

Water Quality Data Review cont.

the Cypress Creek Basin. Agricultural land uses occupy 40% and urban areas occupy 4% of the area respectively. These land uses are substantially more common in this watershed than in the other watersheds of the Cypress Creek Basin. Agricultural clearings occupy approximately 25% of the eastern half of the watershed but can reach amounts greater than 50% over large areas of the western half. The majority of intensive poultry operations are located in the upper subwatersheds near the cities of Pittsburg and Mount Pleasant.

Four industrial permitted discharger facilities are present in the watershed in addition to twelve domestic facilities and four power plants which discharge cooling water. The electric power production facilities are located on Lake Monticello and Welsh Reservoir in the upper watershed and Ellison Creek Reservoir and Johnson Creek Reservoir in the lower watershed. Shoreline residential development is present on Lake Cypress Springs and substantial low-density retirement and recreational residential development surrounds Lake O' the Pines. Urban concentrations of over 10,000 persons occur at Mount Pleasant, with lesser populations in Pittsburg, Daingerfield, Lone Star, and Ore City. There are two permitted hazardous waste sites, Lone Star

Steel and Southwestern Electric Power, located in the watershed just north of Lake O' the Pines.

No major water quality problems are evident in the open waters of Lake Cypress Springs; however, near-shore areas show substantial evidence of an increase in nutrients, particularly when tributary streams are flowing into the lake. Water quality in Lake Bob Sandlin closely resembles that in Lake Cypress Springs.

Segment 404 had four sub segments assessed in 2004: 0404A, Ellison Creek Reservoir; 0404B, Tankersley Creek; 0404C, Hart Creek, and 0404D, Welsh Reservoir. Lake O' the Pines was initially listed on the Texas 2000 303(d) list for depressed dissolved oxygen, and is currently listed on the DRAFT 2004 303(d) List for the same issue in the upper 3700 acres of the lake. Big Cypress Creek (0404), and Tankersley Creek (0404B) were also included as a result of bacteria levels that are sometimes over the level set to protect contact recreation. Discussion of a Special Study initiated to address this issue is contained in the Special Study section of this report. The DRAFT 2004 Texas Water Quality Inventory includes Ellison Creek Reservoir with concerns about metals in sediment in the southeast part of the reservoir near the Lone Star Steel facility and Polychlorinated biphenyls

in fish tissue. Preliminary data for metals in sediment and fish tissue have led to the State proposing more monitoring for this reservoir. In addition, the Texas Department of State Health Services will conduct a survey of fish in this reservoir in 2005 to determine if there is any risk from contaminants in fish tissue to humans who eat fish from the lake. As a follow-up to the Tankersley and Hart Creek Special Study conducted in the last fiscal year, a new special study was initiated to study the elevated bacterial levels on Tankersley and Hart Creeks to try and narrow down the possible sources of elevated bacteria levels.

Intensive/Systematic monitoring was conducted in segment 0405 (Lake Cypress Springs) during fiscal year 2004. For the second year, E. coli bacteria samples were taken at three Lake Cypress Springs parks during the high summer use period to monitor their levels, with no unacceptable results. Frog Creek at Lake Cypress Springs was sampled for bacteria, metals in water and sediment, conventional and field values. Laboratory results from this sampling indicated that additional sampling for bacteria and nutrients were warranted at this site. Sampling at this station was discontinued for FY2005, however a special study may be scheduled for it in 2007. Rapid bioassessment

sampling occurred at Blair Creek along with metals in water and flow. Laboratory results did not indicate any unusual values, and the resulting scores for the aquatic community at this station were high, indicating the aquatic life use is fully supported.

The Lake O' the Pines Watershed TMDL (Total Maximum Daily Load) Project was initiated in the Lake O' the Pines Watershed in response to water quality concerns within the watershed. Lake O' the Pines was determined to have impaired water quality, consequently a TMDL project was instituted. This monitoring was administered through the TCEQ and its TMDL program. The TMDL monitoring program consisted of base flow and wet weather stream flow monitoring within the Lake O' the Pines Watershed. This project has been completed, and implementation plans based on this report have been proposed.

Little Cypress Creek Watershed

The Little Cypress Creek Watershed forms much of the southern boundary of the Cypress Creek Basin. It includes the entire drainage area of Little Cypress Creek (Segment 0409). Little

(Continued on page 11)

Water Quality Data Review cont.

Cypress Creek tends to

exhibit long periods of low flow interrupted by rainfall-runoff events that result in flooding of its broad, heavily wooded floodplain. The Little Cypress Creek Watershed is largely forested with native pines, but is also home to significant agricultural operations.

Agricultural land use (35%) is similar to that of the other watersheds of the Cypress Creek Basin. Conventional agricultural operations (e.g., livestock grazing, improved pasture) are more uniformly distributed across the watershed, while intensive operations such as poultry production and confined cattle feeding facilities are concentrated in the upper areas of the watershed. No large reservoirs or lakes are present on Little Cypress Creek. Two reservoirs constructed on tributaries include Ferndale Lake on South Lilly Creek, and Lake Gilmer on Kelsey Creek.

Urban areas are essentially limited to the City of Gilmer and a portion of the City of Marshall, both with populations of fewer than 30,000. Two permitted hazardous waste sites are located near Marshall Monarch Tile Manufacturing Inc., and Witco Chemical. In addition, there is a state superfund site at Marshall Wood Preserving. There are nine permitted dischargers in the Little Cypress Creek Watershed, including five

domestic, and three industrial wastewater dischargers, and one permitted power plant.

Segment 0409 was placed on the DRAFT 2004 Texas 303(d) List for dissolved oxygen concentrations in the lower and middle reaches where dissolved oxygen levels were below those established to protect a high aquatic life.

During FY2004, Intensive/systematic sampling occurred within this watershed. South Lilly Creek was sampled at two sites to address concerns regarding nutrient and organic loading in the creek. These concerns were initiated by a separate sampling project that was done to study possible impacts of a large egg producing facility near this creek. The water monitoring provided data that showed the nutrient and organic loading in Lilly Creek were at a high level. This is the last year of a private three-year monitoring contract designed to look at nutrient and organic levels in this creek, however this monitoring will be funded through FY2006 to continue to track loading. In addition, rapid bioassessment and metals in water sampling were conducted at South Lilly Creek at FM 2454, South Lilly Creek at Woodchuck Rd., and Little Cypress Bayou at SH155 during FY2004. The resulting biological evaluation scores for all

three stations were in the intermediate/high level, which supports the expected aquatic life use most of the time. Metals sampling revealed no unusual values.

Caddo Lake Watershed

The Caddo Lake Watershed includes Caddo Lake (Segment 0401) and the segment of Big Cypress Creek (Segment 0402) below Lake O' the Pines dam. The Caddo Lake Watershed consists mainly of forested hills (81%). Vegetation of the Caddo Lake Watershed bottomland includes native pines, hickory, and cypress trees.

The Caddo Lake Watershed exhibits little agricultural land use at 10% of the watershed. Although there is substantial retirement and recreational development located in the Caddo Lake watershed, 88% of the total land use consists of forest, wetland and water. Both an industrial hazardous waste site and a federal superfund site are located at the Longhorn Army Ammunition Plant on the southwestern shore of Caddo Lake.

Caddo Lake was one of the largest natural lakes in the south prior to the construction of its dam. The upper half of Caddo Lake is wide, shallow and swamp-like. The ecosystem of Caddo Lake is more diverse than that of reservoirs in the other

watersheds, due in part to the wide, shallow and highly productive nature of the lake.

There is one treated domestic waste permitted discharger located in the Caddo Lake Watershed. Although this is the only permitted discharger in the watershed, the City of Jefferson discharges treated wastewater into Black Cypress Bayou just upstream of its confluence with Big Cypress Creek. Urban centers in the watershed include Karnack, Uncertain, and Jefferson all with populations of less than 3,000.

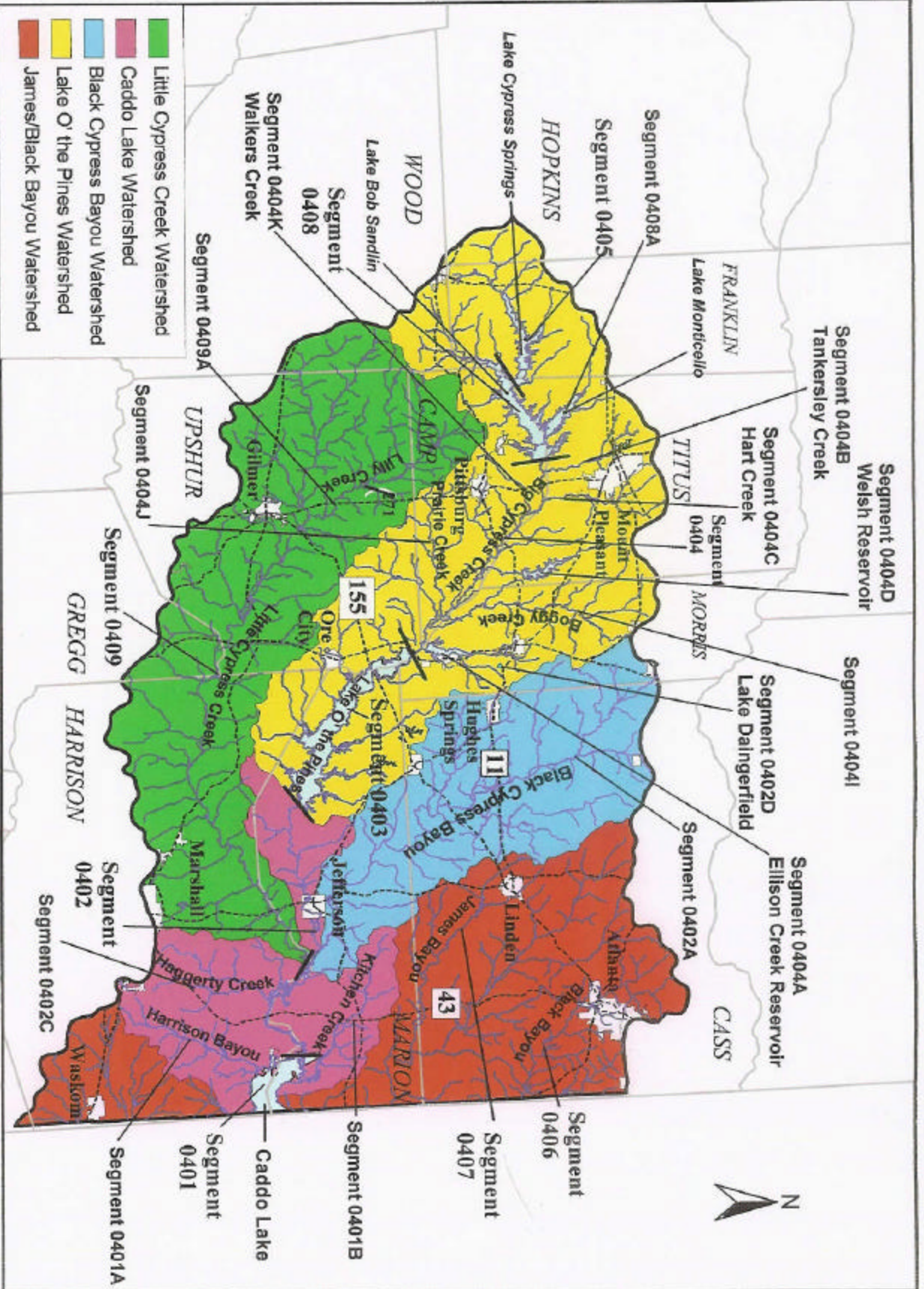
Intensive/systematic monitoring within Segment 0401 was conducted in FY2004 at three stations. Only 24-hr dissolved oxygen samples were recorded at Carter Lake, however monthly bacteria and field samples were collected near the mouth of Harrison Bayou and at Clinton Lake. Bacteria levels recorded from this sampling were within acceptable limits.

Segment 0401 has been identified as not supporting the aquatic life use as a result of depressed dissolved oxygen concentrations in the DRAFT 2004 Texas Water Quality Inventory. In addition, segments 0401 and 0402 have some areas that are of concern due to low pH.

(Continued on page 13)



- █ Little Cypress Creek Watershed
- █ Caddo Lake Watershed
- █ Black Cypress Bayou Watershed
- █ Lake O' the Pines Watershed
- █ James/Black Bayou Watershed



Cypress Creek Basin
 Segments With Water Quality Issues
 Mentioned on the DRAFT 2004 Texas Water Quality Inventory and 303(d) List

Water Quality Data Review cont.

(Continued from page 11)

The DRAFT 2004 Texas 303(d) List indicated that dissolved lead concentrations exceeded the chronic criterion in the upper seven miles of Segment 0402, and mercury in fish tissue is a concern in Segment 0401. As a result of the Texas Department of Health consumption advisory due to mercury in fish tissue, the entire length of Segment 0401 is listed as partially supporting fish consumption use.

In addition, the TCEQ continuously monitors water quality parameters in real-time at two stations in

Caddo Lake. "Real-time" means that the data collected in the field is reported almost simultaneously to the TCEQ, so the agency knows almost immediately about changes in surface water quality in this watershed. Since October 2003 these automatic stations have collected dissolved oxygen, conductivity, temperature and pH data in the transitional and open water areas of Caddo Lake. Additionally, precipitation and pH data are being collected to support the ongoing efforts of a Total Maximum Daily Load (TMDL) to address air-

deposited mercury in the water body and mercury in fish tissue resulting from the mercury deposition. A link to the continuous water quality monitoring stations provided by TCEQ is on our webpage at www.netmwd.com.

Watershed Recommendations:

Focus 24-hour dissolved oxygen monitoring on locations with inadequate samples for analysis.

Utilize 24-hour dissolved oxygen monitoring to investigate the dynamics of daily dissolved oxygen

changes to help define the causes of problems.

Investigate the apparent increase in ammonia concentrations in Frazier Creek, a minimally disturbed stream that is an ecoregion reference.

Given the characteristics of the lower watershed, assess the relative importance of rainfall pH versus groundwater inflows following percolation through forest soils.

Continue studies to determine the sources of indicator bacteria in the Cypress Creek Basin.

Special Studies

Special studies are additional water monitoring projects designed to address a specific concern or to provide additional information as a result of a previous monitoring effort or a current issue affecting water quality. Several special studies produced within the Clean Rivers Program have been conducted in the Cypress Creek Basin in the past few years. The focus of these studies has been the improvement of water quality within the basin, and documentation of watershed conditions both current and historical. As part of the Texas Clean Rivers Program, these special studies deal with specific water quality issues or are used to support other programs (e.g., Total Maximum Daily Load development)

addressing water quality issues in the basin. An important indicator of the possible need for a special study within an area is the 303(d) List produced by the State. This list identifies waters for which preventive measures are not sufficient to achieve water quality standards. Water quality and associated studies completed or in progress in the last few years within the Cypress Creek Basin include the following:

Tankersley Creek Indicator Bacteria Special Study, Upper Big Cypress Creek Watershed

Tankersley Creek was placed on the TCEQ's 2000 303(d) list for exceeding bacteria levels established for safe contact recreation and remained

on the 2002 303(d) list due to insufficient bacteriological data. It was suggested by the Texas Commission on Environmental Quality (TCEQ) and local Cypress Creek Basin stakeholders that additional sampling be conducted to confirm or challenge the 2002 listing. A 12-month special study of the bacteriological water quality on the upper Big Cypress Creek including Tankersley Creek was conducted during FY2003 to determine if the impairment was warranted. There existed a need to document the comparability of the fecal coliform results that resulted in the Tankersley Creek 303 (d) listing with the E. coli sampling that will be used as the water quality standard in the future. In addition, this



“ Several special studies produced within the Clean Rivers Program have been conducted in the Cypress Creek Basin in the past few years.”

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Special Studies cont.



“Sample locations were selected to provide information on the relative importance of urban/rural sources and the presence of central wastewater collection and treatment facilities.”

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indicator bacteria sampling would be utilized to build a comparable *E. coli* and Fecal coliform database, and provide information on the origin and occurrence of these two species. Special study recommendations included a wider geographical coverage for future sampling, and investigation of the relationship between runoff events and bacteria levels.

The study was initiated and monitored under dry and wet weather conditions with the goal of obtaining a broader assessment of the bacterial water quality conditions in the two primary streams draining the Mount Pleasant, Texas area and of the reach of Big Cypress Creek receiving that drainage. Bacteria levels were found to be elevated in Tankersley Creek even during non-run off events. The results of this special study supported the 2002 303(d) listing of Tankersley Creek in terms of distribution but did not determine the possible sources. Therefore, a new special study, the Tankersley Creek Bacterial Source Tracking Special Study was developed to further characterize the bacteriological water quality in relation to land use type in the upper reaches of Tankersley Creek.

Tankersley Creek Bacterial Source Tracking Special Study

Sample locations were

selected to provide information on the relative importance of urban/rural sources and the presence of central wastewater collection and treatment facilities. The Tankersley Creek Bacterial Source Tracking Special Study was designed to include a large number of site sampling locations to obtain results that are representative of the upper reach of the Tankersley Creek Watershed. Monthly sampling for one year will be conducted at all the special study stations in order to account for variations in variables such as season, temperature and flow.

This special study focuses on *E. coli* bacteria monitoring at those locations deemed to have a likelihood of being impacted and selects sample stations based on criteria which include sites with road accessibility, sites near industrial or domestic discharges and areas that may potentially receive high non-point source loads. Sampling for this study began in May of 2004 and will continue throughout the twelve month scheduled study period.

Targeted Flow Monitoring

The TCEQ uses the seven-day, two-year low-flow (7Q2) and the harmonic mean flow to calculate water-quality based effluent limits and to establish testing

parameters in wastewater discharge permits. The TCEQ often has very little site-specific flow information upon which to base the 7Q2 and harmonic mean flow, and the uncertainty in these flows carries through to the permit limit calculations and the testing requirements. The TCEQ has identified seven sites at which flow information would improve the quality of permit limits and conditions. The targeted flow monitoring study was initiated based on these site locations.

In March 2004, NETMWD implemented a targeted monitoring in-stream flow study at six receiving streams recommended by the TCEQ Permitting Section. The monthly monitoring will continue for 18 months and a final report will be submitted to the TCEQ upon completion of the study. Flow measurements, field parameters, recorded observations and photos will be included in the report. Stream discharge will be monitored monthly from March 2004 through August 2005 to help characterize flow conditions for the permitting process and address the information available for seven permit holders. This monitoring will allow the TCEQ to better characterize the flow regime of receiving streams, and determine the 7Q2 and the harmonic mean flow. Use of this information will help to set more accurate permit discharge limits.

Public Outreach

The focus in the Cypress Creek Basin public outreach efforts is the encouragement of public involvement concerning the Clean Rivers Program and other basin activities. This involvement is important to the development of support for the program, and a means of gathering recommendations from the public. The public can get involved in these actions either through the steering committee meetings or volunteer activities.

The primary purpose of our website www.netmwd.com is to provide the citizens of our basin and other interested parties a useful tool which focuses on the Cypress Creek Basin. The Northeast Texas Municipal Water District (NETMWD) is the Cypress Creek Basin Partner with the Texas Commission on Environmental Quality (TCEQ) in the statewide Clean Rivers Program. Under this program NETMWD has assumed a portion of the responsibility for monitoring the water quality and ecosystem health in the rivers and lakes of the Cypress Creek Basin. Information obtained through this monitoring is critical to understanding how our waterways respond to human activity. Monitoring is the primary source of information utilized by those responsible for managing water quality. Members of the community interested in the health of the basin, will find this monitoring

data available to them on the NETMWD Clean Rivers website. Included within our site is a summary of the Clean Rivers work plan, current information on water monitoring, water data, basin maps, and special study information in addition to other resources. Our goal is to provide a readily available resource of information to the public, which we hope will in turn encourage citizens of our basin to reach out and get involved in their local environmental issues.

Included in our website, are several key elements that help define our goals and provide current information to the public.

These elements include:

Public Participation and Outreach: Volunteer monitoring activities, events, newsletters, special studies activities, and meetings dates with agendas are posted regularly on our website. It is hoped that increased public involvement will result in more public awareness and a larger sense of community responsibility. More volunteerism in our basin is another important basin goal. Organizations such as Texas Watch and TCEQ host statewide and regional meetings, and partner certification training, special events and projects that are designed to aid in increasing public awareness and involvement. Contact

information for these events is easily found on the www.netmwd.com site map. Questions or comments concerning any information found on the website are always welcome. Look for the NETMWD staff during Captain Daingerfield Day in October; for the last three years we have entered our Clean Rivers Chili in the cook-off to increase public awareness of our basin!

Basin Steering Committee Meetings:

Held at least once a year, the steering committee meeting announcements and minutes are updated regularly on our website. Meeting agendas are structured to promote public involvement and serve as a review of achievable water quality objectives and priorities for the basin. Steering Committee meeting minutes are available from the homepage or the site map. Open to the public, these meetings are designed to be forums for public comment and input on water quality issues.

Texas Watch: Is prominently presented within the NETMWD website. Through community action projects, Texas Watch helps communities with strategies that encourage actions focused on correcting environmental problems. Some of these strategies include trash clean-ups, stream bank stabilization, and storm drain stenciling.



“Texas Watch helps communities with strategies that encourage actions focused on correcting environmental problems.”

Public Outreach cont.

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Assistance with the assessment of water quality information is also available on a limited basis, and is generally focused in areas where interest in environmental problems will possibly inspire citizens to create positive change. Texas Watch may also help communities with data screening, data analysis, and problem identification within these selected target areas.



“ Find Programs and grants for pollution control and recycling.”

The NETMWD Water Protection Program Website www.cypresscreekbasin.com: Created with a link to our Clean Rivers Website (netmwd.com), this webpage is devoted to specific information regarding the protection of water quality and the associated activities of various entities within the Cypress Creek Basin. With the ever-increasing recognition of the importance of water as a valuable resource, the district and other entities in the Cypress Creek Basin are pursuing ways to protect these

resources. This site also includes information on the district's programs and other current water quality projects active or being implemented in our basin.

Quality Assurance: To the greatest extent possible, the data produced by the Clean Rivers Program (CRP) is of the highest quality required for its intended use. The Quality Assurance Project Plan (QAPP) includes a series of checks and balances that are used in the operation of all CRP activities. The site map on www.netmwd.com provides current information regarding several aspects of Quality Assurance Project Plan.

Water Quality Monitoring: Utilize the site map found on www.netmwd.com and you discover Coordinated Monitoring schedules listing all the scheduled monitoring being done in the current fiscal year.

Maps of all areas, which have been sampled on either past or present schedules, are updated regularly. Monitoring activities, events, special studies and meetings dates with agendas are available to increase public awareness and develop a larger sense of community responsibility. Current water quality data are posted at least quarterly, including specifics of the sampling station location and date sampled.

Data Analysis and Reporting: Compiled data, maps and reports are the result of the information we gather and evaluate. The most current as well as historical data can be viewed on www.netmwd.com. Special study reports such as The Study of Contaminates at Caddo Lake and Lake O' the Pines Nutrient Study can also be downloaded or printed from the www.netmwd.com website.

www.netmwd.com

Cypress Creek Basin Webpage

Ask yourself this question What watershed do I live in? Which streams and rivers in my watershed area are being monitored? Where can I find the current monitoring schedule? To whom can I direct environmental questions about the Cypress Creek Basin?

These are a few of the questions that are easily answered in a matter of minutes when you access

the Northeast Texas Municipal Water District (NETMWD) Clean Rivers Program website www.netmwd.com. Getting acquainted with the Cypress Creek Basin opens up a world of interest and concerns that we all have in common when it comes to our land and drinking water. Not everyone has time to donate towards state projects that span counties, towns and basins, however almost everyone has some time they can devote to

gathering information about their own local area. Our web site is intended to be a place where the public can access that information about NETMWD and the Cypress Creek Basin. The NETMWD website makes this task easier by providing updates on various projects being undertaken throughout the basin, and serving as a forum for public input.

Items available on the Cypress Creek Basin

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www.netmwd.com

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website include:

? **The site map:** All the information contained within the website is found on the site map. Click on the site map link on the homepage, it is easy to find your way through the site at this point.

? **Links to Texas Commission On Environmental Quality (TCEQ):**

TCEQ provides a current and historical record of all basin activity. TCEQ's water quality databases include maps, reports and future projects of all the ba-

sins in Texas.

? **Contact information:** Email, snail mail, we want to hear from you! We are here for your community's benefit!

? **Links to Texas Watch:** Find programs and grants for pollution control and recycling. Texas Watch provides many volunteer opportunities in your basin.

? **Steering Committee Meetings:** Attend a meeting or read the minutes recorded at the last meeting. The meetings are announced


a month in advance on the website.

Public speaking engagements and presentations: As members of the community you are encouraged to get involved and become aware of your environment.

If you have questions about the Cypress Creek Basin, our website is the place to start. Current maps, reports and calendar of events are continually updated. The Cypress Creek Basin website serves as an accessible tool for you to use at your convenience



Annual Chili Cook-off at Daingerfield 2004



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