Guadalupe River Basin

Basin Highlights Report - Spring 2007

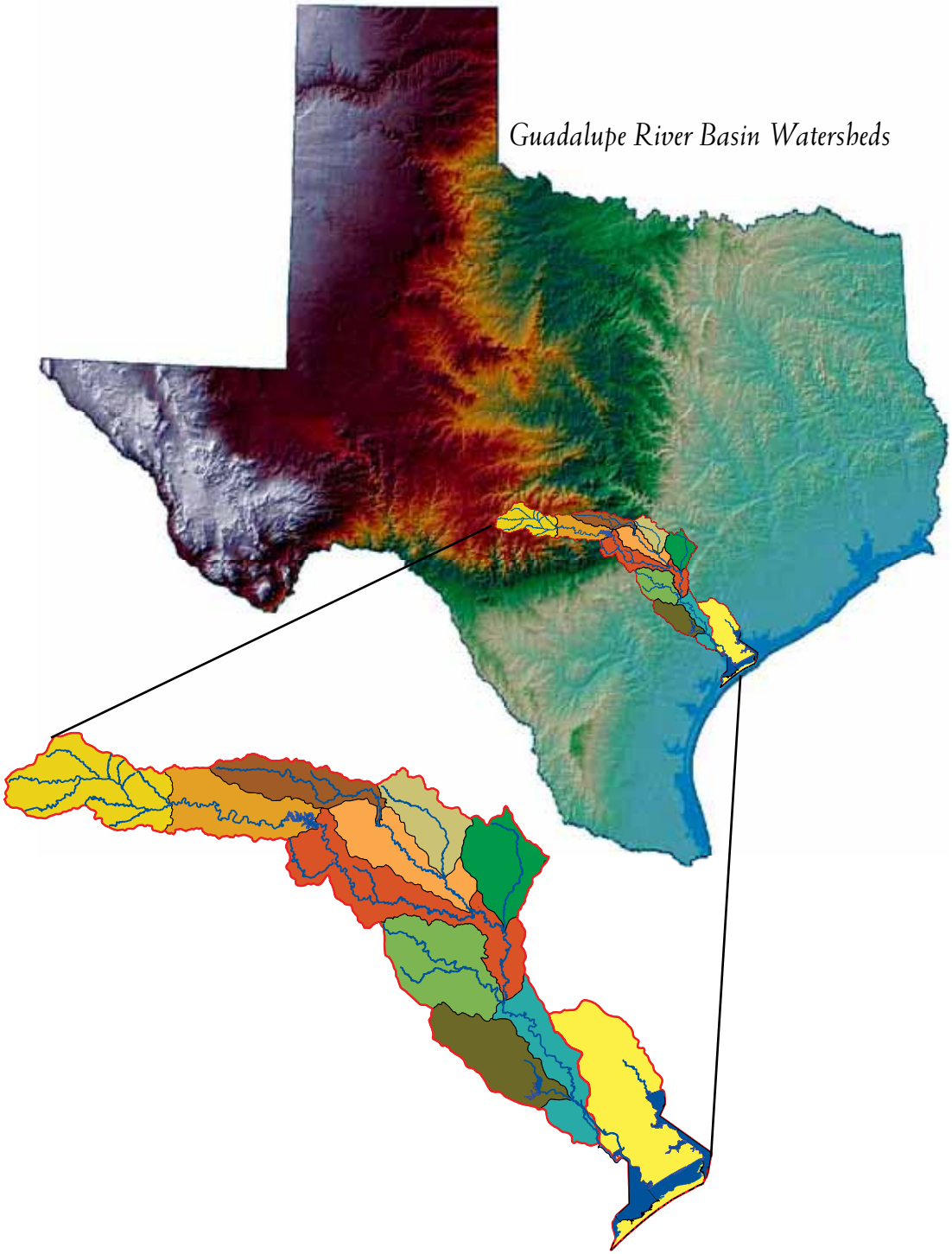
GBRA

TABLE OF CONTENTS

Introduction 1
This Year's Highlights 1
Plum Creek Watershed 2-3
Overview of Water Quality Monitoring 4
Summary Table FY 2006
Description of Water Quality Parameters 5

Watersheds
Upper Guadalupe above Comfort 6-7
Upper Guadalupe below Comfort 8-9
Blanco 10-11
San Marcos 12-13
Plum Creek 14-15
Middle Guadalupe (Parts A & B) 16-19
Peach Creek 20-21
Sandies Creek 22-23
Coleto Creek 24-25
Lower Guadalupe 26-27
Lavaca-Guadalupe 28-29

TCEQ 2006 Water Quality Assessment 30-31
(List of Impaired Water Bodies)
2006 Events Inventory 32
GBRA Public Involvement and Outreach 33-34
CRP Showcase 35
UGRA Public Involvement and Outreach 36-37
Summary of Draft 2006 Assessment 38
Texas Watch Websites 39
Water Quality Testing & Standards & Frequently
Asked Questions 40



Guadalupe River Basin Watersheds

Front and back cover photographs by Drew C. Engelke

INTRODUCTION

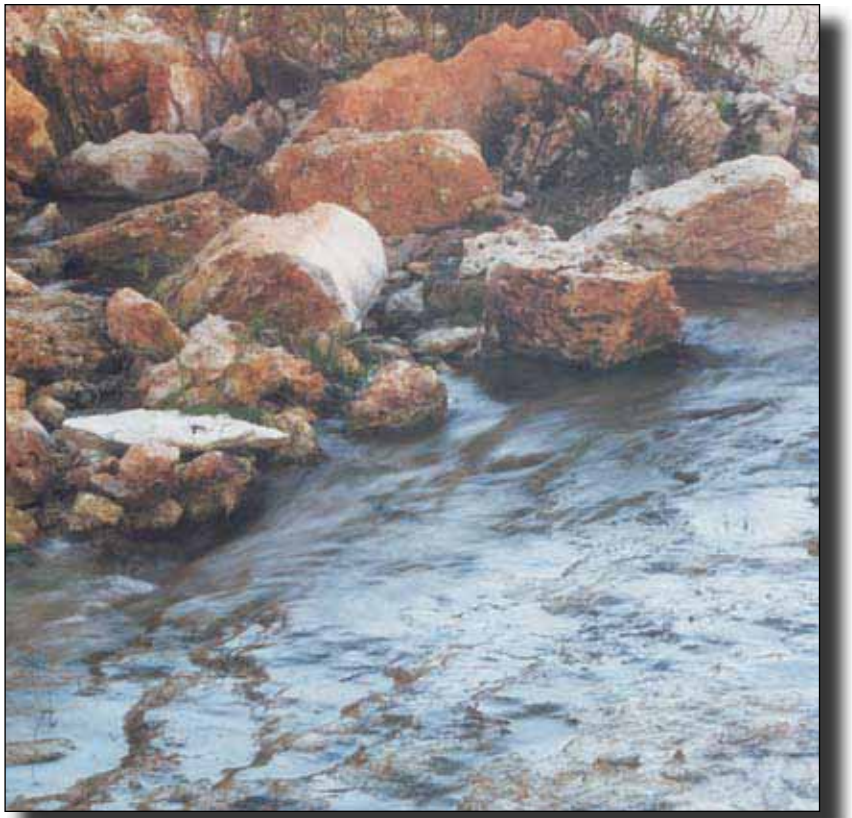
This report highlights recent activities in the Guadalupe River Basin and the Lavaca-Guadalupe Coastal Basin under the Clean Rivers Program (CRP). The CRP is managed by the Texas Commission on Environmental Quality (TCEQ), and funded entirely by fees assessed to wastewater discharge and water rights permit holders. The Guadalupe-Blanco River Authority (GBRA) together with the Upper Guadalupe River Authority (UGRA) carry out the water quality management efforts in these basins under contract to the TCEQ. The activities described in this report include water quality monitoring, a review of the draft 2006 305b Water Quality Inventory, and public communication efforts.

THIS YEAR'S HIGHLIGHTS

The drought of 2005 continued through 2006. The decrease in rainfall and subsequent diminishing stream flow resulted in a negative impact on water quality at several locations. Receiving streams (streams that are the final destination of treated wastewater) became more effluent-dominated, as seen at the Plum Creek at Plum Creek Road monitoring location in Hays County. Nitrate-nitrogen and total phosphorus at this site remained consistently high in late 2006, possibly from wastewater discharges or septic tank contamination. Flow from the Comal Springs dropped, which was correlated with higher bacterial concentrations in the Comal River in May through August. These concentrations were near to or exceeded the stream standard, possibly from heavy recreational pressure over the summer months. Samples from Lake McQueeney, a run-of-river impoundment that is a popular summer destination for locals and tourists alike, indicated an increase in *chlorophyll a* concentrations, during the late spring and summer months when flow is at its lowest and plant growth is at its greatest. Due to the reduction in baseflow, small tributaries throughout the upper watershed became dominated by pools rather than by normal runs and riffles.

Major CRP activities in 2006 included the stream monitoring program and public outreach and education. At the request of citizens in the Coleto Creek watershed, two new systematic sites were added in the watershed. The sites added on Perdido Creek and Coleto Creek will be sampled for two years. The monitoring will be used to gather water quality data on these creeks that may be impacted by oil and gas production activities in the area.

The landowner brochure, *Don't Be Clueless about Water,* was printed and has been distributed throughout the basin. This outreach effort was designed to remind landowners that residuals from activities on their property, such as hazardous waste disposal and fertilizer use, do not remain on their property. Readers are also informed that stormwater and soil infiltration can carry harmful products downstream or into groundwater, impacting water quality in areas away from their land. The *Clueless* brochure was sent to title companies and real estate firms in the basin, to be distributed to new landowners for their use. The brochure has also been used at community events, distributed to school children for supplement to their science activities and has been used to support the Plum Creek Watershed Protection Plan development efforts (see p. 2 for more information).

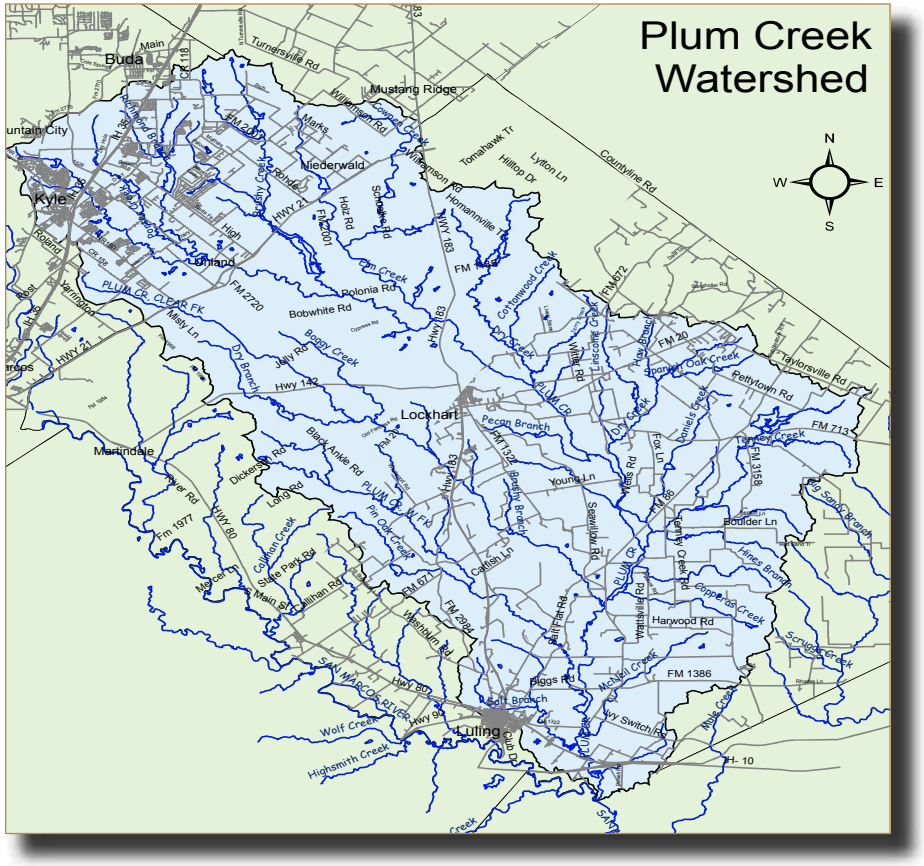


Drew C. Engelke

In 2005, the Texas Department of State Health Services conducted an intensive fish tissue survey on Canyon Reservoir to characterize the potential human health risk of mercury contamination in fish in the reservoir. The fish population surveyed included both predator and bottom feeding species. As a result of the survey, a fish consumption advisory for longnose gar and striped bass has been issued for Canyon Reservoir. Additional fish advisory information can be found at: http://www.dshs.state.tx.us/seafood/default.shtm.

PLUM CREEK WATERSHED

In the Guadalupe River Basin, the Guadalupe-Blanco River Authority partners with the Texas Commission on Environmental Quality's Clean Rivers Program (TCEQ CRP) to maintain and improve water quality using a watershed management approach. The water quality monitoring program is conducted using standardized techniques under a quality assurance project plan. The program is designed to identify problems, set priorities and then evaluate viable solutions, all of the steps made with stakeholder input. An excellent example of the success of the Clean Rivers Program in the Guadalupe River Basin can be seen in the Plum Creek watershed.



Plum Creek begins in southeast Hays County, north of Kyle. It flows south through Caldwell County, through the community of Lockhart, reaching its confluence with the San Marcos River near Luling. The creek is 52 miles in length and has a drainage area of 397 square miles. Other communities in the watershed include Mountain City, Uhland, Niederwald, Goforth, McNeil, Maxwell, Dale, and portions of Buda. In 1996, GBRA began monitoring the lower portion of the creek as part of the CRP. In 2001, a new sampling location was added to the upper watershed near Uhland. Also funded by CRP, a special study was performed by GBRA that investigated the impacts of oil and gas operations in the watershed. (Refer to the Plum Creek section for a map of the sampling locations, land uses and point source discharges; p. 14). The data collected by CRP as well as the data collected by TCEQ at a monitoring site located in the middle of the watershed near Lockhart was used to assess the water quality of Plum Creek. According to the 2004 Texas Water Quality Inventory and the 303d list of Impaired Waterbodies, Plum Creek (segment 1810) is impaired by elevated bacteria concentrations and exhibits elevated nutrient levels. (See section on Categories of Water Quality Conditons; p. 30). For an explanation of assessment status of other watersheds in Guadalupe River Basin see p. 38.

The Texas State Soil and Water Conservation Board has selected the Plum Creek watershed as the site of the development of a watershed protection plan. This effort is being funded by a federal 319 non-point source grant in partnership with the Texas Cooperative Extension (TCE.) Key factors that

PLUM CREEK WATERSHED (Cont.)

influenced the selection of Plum Creek are the identified impairments, rapid urbanization in the northern portion of the watershed, oil and gas production and the potential for impacts by agricultural nonpoint source pollution.

GBRA provided the list of CRP stakeholders in the watershed as a beginning point for the development of the strong community-based stakeholder committee. In July a field trip was held that led stakeholders through the watershed. The GBRA field crew demonstrated the techniques used in water quality monitoring, flow measurements and bioassessments to the stakeholder and technical committee. The data that GBRA collected at the two monitoring sites was discussed to demonstrate to the stakeholders the changes in water quality from upstream to downstream. Table 1 shows a comparison of the water quality between the upper and lower watersheds.

	Upper	Lower
Flow (cfs)	2.89	12.7
E. coli (org/100ml)	184	100
Suspended Solids (mg/L)	22	24.4
Turbidity (NTU)	19.5	16.6
pH	7.84	7.86
Temperature (C)	19.2	20.8
Dissolved Oxygen (mg/L)	7.45	7.22
Conductivity (umhos/cm)	786	1180
Total Phosphorus (mg/L)	0.43	0.37
Nitrate-N (ml/L)	1.87	1.97
Chloride (mg/L)	62	151
Sulfate (mg/L)	84.8	81.7
Total Hardness (mg/L)	278	314
Ammonia-N (mg/L)	0.04	0.08
Chlorophyll a (mg/m^3)	3.1	3.1
Pheophytin (mg/m^3)	6	3.89

Table 1. The comparison of median water quality conditions between the upper and lower reaches of Plum Creek.

The public outreach project funded by the GBRA Clean Rivers Program, *Don't Be Clueless About Water*, was completed this year. The brochure's aim is to make landowners aware of the impact that their actions and land use practices can have on the watershed. The project has been very timely and appropriate for incorporation into the watershed protection plan for Plum Creek. In addition to meetings and discussions with stakeholders, the Plum Creek effort has branched into area schools. Seven elementary schools (approximately 800 students) from throughout the watershed are involved in a water quality monitoring program during school year 2006-07. This project is an outreach from the *River of Life* curriculum developed in part with funds provided by the CRP in 2004. The Plum Creek Watershed Partnership hopes this school effort will continue next year and expand to secondary campuses.

TCEQ explains that the Clean Rivers Program works in three basic steps: 1) find the problem, 2) set priorities and 3) seek solutions. You can look to the activities in the Plum Creek watershed to see how CRP is working. The data collected under a quality assured project plan has identified impairments. The stakeholders and landowners are being made aware and educated about the impairments and the threats that certain activities can have on a waterbody. With this knowledge the stakeholders can determine where there is the most critical need for action. Finally, all of these activities are attracting additional funding and technical resources that will be used to implement the strategies that have been identified and prioritized by the stakeholders.

Plum Creek stakeholder field trip.

OVERVIEW OF WATER QUALITY MONITORING

One of the key roles of the CRP is fostering coordination and cooperation in monitoring efforts. Coordinated monitoring meetings are held once a year to bring all the monitoring agencies and entities together to discuss streamlining and coordinating efforts. The table below outlines the types and amounts of water quality monitoring conducted in the Guadalupe River Basin and the Lavaca-Guadalupe Coastal Basin under a TCEQ-approved Quality Assurance Project Plan for September 2005 through August 2006.

The Wimberley Valley Watershed Association (WVWA) is conducting the Blanco River-Cypress Creek Water Quality Monitoring Study. The goals of this study include establishing a baseline of the water quality data; identifying potential pollution problems; documenting spatial and temporal changes; determining impacts of point and nonpoint source pollution; and assessing compliance with water quality standards. The study will also provide recommendations for local planning efforts to protect water quality. The GBRA is providing technical assistance and oversight of monitoring activities in addition to the laboratory analysis and quality assurance support.

The complete monitoring schedule is updated frequently on the GBRA web page at www.gbra.org. The following sections show, by watershed, the distribution of the monitoring sites plus activities that may affect water quality, such as major communities where wastewater discharges are located, areas with a concentration of poultry activity, and the locations of major oil and gas fields.

FY 2006 (September 2005 through August 2006) Summary of Sampling for the Guadalupe & Lavaca-Guadalupe Basins

Sampling Entity	Field	Conventional	Bacteria	Biological and Habitat	24 Hr DO	Metals in Water	Metals in Sediment	Organics in Water	Organics in Sediment
GBRA	19 sites monthly; 3 sites bimonthly; 7 sites quarterly	19 sites monthly; 3 sites bimonthly; 7 sites quarterly	19 sites monthly 3 sites bimonthly 7 sites quarterly	5 sites annually		6 sites annually		2 sites annually	
UGRA (Kerr Co.)	10 sites quarterly	10 sites quarterly 19 sites weekly (May - August)	10 sites quarterly 19 sites weekly (May - August)	2 sites annually		2 sites annually	1 site annually		1 site annually
TCEQ	15 sites quarterly	15 sites quarterly	15 sites quarterly		1 site 4 times	1 site semi-annually	1 site semi-annually		
WVWA	7 sites 8 times a year	7 sites 8 times a year	7 sites 8 times a year						

DESCRIPTIONS OF WATER QUALITY PARAMETERS

FIELD PARAMETERS are those water quality constituents that can be obtained on-site and generally include: dissolved oxygen (DO), conductivity, pH, temperature, stream flow (not in reservoirs), and secchi disc depth (reservoirs only).

Dissolved Oxygen indicates the amount of oxygen available in the stream to support aquatic life. DO can be reduced by the decomposition of organic matter.

Conductivity is a measure of the water body's ability to conduct electricity and indicates the approximate levels of dissolved salts, such as chloride, sulfate and sodium in the stream. Elevated concentrations of dissolved salts can impact the water as a drinking water source and as a suitable aquatic habitat.

pH is a measure of the hydrogen ion concentration in an aqueous solution. It is a measure of the acidity or basic property of the water. Chemical and biological processes can be affected by the pH. pH can be influenced by dissolved constituents, such as carbon dioxide and by point and nonpoint source contributions to the stream.

Temperature of the water affects the ability of the water to hold dissolved oxygen. It also has an impact on the biological functions of aquatic organisms.

Stream Flow is an important parameter affecting water quality. Low flow conditions common in the warm summer months create critical conditions for aquatic organisms. Under these conditions, the stream has a lower assimilative capacity for waste inputs from point and nonpoint sources.

Secchi Disc transparency is a measure of the depth to which light is transmitted through the water column, and thus the depth at which aquatic plants can grow.

CONVENTIONAL PARAMETERS are typical water quality constituents that require laboratory analysis and generally include: nutrients, chlorophyll a, total suspended solids, turbidity, hardness, chloride, and sulfate.

Nutrients include the various forms of nitrogen and phosphorus. Elevated nutrient concentrations may result in excessive aquatic plant growth and can make a water body unfit for its intended use(s).

Chlorophyll a is a plant pigment whose concentration is an indicator of the amount of algal biomass and growth in the water.

Total Suspended Solids indicate the amount of particulate matter suspended in the water column.

Turbidity is a measure of the water clarity or light transmitting properties. Increases in turbidity are caused by suspended and colloidal matter such as clay, silt, finely divided organic and inorganic matter, plankton and other microscopic organisms.

Hardness is a composite measure of certain ions in the water, primarily calcium and magnesium. The hardness of the water is critical due to its effect on the toxicity of certain metals. Typically, higher hardness concentrations in the receiving stream can result in reduced toxicity of heavy metals.

Chloride and Sulfate are major inorganic anions in water and wastewater. Numeric stream standards for chloride and sulfate have been set on all of the classified stream segments in the basin. Both of these inorganic constituents can impact the designated uses and can come from point and nonpoint sources, such as wastewater discharges, oil field activities, and abandoned flowing wells from groundwater with elevated concentrations of dissolved solids.

Drew C. Engelke

Bacteria, specifically the *E. coli* bacteria, is used as an indicator of the possible presence of disease-causing organisms.

Biological and Habitat assessment includes collection of fish community data, benthic macroinvertebrate (insects) data, and measurement of physical habitat parameters. This information is used to determine whether the stream adequately supports a diverse and desirable biological community. The physical, chemical and biological data are used together to provide an integrated assessment of aquatic life support.

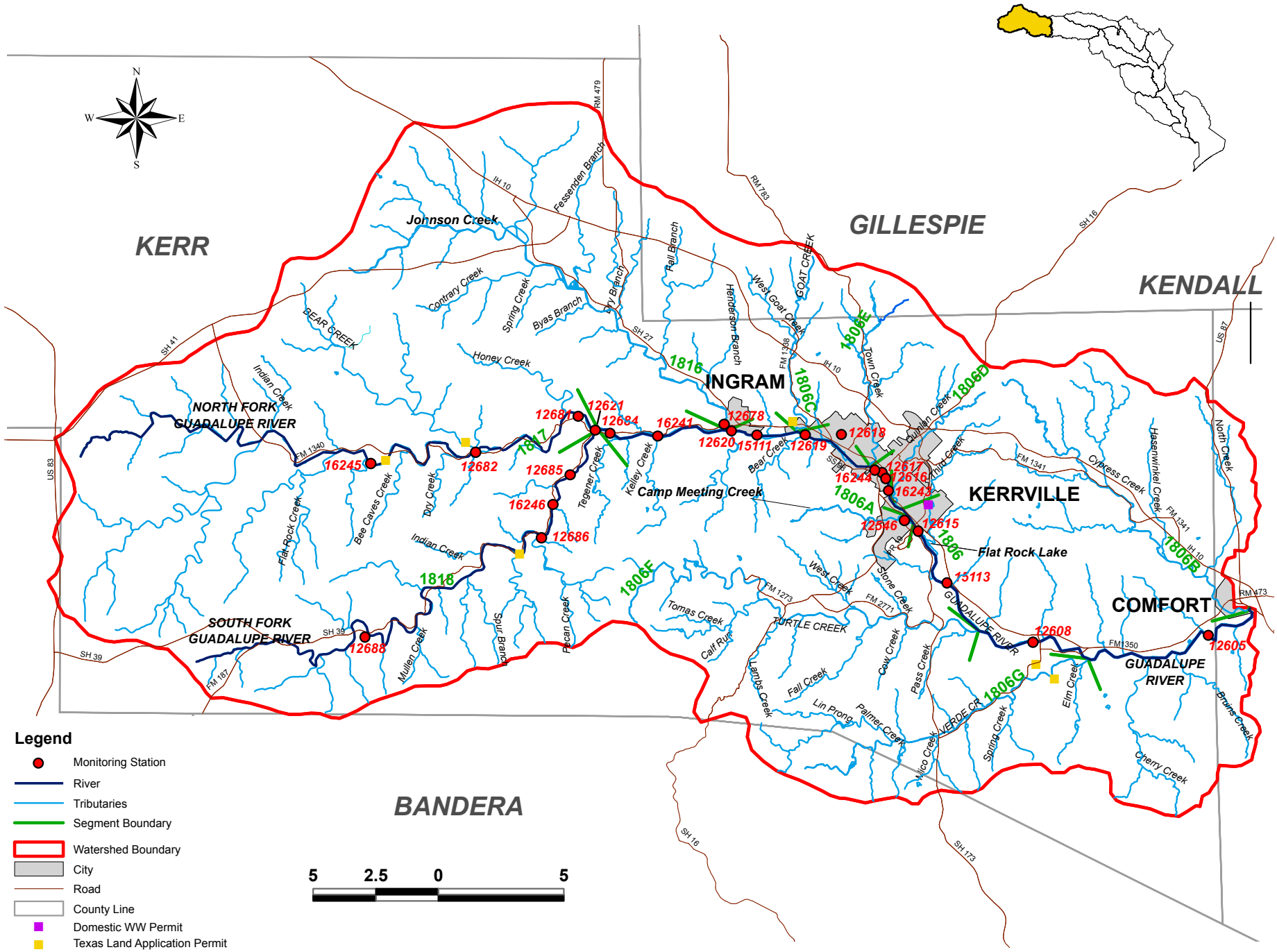
24 Hr DO studies perform measurements of DO in frequent intervals (e.g. one hour) in a 24-hour period. The average and minimum concentrations in the 24-hour period are compared to corresponding criteria. This type of monitoring takes into account the diurnal variation of DO and avoids the bias in samples taken only at certain times of the day.

Metals in Water, such as mercury or lead, typically exist in low concentrations, but can be toxic to aquatic life or human health when certain levels are exceeded. To obtain accurate data at low concentrations, the GBRA uses special clean methods that minimize the chance for sample contamination and provide high quality data.

Organics and Metals in Sediment could be a source of toxicants for the overlying water, though currently there are no numeric sediment standards.

Organics in Water, such as pesticides or fuels, can be toxic to aquatic life or human health when certain levels are exceeded.

Upper Guadalupe River Watershed Above Comfort



Upper Guadalupe Above Comfort Watershed

Drainage Area: 850 square miles

Streams and Rivers: North Fork and South Fork of the Guadalupe River, Johnson Creek, Quinlin Creek, Flat Rock Lake, Camp Meeting Creek, Town Creek, Cypress Creek, Goat Creek, Turtle Creek, Verde Creek, Bear Creek

Aquifer: Trinity

River Segments: 1816, 1817, 1818, 1806A-G

Cities: Center Point, Ingram, Kerrville, Comfort

Counties: Kerr, Gillespie, Bandera, Kendall

EcoRegion: Edwards Plateau

Vegetation Cover:
Evergreen Forest - 46.9% Grass/Herbaceous - 14.4%
Shrublands - 28.8%

Climate:
Average annual rainfall: 30 inches
Average annual temperature: January 32° July 94°

Land Uses: Ranching, Farming, Tourism, Light Manufacturing

Water Body Uses: Aquatic Life Use, Contact Recreation Use, General Use, Fish Consumption Use, Public Water Supply Use

Soils: Dark and loamy over limestone; to the south and east soils are variable with light colored brown to red soils in some areas and dark loamy or loamy soils over clay subsoils elsewhere

Permitted Wastewater Treatment Facilities:
Domestic: 1 Land Application: 6
Industrial: 0

RIVER SEGMENTS DESCRIPTIONS/CONCERNS:

Segment 1816 *(Johnson Creek)*: This spring-fed 21 mile segment consisting of Johnson Creek to its confluence with the Guadalupe River in Kerr County has good water quality. Intermittent in stages, the stream crosses an area characterized by steep slopes. The generally shallow, stony soils support grasses and open stands of live oak and Ashe juniper.

Segment Concerns: None

Segment 1817 *(North Fork Guadalupe River)*: The spring-fed 29 mile North Fork of the Guadalupe River is a perennial stream with exceptional aquatic life designation. River flow is swift but shallow. Typical vegetation are baldcypress, live oak and Ashe juniper trees.

Segment Concerns: The draft 2006 water quality assessment for the North Fork Guadalupe River found a concern for dissolved oxygen grab samples at the screening level. The source of the concern is unknown.

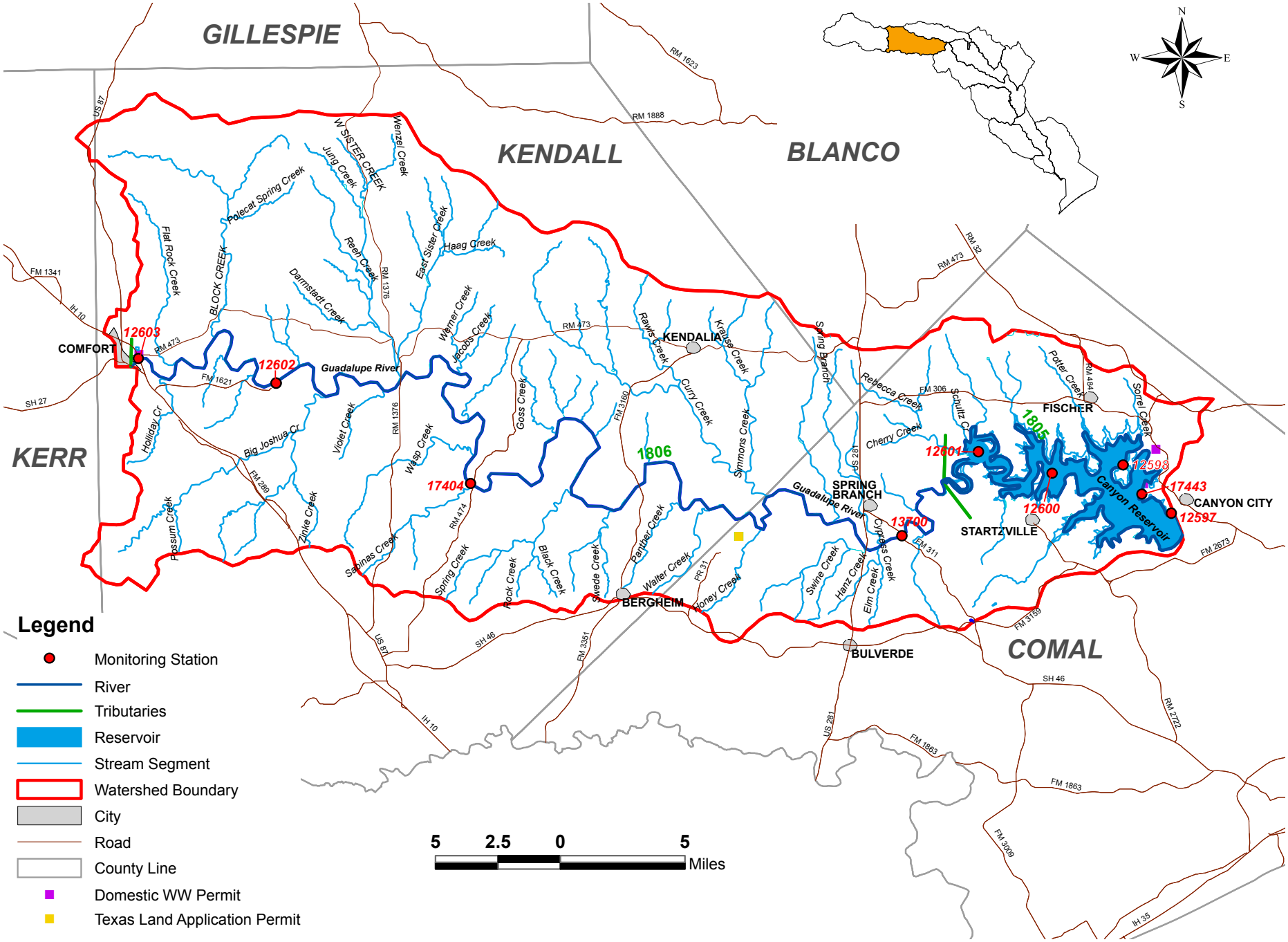
Segment 1818 *(South Fork Guadalupe River)*: The spring-fed 27 mile South Fork of the headwaters of the Guadalupe River is clear moderately flowing water, quality is excellent, a very scenic river with baldcypress lined banks. The river is narrow and shallow.

Segment Concerns: None

Segment 1806/1806A *(Guadalupe River Above Canyon Lake and Camp Meeting Creek)*: This 18-mile portion of the Guadalupe River from the upper reach of the Canyon Reservoir in Comal County to the confluence with the North and South Forks of the Guadalupe River in Kerr County is scenic with crystal clear water between baldcypress-lined banks. The shallow riffle areas, punctuated with deep pools create an exceptional aquatic life ecosystem.

Segment Concerns: According to the draft 2006 assessment performed by TCEQ, Camp Meeting Creek has been listed as not supporting when screened against the dissolved oxygen 24 hour average. No known source has been identified. In prior assessments, the entire segment, Guadalupe River Above Canyon Lake, has been found to be not supporting due to *E. coli* bacteria concentrations that exceeded both the geometric mean and the single grab screening level. A TMDL has been completed and the report was issued in late March.

Upper Guadalupe River Watershed Below Comfort



Upper Guadalupe Below Comfort Watershed

Drainage Area: 596 square miles

Streams and Rivers: Guadalupe River from Comfort to Canyon Lake, Joshua Creek, Flat Rock Creek, Rebecca Creek, Block Creek, West Sister Creek

Lake: Canyon Lake

Aquifer: Trinity

River Segments: 1805, 1806

Cities: Comfort, Kendalia, Bergheim, Bulverde, Canyon City, Spring Branch, Startzville

Counties: Kerr, Comal, Kendall, Blanco

EcoRegion: Edwards Plateau

Vegetation Cover:
Evergreen Forest - 43.6% Shrublands - 11.0%
Grass/Herbaceous - 31.3%

Climate:
Average annual rainfall: 32 inches
Average annual temperature: January 38° July 95°

Land Uses: Urban, Unincorporated Suburban Sprawl, Cattle, Goat and Sheep Production, Light and Heavy Industry, and Recreational

Water Body Uses: Aquatic Life Use, Contact Recreation Use, General Use, Fish Consumption Use, and Public Water Supply Use

Soils: Dark and loamy over limestone to loam with clay subsoils

Permitted Wastewater Treatment Facilities:
Domestic: 3 Land Application: 1
Industrial: 0

RIVER SEGMENTS DESCRIPTIONS/CONCERNS:

Segment 1806 *(Guadalupe River above Canyon Lake)*: From a point (1.7 miles) downstream of Rebecca Creek Road in Comal County to the confluence of North Fork Guadalupe River and the South Fork of Guadalupe River in Kerr County.

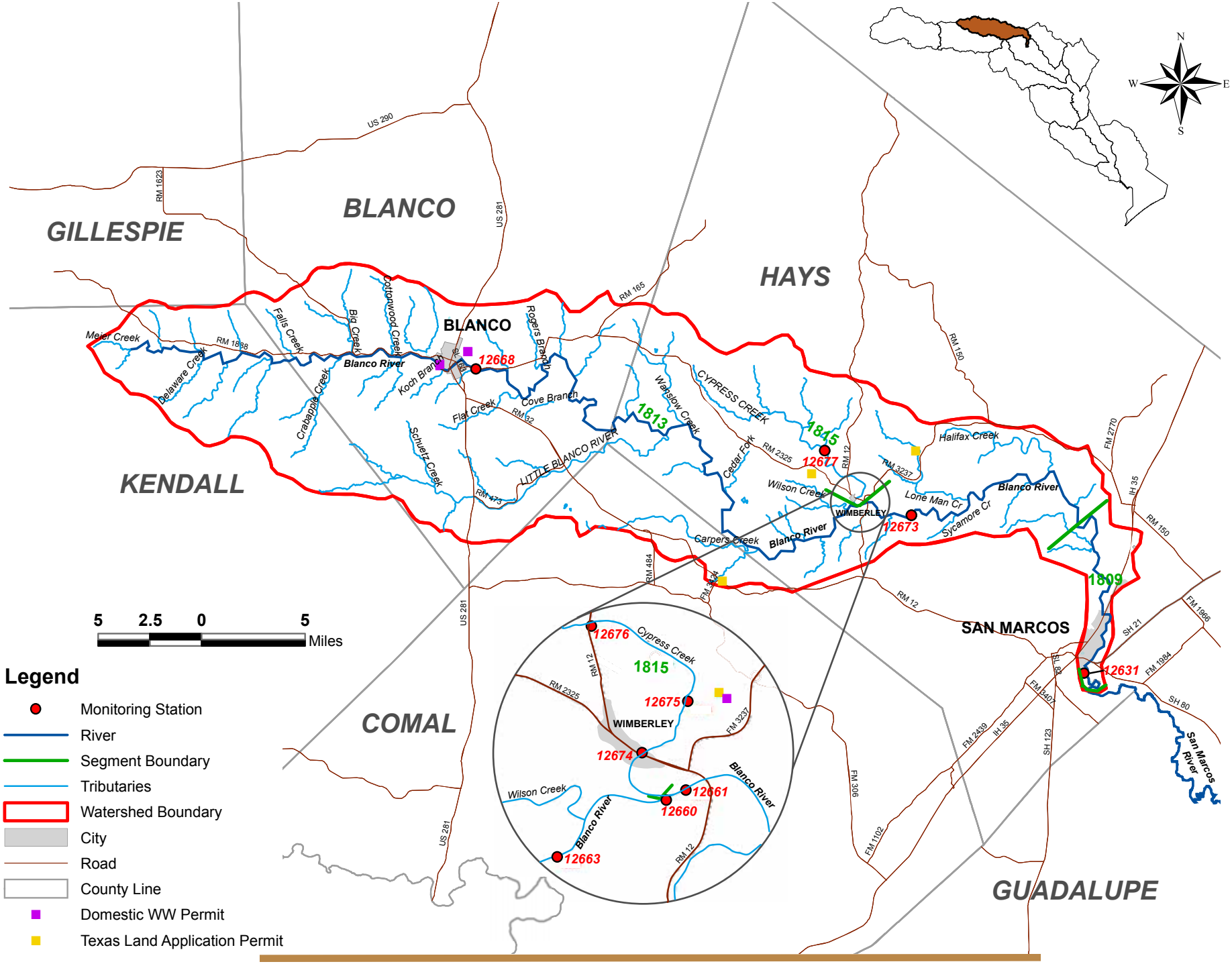
Segment Concerns: Urban and suburban growth (large lot housing developments) along the 281 corridor between San Antonio and Blanco is a growing concern, especially in the regions near the city of Bulverde and the city of Spring Branch.

Segment 1805 *(Canyon Lake)*: From Canyon Dam in Comal County to a point (1.7 miles) downstream of Rebecca Creek Road in Comal County, including Canyon Reservoir. Canyon Reservoir is a flood control and water supply reservoir, impounding the Guadalupe River with a normal pool elevation of 909 feet mean sea level (msl).

Segment Concerns: Explosive suburban growth in the Canyon Reservoir region.

Special Note: In 2003 a Tier One Fish Tissue Survey was done on selected reservoirs in Texas. The survey, conducted by the Texas Parks and Wildlife Department, the TCEQ and the Texas Department of State Health Services (DSHS, formerly Texas Department of Health), found mercury in fish tissue collected from largemouth bass in Canyon Reservoir. In 2005, the DSHS conducted an intensive Tier Two Survey on Canyon Reservoir to characterize the potential risk to human health. The fish population surveyed included predator and bottom feeding species. As a result of the Tier Two Survey, a fish consumption advisory for longnose gar and striped bass has been issued for Canyon Reservoir. The DSHS advises that adults should limit consumption of longnose gar and striped bass to no more than two eight ounce meals per month and children under twelve years old should limit consumption to no more than two four ounce meals per month. Potential sources of mercury include emissions from coal-fired power plants, cement plants, volcanoes, industrial discharges, and batteries. Without any physiological mechanisms to remove mercury from their bodies, fish tend to bioaccumulate the mercury in their tissue introduced by absorption from food and surrounding waters. Samples of water from Canyon Reservoir have shown no detectable concentrations of mercury. The DSHS has not speculated as to the source of the mercury.

Blanco River Watershed



Legend

- Monitoring Station
- River
- Segment Boundary
- Tributaries
- Watershed Boundary
- City
- Road
- County Line
- Domestic WW Permit
- Texas Land Application Permit

Blanco River Watershed

Drainage Area: 440 square miles

Streams and Rivers: Guadalupe River, Lower Blanco River, Upper Blanco River, Cypress Creek, Meier Creek, and Sycamore Creek

Aquifers: Edwards-Trinity, Trinity

River Segments: 1813, 1815, 1809

Cities: Blanco, Fisher, Wimberley, Kyle, San Marcos

Counties: Kendall, Comal, Blanco and Hays

EcoRegion: Edwards Plateau

Vegetation Cover:

Evergreen Forest - 42.9%	Shrublands - 11.0%
Grass/Herbaceous - 32.2%	Deciduous Forest - 7.7%

Climate:
Average annual rainfall: 31 inches
Average annual temperature: January 34° July 94°

Land Uses: Urban, Agricultural Crops (wheat, hay, oats, peaches & pecans), Sheep, Cattle, Goats and Turkey Productions; Light Manufacturing and Recreation

Water Body Uses: Aquatic Life Use, Contact Recreation Use, General Use, Fish Consumption Use, and Public Water Supply Use

Soils: Varies from thin limestone to black, waxy, chocolate, and grey loam, calcareous, stony, and clay loams

Permitted Wastewater Treatment Facilities
Domestic: 2 Land Application: 3
Industrial: 0

RIVER SEGMENTS DESCRIPTIONS/CONCERNS:

Segment 1813 (*Upper Blanco River*): Flowing 71 miles from northern Kendall County until Limekiln Road in Hays County, the upper Blanco is a spring-fed stream. Cypress Creek joins the river in the village of Wimberley. The steep sloped, intermittent, meandering stream is lined with bald cypress, oak and Ashe juniper.

Segment Concerns: The draft 2006 assessments performed by TCEQ found that there is a concern for water quality when dissolved oxygen grab samples are assessed against the stream standard of 6.0 milligrams per liter of dissolved oxygen for streams with an exceptional aquatic habitat designation. Suburban growth (large lot housing developments) along the 281 corridor between San Antonio and the city of Blanco is a growing concern because of the potential for nonpoint source pollution.

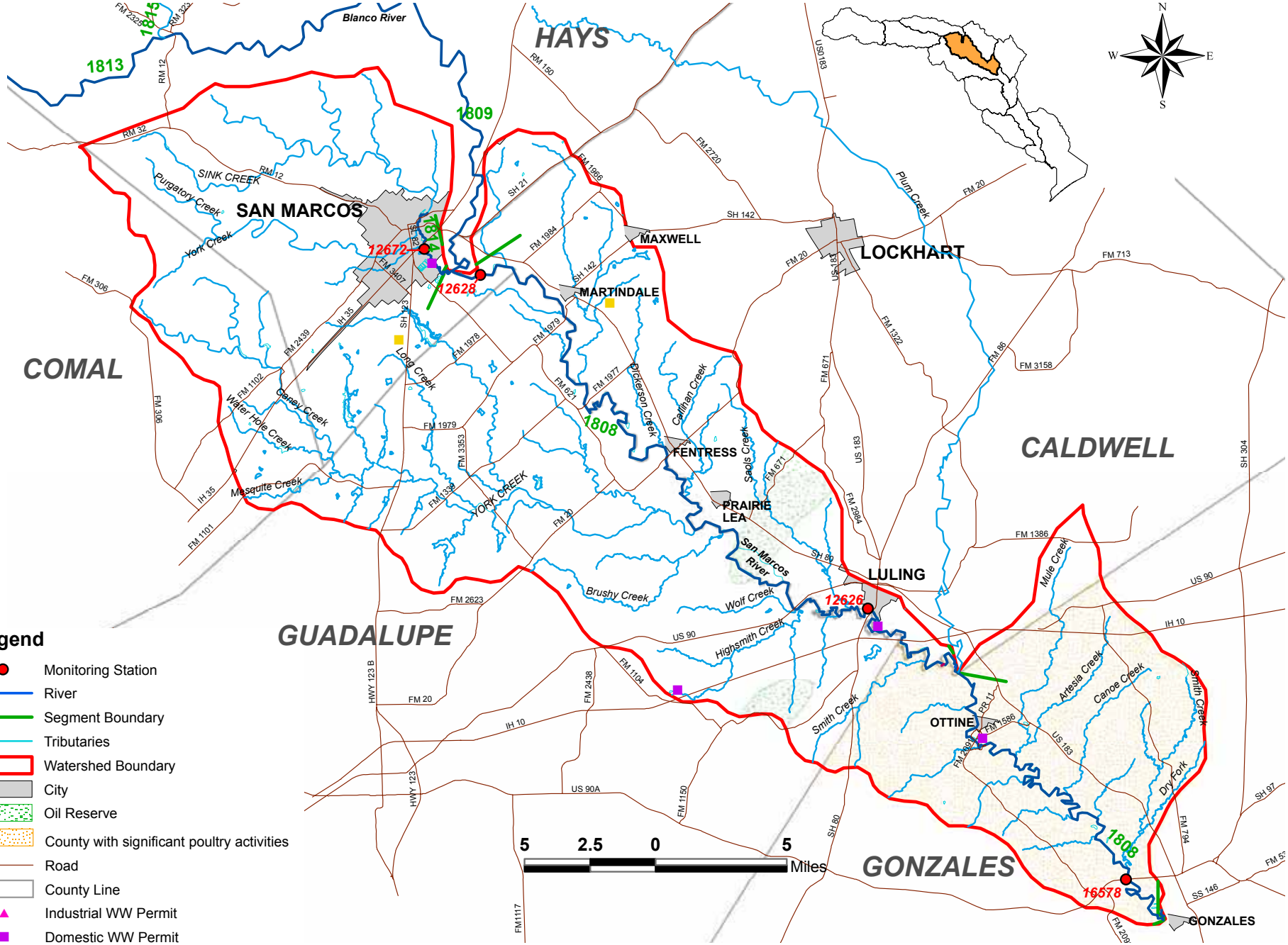
Segment 1815 (*Cypress Creek*): The spring-fed creek flows 14 miles into the village of Wimberley where it merges with the Blanco River in Hays County. A picturesque creek, lined with bald cypress trees, with good water quality.

Segment Concerns: The segment is experiencing tremendous residential and commercial suburban growth. Occasional high levels of *E. coli* bacteria are likely due to faulty septic tanks.

Segment 1809 (*Lower Blanco River*): This 15-mile lower stretch of the Blanco River from Limekiln Road until the confluence with the San Marcos River varies from a rapid moving stream as it crosses the Balcones Fault Zone to a shallow, slow moving stream, lined with scrub oaks as it enters the Blackland Prairies.

Segment Concerns: Located in the middle of the IH35 corridor from the northern boundary of the city of San Marcos and the southern boundary of the city of Kyle. Concerns voiced by stakeholders are the cumulative impacts on watersheds caused by construction and multiple subdivision development. Impervious cover (rooftops and buildings, roads, parking lots) associated with the growth increases the quantity of stormwater that scours stream beds, creating additional sediment loading and pollutants to the small tributaries of the watershed. Also voiced is the need for adequate construction oversight to assure that stormwater controls are appropriate and in place.

San Marcos River Watershed



Legend

- Monitoring Station
- River
- Segment Boundary
- Tributaries
- Watershed Boundary
- City
- Oil Reserve
- County with significant poultry activities
- Road
- County Line
- Industrial WW Permit
- Domestic WW Permit
- Texas Land Application Permit

San Marcos Watershed

Drainage Area: 522 square miles

Streams and Rivers: Lower San Marcos River, Upper San Marcos River, Sink Creek, York Creek

Aquifers: Edwards-Balcones Fault Zone, Carrizo-Wilcox

River Segments: 1814, 1808

Cities: San Marcos, Maxwell, Martindale, Fentress, Prairie Lea, Luling, Ottine, Gonzales

Counties: Hays, Guadalupe, Caldwell, Gonzales

EcoRegion: Edwards Plateau
Post Oak Savannah
Texas Blackland Prairies

Vegetation Cover:

Pasture/Hay- 27.0%	Evergreen Forest - 12.8%
Grass/Herbaceous - 16.3%	Shrublands - 12.2%
Deciduous Forest - 19.0%	Row Crops - 8.6%

Climate:
Average annual rainfall: 33 inches
Average annual temperature: January 40° July 96°

Land Uses: Urban, Industry, Agricultural Crops (corn, sorghum, hay, cotton, wheat, pecans), Cattle & Hog Production, Poultry Production, Oil Production, and Recreation

Water Body Uses: Aquatic Life Use, Contact Recreation Use, General Use, Fish Consumption Use, and Public Water Supply Use

Soils: Varies from thin limestone to black, waxy, chocolate, and grey loam

Permitted Wastewater Treatment Facilities:
Domestic: 4 Land Application: 2
Industrial: 0

RIVER SEGMENTS DESCRIPTIONS/CONCERNS:

Segment 1814 *(Upper San Marcos River)*: Beginning at the San Marcos Springs that are fed by the Edwards Aquifer in Hays County, the five mile stretch of river continues through to the confluence with the Blanco River east of San Marcos. The headwaters of the San Marcos River are clear flowing and a constant temperature year long.

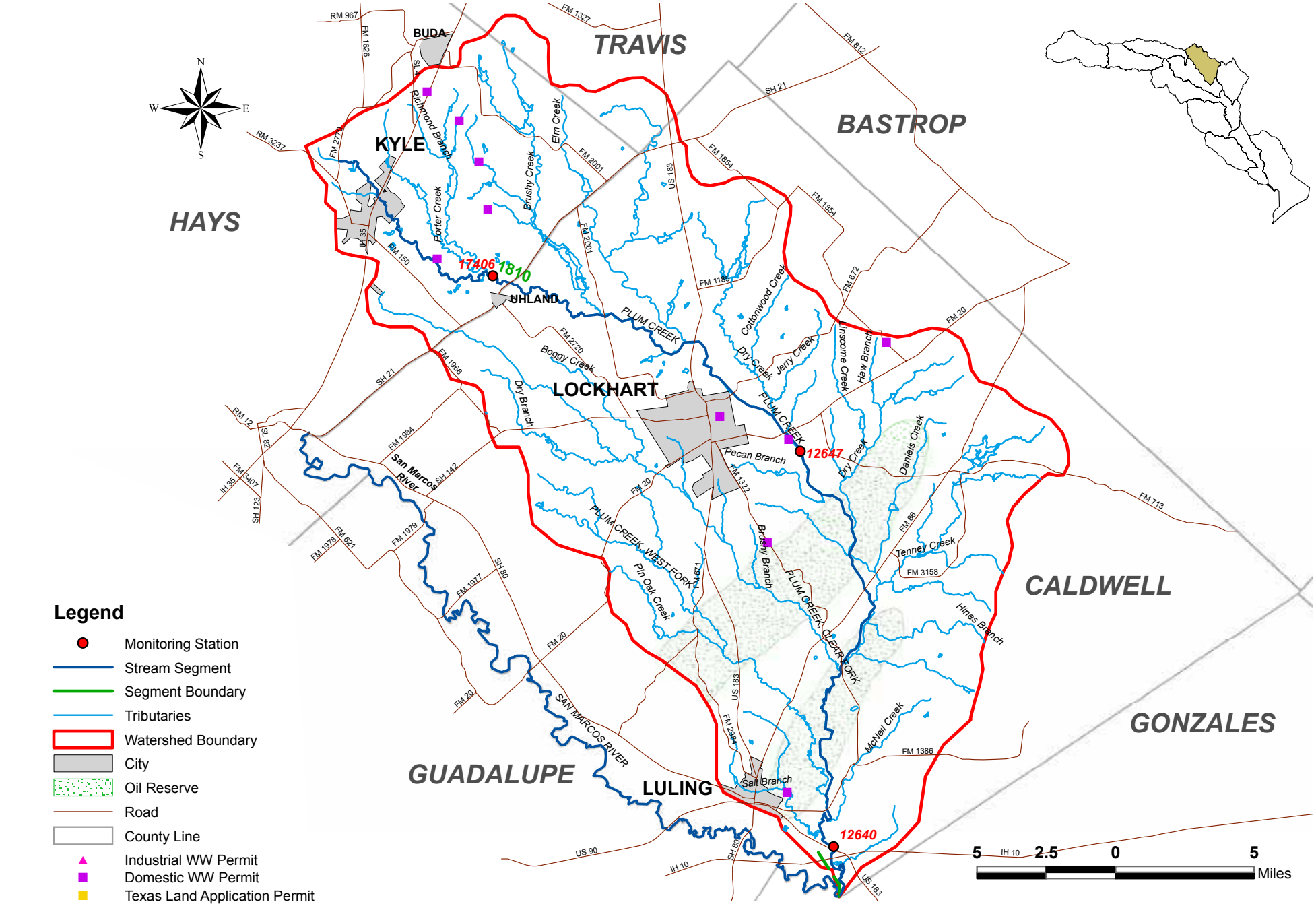
Segment Concerns: The spring-fed stream, sometimes referred to as an island ecosystem, is the home to a number of endangered species that are dependent upon the constancy of clean springflow for their survival. Springflow is a concern during times of drought. Population growth is also a concern in this stream, which is located in the IH 35- growth corridor. Recreation use of the river is high during summer months.

Segment 1808 *(Lower San Marcos River)*: From the confluence of the San Marcos River with the Blanco River continuing about 75 miles until the point of confluence with the Guadalupe River outside the city of Gonzales. Includes the confluence with Plum Creek. The lower San Marcos River is a lazy, smooth flowing river during normal flow.

Drew C. Engelke

Segment Concerns: Protecting spring flow is a concern during times of drought. Recreational use of the river is rising. Activities related to the production and transportation of petroleum are potential threats to the watershed. An additional threat includes activities related to poultry production.

Plum Creek Watershed



Legend

- Monitoring Station
- Stream Segment
- Segment Boundary
- Tributaries
- Watershed Boundary
- City
- Oil Reserve
- Road
- County Line
- Industrial WW Permit
- Domestic WW Permit
- Texas Land Application Permit

Plum Creek Watershed

Drainage Area: 397 square miles

Streams and Rivers: San Marcos River, Plum Creek, Clear Fork Creek

Aquifers: Edwards-Balcones Fault Zone, Carrizo Wilcox

River Segments: 1810

Cities: Kyle, Buda, Uhland, Luling, Lockhart

Counties: Hays, Travis, Caldwell

EcoRegion: Texas Blackland Prairies
Post Oak Savannah

Vegetation Cover:

Deciduous Forest - 23.6%	Row Crops - 14.4%
Pasture/Hay- 22.9%	Shrublands - 11.4%
Grass/Herbaceous - 22.4%	

Climate:
Average annual rainfall: 33 inches
Average annual temperature: January 40° July 95°

Land Uses: Industry, Urban, Oil & Gas Production, Cattle, Hog and Poultry Productions, Agriculture Crops (sorghum, hay, cotton, wheat and corn)

Water Body Uses: Aquatic Life Use, Contact Recreation Use, General Use, Fish Consumption Use

Soils: Black, waxy soil to sandy soil, limestone to black waxy chocolate and grey loam

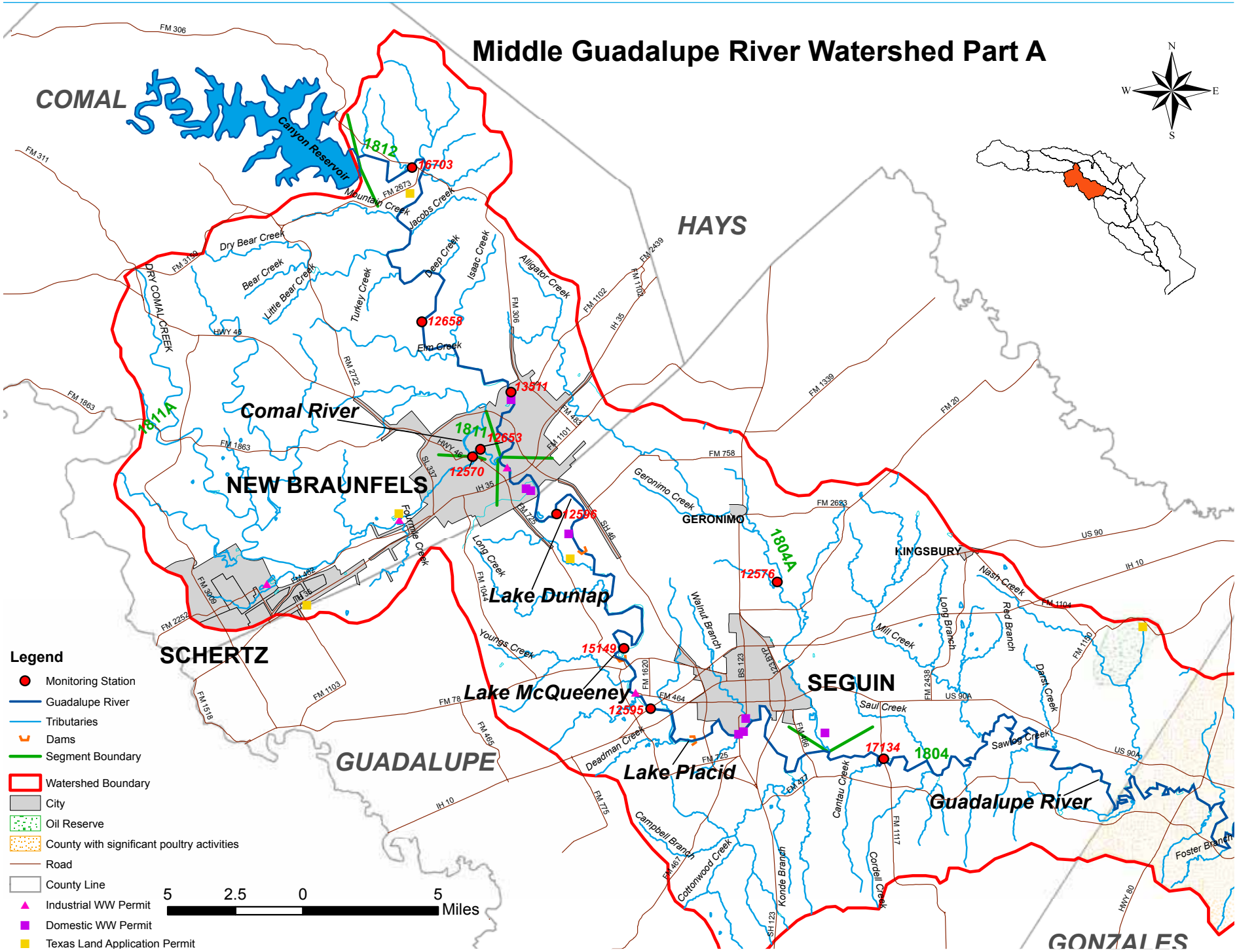
Permitted Wastewater Treatment Facilities:
Domestic: 10 Land Application: 0
Industrial: 0

RIVER SEGMENTS DESCRIPTIONS/CONCERNS:

Segment 1810 *(Plum Creek)*: Plum Creek begins in northeastern Hays County at about FM 2770 and continues 52 miles to the confluence with the San Marcos River south of Luling in Caldwell County. Plum Creek is typically a shallow, slow moving stream flowing through gently rolling hills lined with agricultural fields and scrub oak trees.

Segment Concerns: Nutrient enrichment is a concern, likely due to high numbers of wastewater treatment plants contributing effluent. The upper part of the segment has been listed as impaired due to elevated bacteria counts. The southern part of the watershed in Caldwell County has a history of oil and gas activities, leading to concerns for dissolved salts that can be contributed by improperly plugged oil and gas wells. Another concern is its location. The segment is in an area being developed very rapidly. Concerns voiced by stakeholders are the cumulative impacts on watersheds caused by construction and multiple subdivision development. Impervious cover (rooftops and buildings, roads, parking lots) associated with the growth increases the quantity of stormwater that scours stream beds, creating additional sediment loading and pollutants to the small tributaries of the watershed. Also voiced is the need for adequate construction oversight to assure that stormwater controls are appropriate and in place. Another source of nonpoint source pollution that has been observed in the watershed is the illegal dumping seen at many creek crossings.

Special Project: The Texas State Soil and Water Conservation Board (TSSWCB) has selected the Plum Creek Watershed for the development of a Watershed Protection Plan (WPP). A WPP is a proactive, voluntary strategy for protecting and improving water quality that identifies appropriate best management practices, needed education and awareness programs, and other measures necessary to ensure the long-term health of the watershed. TSSWCB has partnered with Texas Cooperative Extension to facilitate development and implementation of a WPP through the Plum Creek Watershed Partnership (PCWP), a collaboration between local citizens and regional entities, including GBRA, Plum Creek Conservation District, Caldwell-Travis Soil and Water Conservation District, and Hays County Soil and Water Conservation District. Local stakeholders are vital to the success of the PCWPP and to protecting the region's water resources now and into the future. For more information, please visit <http://pcwp.tamu.edu/>.


Middle Guadalupe River Watershed Part A
COMAL
HAYS
GUADALUPE
GONZALES
Canyon Reservoir
Comal River
NEW BRAUNFELS
SCHERTZ
GERONIMO
KINGSBURY
SEGUIN
Lake Dunlap
Lake McQueeney
Lake Placid
Guadalupe River
1812
16703
12658
13511
1811A
1811
12653
12570
12596
1804A
12576
15149
12595
17134
1804
Mountain Creek
Jacobs Creek
Dry Bear Creek
Bear Creek
Little Bear Creek
Turkey Creek
Deep Creek
Isaac Creek
Alligator Creek
Elm Creek
DRY COMAL CREEK
Fourmile Creek
Long Creek
Youngs Creek
Walnut Branch
Geronimo Creek
Nash Creek
Long Branch
Red Branch
Mill Creek
Dorst Creek
Saul Creek
Sawlog Creek
Deadman Creek
Campbell Branch
Cottonwood Creek
Konde Branch
Cantau Creek
Cordell Creek
Foster Branch
FM 306
FM 311
FM 3159
FM 2673
HWY 46
FM 2722
FM 1863
FM 1102
FM 1103
FM 2439
FM 1102
IH 35
FM 1339
FM 20
FM 758
FM 2693
US 90
IH 10
FM 1104
FM 1150
FM 2438
US 90A
FM 1620
FM 464
FM 78
FM 1518
FM 465
FM 725
FM 775
FM 467
FM 1117
SH 123
HWY 80
SL 337
FM 1044
FM 3009
FM 2252
Legend
Monitoring Station
Guadalupe River
Tributaries
Dams
Segment Boundary
Watershed Boundary
City
Oil Reserve
County with significant poultry activities
Road
County Line
Industrial WW Permit
Domestic WW Permit
Texas Land Application Permit
5 2.5 0 5
Miles
N
W
E
S

Middle Guadalupe Watershed (Part A)

Drainage Area: 939 square miles

Streams and Rivers: Guadalupe River below Canyon Dam, Dry Comal Creek, Comal River, Geronimo Creek

Lakes: Lake Dunlap, Lake McQueeney, Lake Placid

Aquifers: Edwards Trinity, Edwards Balcones Fault Zone, Carrizo Wilcox

River Segments: 1804, 1804A, 1811, 1811A, 1812

Cities: Sattler, New Braunfels, Schertz, Seguin, Geronimo, Kingsbury

Counties: Comal, Guadalupe, Gonzales

EcoRegions: Texas Blackland Prairies
Post Oak Savannah

Vegetation Cover:

Pasture/Hay- 25.5%	Grass/Herbaceous - 15.1%
Evergreen Forest - 18.0%	Shrublands - 12.0%
Deciduous Forest - 15.5%	Row Crops - 8.1%

Climate:
Average annual rainfall: 29 inches
Average annual temperature: January 35° July 95°

Land Uses: Urban, Light Manufacturing, Heavy Manufacturing, Farming, Cattle Ranching, Poultry, Petroleum Production, Gravel Mining

Water Body Uses: Aquatic Life, Contact Recreation, Fish Consumption, General, Public Water Supply, Hydroelectricity, Agricultural Crops, Industrial

Soils: Dark, calcareous clay, sandy loam, loam with clay subsoils; dark red sandstone, light tan and gray sandstone

Permitted Wastewater Treatment Facilities:
Domestic: 8 Land Application: 5
Industrial: 4

MIDDLE GUADALUPE A - RIVER SEGMENTS DESCRIPTIONS/CONCERNS:

Segment 1812 *(Guadalupe River Below Canyon Dam)*: As the Guadalupe River flows from Canyon Dam to the confluence with the Comal River, the river is considered to be one of the finest white-water stretches in the state. The rapids are attributed to the change in elevation as the river cuts through the Balcones Fault Zone. The river is scenic, with limestone bluffs, bald cypress, pecan and elm trees. Trout Unlimited takes advantge of the cold-water releases from the bottom of Canyon Dam and sponsors the stocking of rainbow trout in the tailrace.

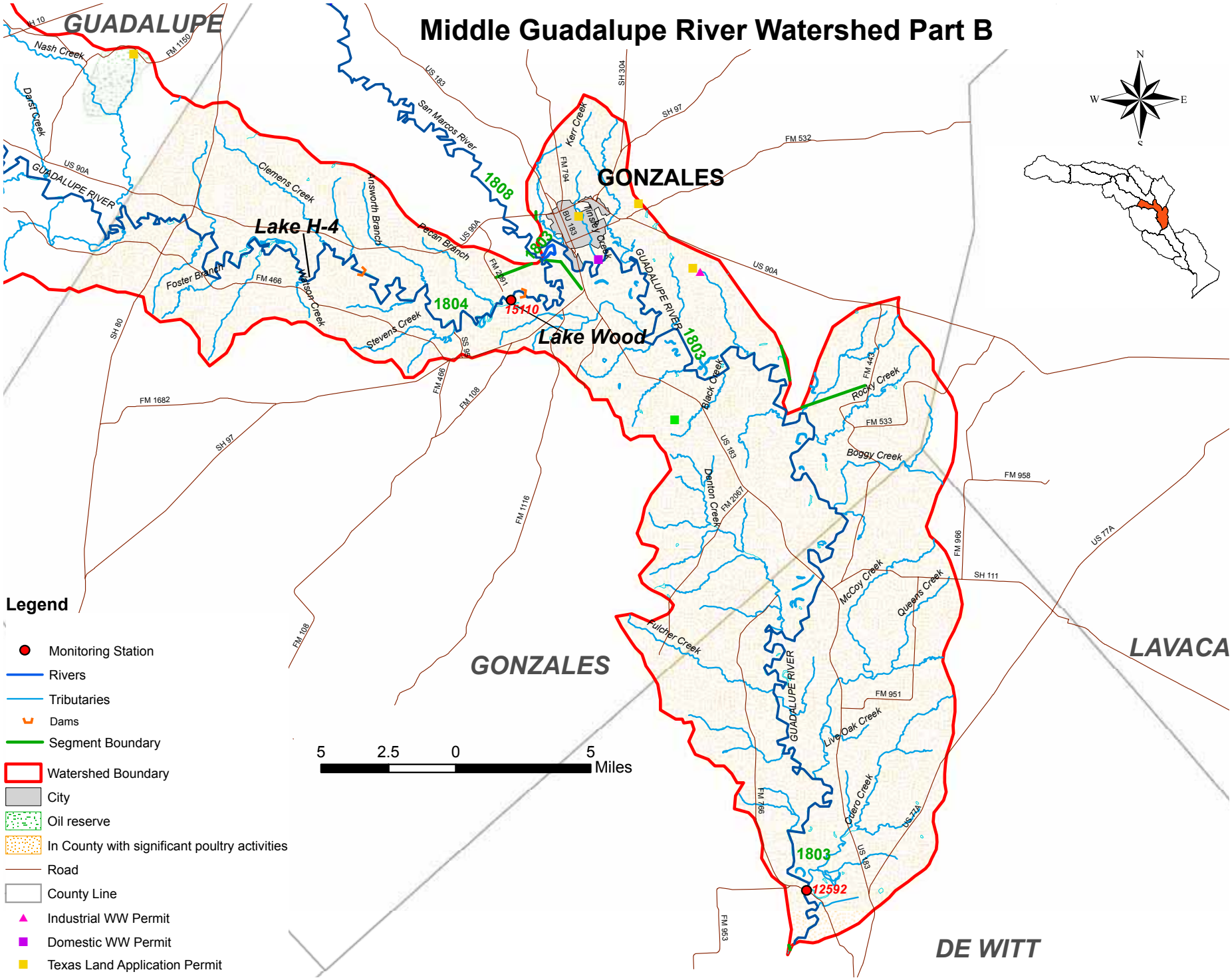
Segment Concerns: Water quality is good. No water quality concerns have been identified by the assessment performed in 2006. Releases from Canyon Reservoir can be anoxic in late summer and early fall but the stilling basin and weirs aerate the water to above the stream standard for aquatic life use. Stakeholders raised concerns about the impacts from heavy recreational use. The impacts mentioned are nonpoint source pollution loading (bacteria and trash) associated with the number of recreationists using the area during the low flow, summer months.

Segment 1811 *(Comal River)*: The 2 ½ mile long Comal River, spring-fed from the Edwards Aquifer, has no water quality concerns but has developed large stands of aquatic macrophytes. The clean, clear, fast moving water is a constant temperature all year, and supports a number of endangered species as well as intensive recreational uses. Dry Comal Creek is also included in this segment.

Segment Concerns: No water quality concerns were noted in the draft 2006 assessment but population growth and recreational pressure are of concern to stakeholders. The impacts mentioned are nonpoint source pollution loading (bacteria and trash) associated with the number of recreationists using the area during the low flow, summer months. Also of concern to stakeholders in the area are the introduction of non-native invasive species such as hygrophila (aquatic plant), the ram's horn snail and loriicarids, a tropical fish used in aquariums for algae control. Non-native species have very few predators in the watershed and can disturb the balance of species in the aquatic ecosystem.

Segment 1804 *(Guadalupe River Below Comal River)*: This stretch of the Guadalupe River between the confluence with the Comal River in New Braunfels to the confluence of the San Marcos River in Gonzales is a beautiful flowing river. Seven GBRA hydroelectric facilities utilize the elevation changes, creating small lakes that are widely used for recreation in Guadalupe County. Lake elevations are managed by GBRA. From New Braunfels to below Seguin, the banks of the hydroelectric lakes are lined with private residences, primarily on septic tanks.

Segment Concerns: Lake McQueeney was previously listed as having a concern for water quality when screened against *reservoir* chlorophyll a standards. The draft 2006 assessment uses the *stream* standard for chlorophyll a, rather than for reservoirs which removed the concern. Geronimo Creek has been listed as impaired due to elevated bacteria concentrations. As seen in previous assessments, Geronimo Creek also has a concern for nutrient enrichment, with no known source. Stakeholders along the hydroelectric impoundments in this segment voiced concern for the impacts from the recreational pressure upstream, including trash and aluminum cans, and from the introduction of non-native species such as hygrophila (aquatic plant), the ram's horn snail and loriicarids, a type of tropical fish used in aquariums for algae control. Non-native species have very few predators in the watershed and can disturb the balance of species in the aquatic ecosystem.


Middle Guadalupe River Watershed Part B
GUADALUPE
GONZALES
LAVACA
DE WITT
Lake H-4
Lake Wood
GUADALUPE RIVER
San Marcos River
Nash Creek
Darst Creek
Clemens Creek
Ainsworth Branch
Pecan Branch
Foster Branch
Watson Creek
Stevens Creek
Kerr Creek
Tinsley Creek
Black Creek
Rocky Creek
Boggy Creek
Denton Creek
Fulcher Creek
McCoy Creek
Queans Creek
Live Oak Creek
Ottero Creek
1808
1803
1804
15110
12592
US 183
US 90A
SH 304
SH 97
FM 532
FM 794
BU 183
FM 2191
FM 466
SH 80
FM 1682
FM 108
FM 1116
FM 443
FM 533
FM 2667
FM 958
FM 966
SH 111
US 77A
FM 951
FM 766
US 59
US 77A
FM 953
Legend
Monitoring Station
Rivers
Tributaries
Dams
Segment Boundary
Watershed Boundary
City
Oil reserve
In County with significant poultry activities
Road
County Line
Industrial WW Permit
Domestic WW Permit
Texas Land Application Permit
5 2.5 0 5
Miles
N
W
E
S

Middle Guadalupe Watershed (Part B)

Drainage Area: 939 square miles

Streams and Rivers: Guadalupe River below Canyon Dam, Guadalupe River from confluence with the San Marcos River

Lakes: Lake H-4, Lake Wood

Aquifers: Carrizo Wilcox

River Segments: 1803, 1804

Cities: Gonzales

Counties: Guadalupe, Gonzales, Lavaca, DeWitt

EcoRegions: Texas Blackland Prairies
Post Oak Savannah

Vegetation Cover:

Pasture/Hay- 25.5%	Grass/Herbaceous - 15.1%
Evergreen Forest - 18.0%	Shrublands - 12.0%
Deciduous Forest - 15.5%	Row Crops - 8.1%

Climate:
Average annual rainfall: 29 inches
Average annual temperature: January 35° July 95°

Land Uses: Urban, Light Manufacturing, Heavy Manufacturing, Farming, Cattle Ranching, Poultry, Petroleum Production, Gravel Mining

Water Body Uses: Aquatic Life, Contact Recreation, Fish Consumption, General, Public Water Supply, Hydroelectricity, Agricultural, Industrial

Soils: Dark, calcareous clay, sandy loam, loam with clay subsoils; dark red sandstone, light tan and gray sandstone

Permitted Wastewater Treatment Facilities:
Domestic: 1 Land Application: 4
Industrial: 1

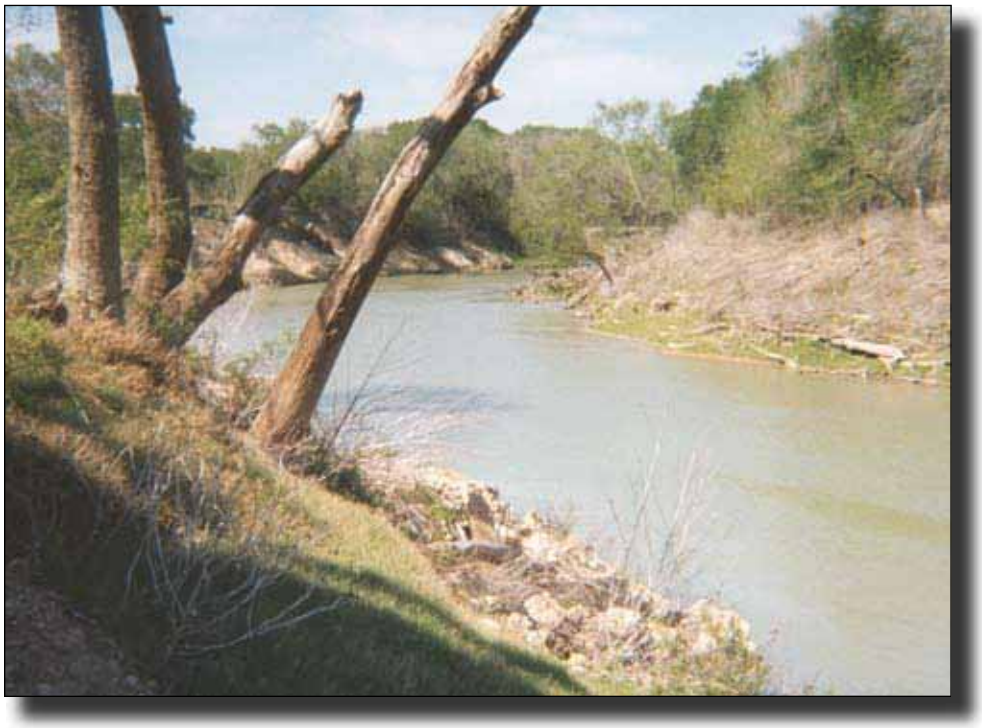
MIDDLE GUADALUPE B - RIVER SEGMENTS DESCRIPTIONS/CONCERNS:

Segment 1804 *(Guadalupe River Below Comal River):* This stretch of the Guadalupe River between the confluence with the Comal in New Braunfels to the confluence of the San Marcos River in Gonzales is a beautiful flowing river. Seven GBRA hydroelectric facilities utilize the elevation changes, creating small lakes that are widely used for recreation in Guadalupe County. Lake elevations are managed by GBRA.

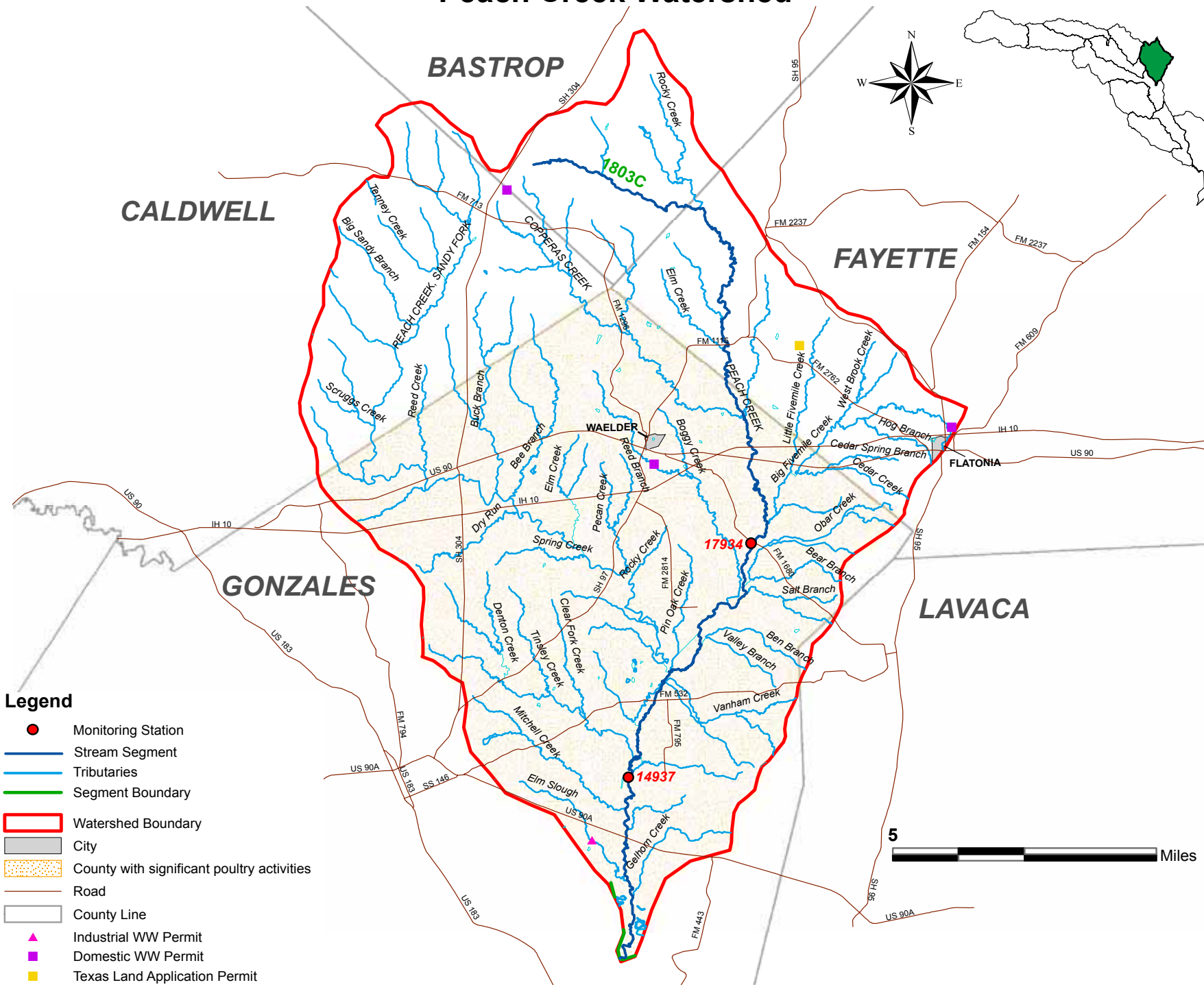
Segment Concerns: Hydroelectric lakes have a history of problems created by non-native invasive aquatic macrophytes, such as hydrilla and water hyacinth.

Segment 1803 *(Guadalupe River Below San Marcos River):* From the point of confluence of the San Marcos River, the Guadalupe becomes a much larger, slower moving stream as it flows toward the coast. Elevation changes are minimal.

Segment Concerns: A number of large poultry farms and cattle ranches are located in this area. To date, there have been no problems in the main segment associated with these land uses, although subwatersheds have been listed as impaired (1803B Sandies Creek and 1803C Peach Creek). See website for links to information on TMDL studies on these streams.



Peach Creek Watershed



Peach Creek Watershed

Drainage Area: 480 square miles

Streams and Rivers: Guadalupe River, Peach Creek, Copperas Creek

Aquifers: Carrizo-Wilcox

River Segments: 1803C

Cities: Waelder, Flatonia

Counties: Caldwell, Bastrop, Fayette, Gonzales

EcoRegion: Texas Blackland Prairies
Post Oak Savannah

Vegetation Cover:

Pasture/Hay- 21.1%	Shrublands - 13.9%
Grass/Herbaceous - 23.4%	Deciduous Forest - 34.1%

Climate:
Average annual rainfall: 31 inches
Average annual temperature: January 39° July 94°

Land Uses: Recreation, Extensive Cattle and Poultry Productions, Light Industry, Agricultural Crops

Water Body Uses: Aquatic Life Use, Contact Recreation Use, Fish Consumption Use

Soils: Dark red sandstone and tan and grey sandstone

Permitted Wastewater Treatment Facilities:
Domestic: 3 Land Application: 2
Industrial: 1

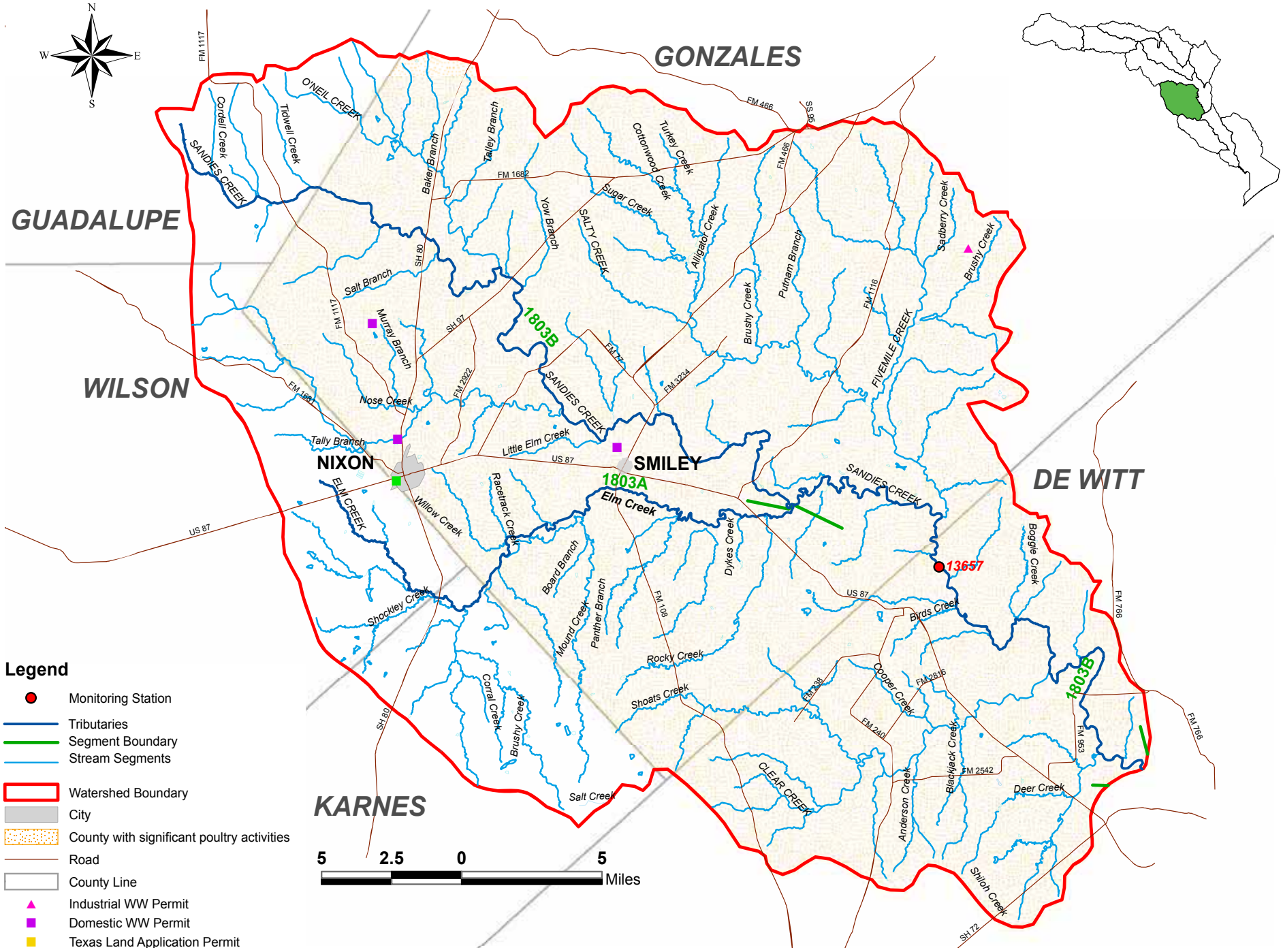
RIVER SEGMENTS DESCRIPTIONS/CONCERNS:

Segment 1803C *(Peach Creek) (Unclassified water body)*: A small system, Peach Creek flows east and south through gently rolling hills for 64 miles from Bastrop and Fayette counties northeast of Waelder into the Guadalupe River in eastern Gonzales County.

Segment Concerns: Contact recreation use is a concern due to bacteria. Peach Creek was included in a TMDL project conducted by the TCEQ. See the GBRA website for links to information on the TMDL study on this watershed.

Special Note: TCEQ has completed the TMDL on Peach Creek. The segment was listed due to elevated bacterial indicators for contact recreation. A TMDL is an allocation of point and nonpoint source pollution loadings that will enable the waterbody to meet water quality standards. A Task Force on Bacteria TMDLs was formed in 2006 to evaluate and recommend methods for developing bacteria TMDLs. TCEQ will use the findings of the task force to determine the ultimate TMDL for the segment. Specific activities have occurred in the Peach Creek watershed as a result of the heightened awareness of the bacterial impairments. Three cattle producers in the watershed have adopted water quality plans for their operations and have used cost share funding to implement their plans. A wastewater lagoon used by a chicken producer has been closed and the poultry houses removed. However, with the inclusion of additional data collected as part of the TMDL, the draft 2006 assessment has included a concern to water quality at the dissolved oxygen grab screening level.

Sandies Creek Watershed



Sandies Creek Watershed

Drainage Area: 711 square miles

Streams and Rivers: Guadalupe River, Elm Creek, and Sandies Creek, Five Mile Creek, Salty Creek, Clear Creek, O'Neil Creek

Aquifers: Carrizo-Wilcox, Gulf Coast

River Segments: 1803A, 1803B

Cities: Smiley, Nixon

Counties: Guadalupe, Karnes, Wilson, Gonzales, DeWitt

EcoRegion: Texas Blackland Prairies
Post Oak Savannah

Vegetation Cover:

Pasture/Hay- 24.9%	Deciduous Forest - 19.6%
Grass/Herbaceous - 24.3%	Evergreen Forest - 5.3%
Shrublands - 21.1%	Row Crops - 3.4%

Climate:
Average annual rainfall: 31 inches
Average annual temperature: January 39° July 94°

Land Uses: Light Manufacturing, Extensive Cattle Production and Poultry Production; Agricultural Crops (hay, sorghum, etc.)

Water Body Uses: Aquatic Life Use, Contact Recreation Use, Fish Consumption Use

Soils: Dark red sandstone, light tan and gray sandstone

Permitted Wastewater Treatment Facilities
Domestic: 3 Land Application: 1
Industrial: 1

RIVER SEGMENTS DESCRIPTIONS/CONCERNS:

Segment 1803A *(Elm Creek) (Unclassified water body)*: Elm Creek flows 24.3 miles before it confluences with Sandies Creek, east of Smiley in Gonzales County.

Segment Concerns: In past stream assessments, the entire waterbody was listed as impaired for aquatic life use due to depressed dissolved oxygen, and impaired for contact recreation use due to bacteria. Elm Creek was included in the TMDL study, along with Sandies Creek. The TMDL study is still underway.

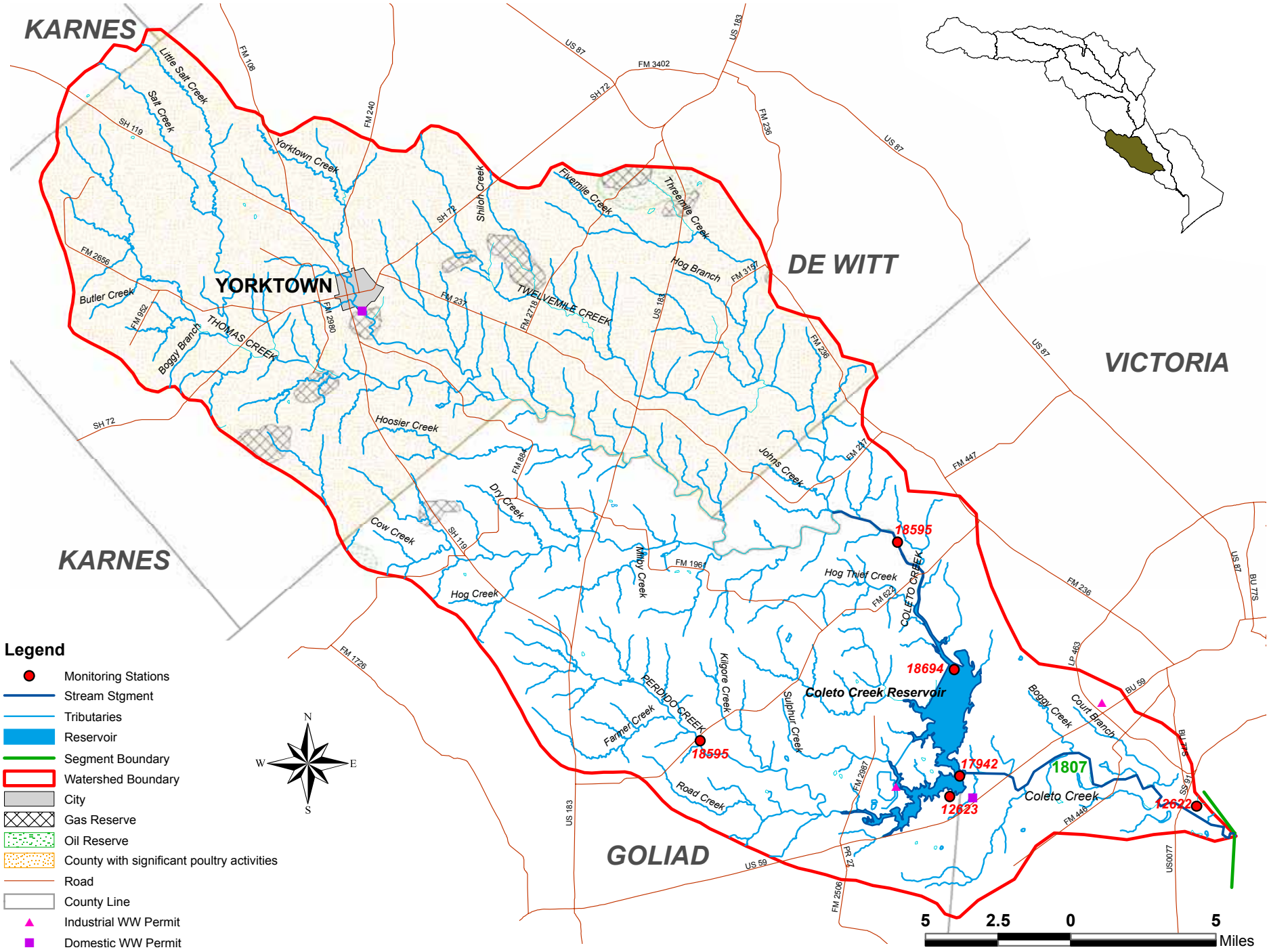
Segment 1803B *(Sandies Creek) (Unclassified water body)*: Sandies Creek is a 65 mile long stream originating in Guadalupe County northwest of Nixon to the confluence of the Guadalupe River west of Cuero in DeWitt County.

Segment Concerns: Sandies Creek is impaired for aquatic life use due to depressed dissolved oxygen and impaired for contact recreation uses due to elevated bacteria. With the additional data collected during the on-going TMDL study, the concern for nutrient enrichment due to ammonia-nitrogen has been removed.

Special Note: TCEQ is conducting a TMDL on Sandies Creek due in part to elevated bacterial indicators for contact recreation. A TMDL is an allocation of point and nonpoint source pollution loadings that will enable the water body to meet water quality standards. A Task Force on Bacteria TMDLs was formed in 2006 to evaluate and recommend methods for developing bacteria TMDLs. TCEQ will use the findings of the task force to determine the ultimate TMDL for the segment.

Drew C. Engelke

Coleto Creek Watershed



Legend

- Monitoring Stations
- Stream Stgment
- Tributaries
- Reservoir
- Segment Boundary
- Watershed Boundary
- City
- Gas Reserve
- Oil Reserve
- County with significant poultry activities
- Road
- County Line
- Industrial WW Permit
- Domestic WW Permit

Coleto Creek Watershed

Drainage Area: 558 square miles

Streams and Rivers: Guadalupe River, Coleto Creek, Perdido Creek, Twelve Mile Creek, Thomas Creek

Aquifer: Gulf Coast

River Segments: 1807

Cities: Yorktown

Counties: DeWitt, Goliad, Victoria

EcoRegion: Texas Blackland Prairies
Gulf Coastal Plains

Vegetation Cover:

Pasture/Hay- 15.3%	Shrublands - 9.7%
Grass/Herbaceous - 33.2%	Deciduous Forest - 18.7%
Row Crops - 5.0%	

Climate:
Average annual rainfall: 30 inches
Average annual temperature: January 41° July 95°

Land Uses: Agricultural Crops (sorghum, rice, cotton and corn), Beef, Hogs and Poultry Productions and Oil and Gas Production

Water Body Uses: Aquatic Life Use, Contact Recreation Use, Fish Consumption Use, Public Water Supply Use and Power Plant Cooling

Soils: Sandy, sandy loam and clay loam

Permitted Wastewater Treatment Facilities:
Domestic: 2
Industrial: 2

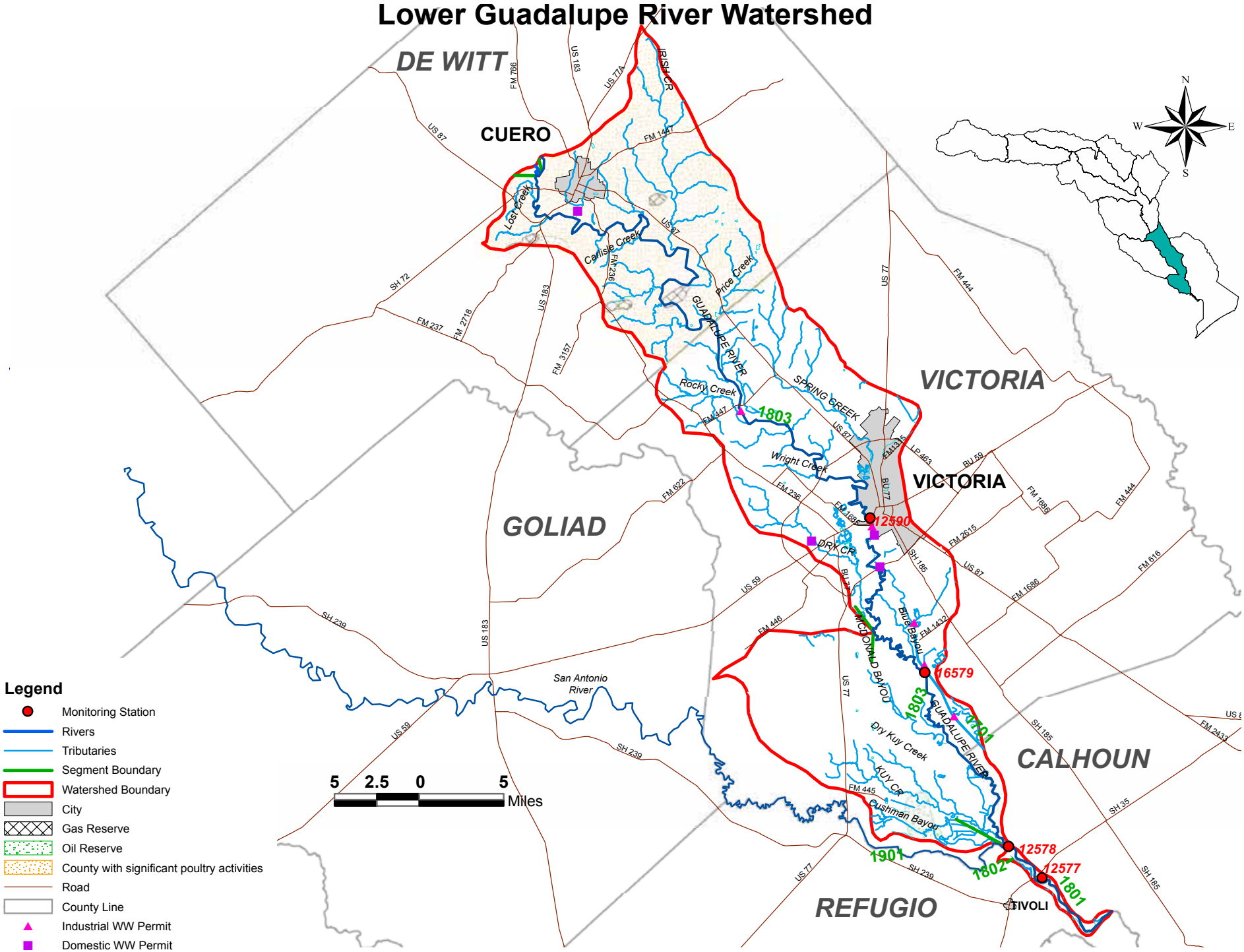
RIVER SEGMENTS DESCRIPTIONS/CONCERNS:

Segment 1807 *(Coleto Creek):* Coleto Creek extends 27miles beginning in DeWitt County, through Goliad and Victoria Counties, including the 3,100 acre Coleto Creek Reservoir to the confluence with the Guadalupe River in Victoria County. Because of the size of Coleto's drainage basin, this normally slow moving creek can become a fast, flowing river during a typical South Texas rainstorm. Much of the creek bottom is made up of sand with typical vegetation ranging from mesquite and huisache to large live oaks and anaque trees. Because of its rural sitting and limited development you can still find a wide range of Texas wildlife along its shores ranging from turkey and deer, to red fox and bobcats; and with the completion of the Coleto Creek Reservoir it now supports over 100 different species of birds with the most noted being the Southern Bald Eagle, Osprey, and Roseate Spoonbills.

Segment Concerns: Coleto Creek Reservoir is used for cooling water by the Coleto Creek, WLE, LP coal-fired power plant. This use may impact aquatic life (temperature, dissolved oxygen, excessive aquatic macrophyte growth). Other activities in the watershed that may impact water quality include oil field activities, increasing numbers of subdivision developments, land clearing on existing ranches along the creek, and introduction of non-native aquatic plant species into the Coleto Creek system.

Special Note: The Uranium Energy Corporation is proposing to lease property in Goliad County to mine uranium by in-situ leaching. In-situ mining is the stripping of uranium from underground formations by the injection of acid and water. The subsequent solution containing dissolved uranium is pumped to the surface and piped to a production facility. The Uranium Information at Goliad (UIAG), a citizen group, has formed to gather and disseminate information about the process and possible impacts to surface and ground water. The stakeholders have asked CRP to collect background samples from Coleto Creek for radiological compounds. Those samples will be collected in FY2008.

Lower Guadalupe River Watershed



Lower Guadalupe Watershed

Drainage Area: 488 square miles

Streams and Rivers: Guadalupe River Tidal, Guadalupe River Below San Antonio River, and Guadalupe River Below San Marcos River, Sandies Creek, Elm Creek, Coleto Creek, Spring Creek, McDonald Bayou

Aquifers: Carrizo-Wilcox, Gulf Coast

River Segments: part of 1803, 1802, 1801, 1701

Cities: Cuero, Victoria, Tivoli

Counties: Calhoun, Refugio, Victoria, DeWitt

EcoRegion: Gulf Coastal Plains
East Central Texas Plains

Vegetation Cover:

Pasture/Hay- 14.8%	Shrublands - 21.1%
Grass/Herbaceous - 22.6%	Evergreen Forest - 5.7%
Row Crops - 4.2%	Wetlands - 10.2%
Deciduous Forest 14.8%	

Climate:
Average annual rainfall: 37.4 inches
Average annual temperature: January 53° July 84°

Land Uses: Urban, Agricultural Crops (cotton, corn, wheat, rice, hay, grain sorghum), Cattle and Hog Productions, Industrial (plastics, chemicals, petrochemicals)

Water Body Uses: Aquatic Life Use, Contact Recreation Use, General Use, Fish Consumption Use, Heavy Industrial Use, Public Water Supply Use

Soils: Cracking clay subsoil, sandy, sandy and clay loam

Permitted Wastewater Treatment Facilities:
Domestic: 4
Industrial: 5

RIVER SEGMENTS DESCRIPTIONS/CONCERNS:

Segment 1803 *(Guadalupe River Below San Marcos River):* From the point where the San Marcos River confluences with the Guadalupe River in Gonzales, Segment 1803 becomes a twisting, slow-moving coastal river, lined with pecan bottoms, with no rapids of any consequence. This portion of Segment 1803 begins to the west of the city of Cuero, flowing south to the west of the city of Victoria, to immediately upstream of the confluence with the San Antonio River.

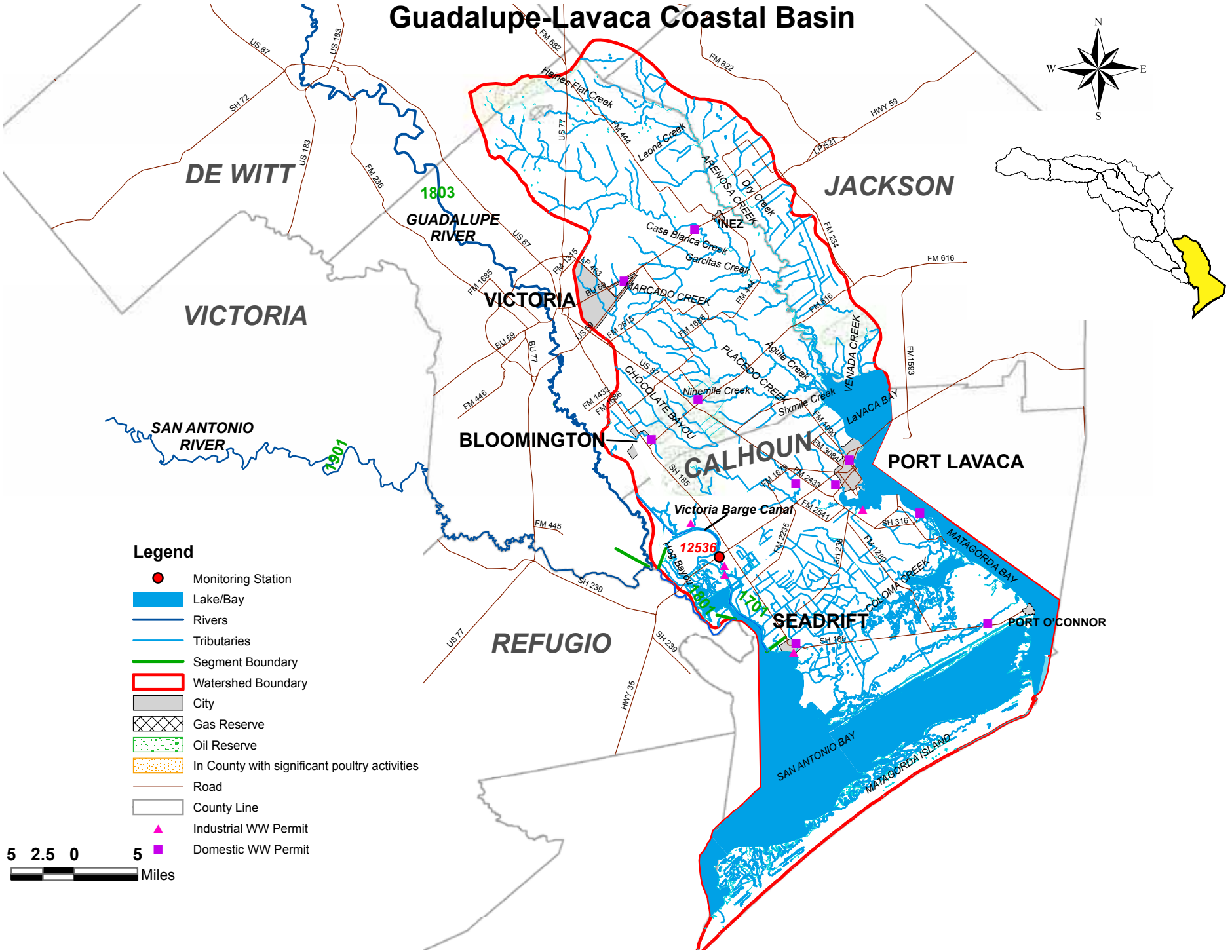
Segment 1802 *(Guadalupe River Below San Antonio River):* This 0.4 mile long stretch between the confluence of the San Antonio and Guadalupe Rivers to the GBRA Salt Water Barrier is a typical slow moving coastal river.

Segment Concerns: In early assessments, this segment was found to have a concern for nutrient enrichment from the San Antonio River. With additional data collection, the draft 2006 assessment has removed the segment from the list of concerns in the Guadalupe River Basin.

Segment 1801 *(Guadalupe River Tidal):* From the confluence with Guadalupe Bay in Calhoun/Refugio County to the Guadalupe-Blanco River Authority Salt Water Barrier (0.4 miles) downstream of the confluence of the San Antonio River in Calhoun/Refugio County.

Segment Concerns: In early assessments, in addition to the concern for nutrient enrichment, this segment was thought to have a concern for depressed dissolved oxygen. With additional data collection and assessment against the correct standard, the draft 2006 assessment has removed the segment from the list of concerns for aquatic life use in the Guadalupe River Basin.

2003 - Diane Loyd


Guadalupe-Lavaca Coastal Basin
N
W
E
S
DE WITT
VICTORIA
JACKSON
CALHOUN
REFUGIO
1803
GUADALUPE RIVER
SAN ANTONIO RIVER
1901
VICTORIA
BLOOMINGTON
INEZ
PORT LAVACA
SEADRIFT
PORT O'CONNOR
Victoria Barge Canal
12536
1701
1601
Harles Flat Creek
Leona Creek
ARENOSA CREEK
Dry Creek
Casa Blanca Creek
Garcitas Creek
MARCADO CREEK
PLACEDO CREEK
Aguila Creek
Ninemile Creek
Sixmile Creek
CHOCOLATE BAYOU
VENADA CREEK
LAVACA BAY
COLOMA CREEK
MATAGORDA BAY
SAN ANTONIO BAY
MATAGORDA ISLAND
Lynn Bayou
US 87
US 183
SH 72
FM 236
US 77
FM 444
FM 822
HWY 59
LP 521
FM 234
FM 616
FM 1685
FM 1315
LP 463
BU 59
FM 2915
FM 1593
BU 77
FM 446
FM 1431
FM 1686
SH 185
FM 1090
FM 3082
FM 1679
FM 2433
FM 2541
FM 445
SH 239
FM 2235
SH 316
FM 1289
SH 35
HWY 35
Legend
Monitoring Station
Lake/Bay
Rivers
Tributaries
Segment Boundary
Watershed Boundary
City
Gas Reserve
Oil Reserve
In County with significant poultry activities
Road
County Line
Industrial WW Permit
Domestic WW Permit
5 2.5 0 5
Miles

Guadalupe-Lavaca Coastal Basin

Drainage Area: 998 square miles

Streams and Rivers: Guadalupe River, Garcitas Creek, Victoria Barge Canal, Marcado Creek, Arenosa Creek

Aquifer: Gulf Coast

River Segments: 1701

Cities: Victoria, Seadrift, Bloomington, Inez, Port O'Connor, Port Lavaca

Counties: Calhoun, Victoria, Jackson

EcoRegion: Gulf Coastal Plains

Vegetation Cover:

Pasture/Hay- 15.1%	Shrublands - 16.9%
Grass/Herbaceous - 13.7%	Deciduous Forest - 8.4%
Row Crops - 21.4%	Wetlands - 17.2%

Climate:
Average annual rainfall: 42 inches
Average annual temperature: January 44° July 93°

Land Uses: Agriculture Row Crops (cotton, corn, rice and grain sorghum), Urban, Recreation, Oil & Gas Production, Cattle, Hog and Poultry Production, Industry (plastics, chemicals, petrochemicals)

Water Body Uses: Aquatic Life Use, Non-contact Recreation Use, Fish Consumption Use, Industrial Cooling

Soils: Clay subsoils, deep black soil, sandy clay, dark clay loam, clay

Permitted Wastewater Treatment Facilities:
Domestic: 10
Industrial: 5

RIVER SEGMENTS DESCRIPTIONS/CONCERNS:

Segment 1701 *(Victoria Barge Canal):* From the Victoria Turning Basin in Victoria County to the confluence with San Antonio Bay in Calhoun County.

Segment Concerns: The concern for aquatic life use has been removed from this segment after additional 24-hour dissolved oxygen data was collected and used in the draft 2006 assessment.

TCEQ 2006 WATER QUALITY ASSESSMENT

While water quality in the two basins (Basin 18 – Guadalupe River and Basin 17 – Lavaca-Guadalupe) is generally good, a number of water bodies have been identified as impaired or having concerns for nutrient enrichment and/or dissolved oxygen grab concentrations at screening levels. TCEQ has performed an extensive assessment of the water bodies in the basin, as a requirement of Sections 305(b) and 303(d) of the Federal Clean Water Act. The *draft 2006 Texas Water Quality Inventory and 303(d) List* prepared by TCEQ has been issued for review. The report describes the status of water quality in all surface water bodies in the Guadalupe River Basin that were evaluated using the data collected during the period of December 1, 1999 and November 30, 2004.

Drew C. Engelke

Water quality is evaluated according to guidance developed by TCEQ through a stakeholder process. After assessments are completed, water bodies are placed into one of five categories. The categories indicate the status of water quality of each segment. Category 5 constitutes the 303(d) List of Impaired Waters, for which total maximum daily load studies may be required. Each category 5 water body is further classified according to the priority for improving its condition and the need for additional data to make a more complete assessment. Category 5a is assigned to a water body that has a TMDL study scheduled or underway. Category 5b is assigned to a water body that will have a review of the water quality standards for the water body before a TMDL is scheduled. Category 5c is assigned to a water body on which additional data and information will be collected before a TMDL is scheduled.

Data used in the assessment process includes data submitted to and stored in the TCEQ integrated database. These data are collected by TCEQ Surface Water Quality Monitoring team, the U.S. Geological Survey, the Texas Department of State Health Services, the Texas Parks and Wildlife Department and Clean Rivers Program planning agencies and associated partners, such as the Upper Guadalupe River Authority and the Wimberley Valley Watershed Association. Given the regulatory implications associated with the assessment of water

Categories of Water Quality Conditions

The term ***Impairment*** is assigned by TCEQ to a portion of a water body when certain water quality constituents reach threshold concentrations (as specified in the Texas Surface Water Quality Standards or screening procedure documents) for a minimum number of times over a period of five years. This designation indicates that TCEQ believes the uses of the water body (drinking water supply, recreation, aquatic life, etc.) may have been *impaired*. In other words, the fish may not be able to get enough oxygen to survive, the water may not be suitable for swimming, or the water may not be fit to be used as a public drinking water supply. Streams that are shown to have an *Impairment* for one or more constituents are placed on the TCEQ's CWA Section 303(d) list.

Once a portion of a stream is placed on the list, a series of actions may be taken by the TCEQ, including but not limited to: denial of increases in wastewater permit effluent limits; a Total Maximum Daily Load (TMDL) study to allocate pollutant loads to certain sources; and instituting a strategy for reducing loads from all sources.

Some water bodies are identified with ***Concerns***. These concerns are identified for parameters such as dissolved oxygen which are directly tied to support of designated uses and criteria adopted in the Texas Surface Water Quality Standards.

Two new designations have been established for concerns. ***Concern for near non-attainment*** is given to those water bodies that are statistically meeting the standard but are within one exceedance of being listed as impaired. It is used as a warning flag. ***Concern for water quality at the screening level*** indicates that there is marginal water quality for a parameter using the concern assessment method. The concern assessment method assesses a site using established screening levels. Screening levels are concentrations that are statistically derived, based on long-term historical monitoring data or based on published levels of concern.

bodies, TCEQ requires the highest quality data feasible. Only data collected using consistent and scientifically rigorous water quality sampling methods are used in the assessment process. Data without appropriate quality assurance documentation will be considered as anecdotal evidence to support or refute assessment results, but will not be used in statistical evaluations. Examples of this type of data includes data collected by Texas Watch monitoring groups that have not adopted all aspects of the Texas Watch quality assurance project plan.

Those water bodies in the Guadalupe River Basin that are on the draft 303(d) List of Impaired Waters are listed below. A list of all assessed water bodies in the Guadalupe River Basin that have water quality concerns or impairments can be found on page 38 of this report. The draft 2006 Inventory and methodology for assessment can be found at http://www.tceq.state.tx.us/compliance/monitoring/water/quality/data/06twqi/twqi06.html.

TCEQ assesses the data as grab samples as well as means of data points for each parameter for monitoring sites within a segment. The data is compared to the numeric stream standard if established for the segment or compared to screening levels.

Draft 2006 Clean Water Act Section 303(d) List of Impaired Water Bodies for the Guadalupe River Basin

Segment Number	Area	Parameter of Impairment
1803A	Elm Creek (entire water body)	DO, Bacteria
1803B	Sandies Creek (from the confluence with Elm Creek to upper end of water body)	DO
1803B	Sandies Creek (from the confluence with the Guadalupe River to the confluence with Elm Creek)	DO, Bacteria
1803C	Peach Creek (lower 25 miles)	Bacteria
1803C	Peach Creek (from 1.2 miles downstream of FM1680 in Gonzales County to confluence with Elm Creek in Fayette County)	DO, Bacteria
1804A	Geronimo Creek (entire segment)	Bacteria
1805	Canyon Lake (entire segment)	Mercury in fish tissue
1806	Guadalupe River above Canyon Lake (from 1 mile upstream of Flat Rock Dam to the confluence with Camp Meeting Creek)	Bacteria
1806	Guadalupe River above Canyon Lake (from RR 394 1 mile downstream)	Bacteria
1806A	Camp Meeting Creek (entire waterbody)	DO
1810	Plum Creek (from approximately 0.5 mile upstream of SH21 to upper end of segment)	Bacteria

2006 INVENTORY OF EVENTS THAT COULD IMPACT WATER QUALITY (entire historial listing available on www.gbra.org)

Date	Event	River Segment	Comments
Jan. 18, 2006	Watermaster investigated construction site in Comal County	1812 Guadalupe below Canyon Dam	Rockin' R River Company was investigated by the South Texas Watermaster for possible diversion the Guadalupe River. There was no diversion but it was noted that there was a large amount of raw soil that had been pushed into the main river channel between the silt fencing and the river channel. It was reported to the Region 13 office for further investigation.
Jan. 24, 2006	Spill of 50% Caustic (Sodium Hydroxide) in DeWitt County	1803 Middle Guadalupe	A truck overturned at the intersection of Hwy 183 and Hwy 111 in DeWitt County, releasing a sizable amount of 50% sodium hydroxide into a drainage ditch. The spill was contained by a series of earthen berms constructed by the Yoakum Volunteer Fire Dept. No material reached the creek.
Mar. 20, 2006	Holmes Foods applies for discharge permit in Gonzales County	1803 Middle Guadalupe	Holmes Foods has applied to TCEQ for a TPDES permit for the discharge of treated wastewater at a volume not to exceed an average daily flow of 7000 gallons per day. The discharge route is into Five Mile Creek and then into Sandies Creek.
March 2006	Paddling trail opens on the San Marcos River near Luling	1808 San Marcos	Six-mile stretch of the San Marcos River, from the U.S. Hwy. 90 to Luling at the Zedler Mill, is the first inland paddling trail in Texas. Two other paddling trails are being developed in the basin.
Mar. 30, 2006	A 4" line was discovered crossing the San Marcos River near the golf course in Luling	1808 San Marcos	A 4" pipe crossing the San Marcos River was found to be damaged by debris and about 18" above the water level. The RRC was notified but there is no information on what is transported in the pipe or who owns the pipe. The RRC investigated and the problem has been resolved.
May 2006	Uranium Energy Corporation begins drilling test wells for uranium mining in Goliad County	1807 Coleto Creek	In response to the Uranium Energy Corporation's announcement of drilling operations in Goliad County, the Uranium Information at Goliad group has been formed. Goals of the group are to research uranium mining and its impacts on ground water, property values and to educate the citizens of Goliad County. They have held several town meetings that have allowed the citizens to hear all sides of the issues as well as ask questions of the mining company.
May 2006	Watershed Protection Plan efforts for Plum Creek	1810 Plum Creek	The TSSWCB, TCEQ, EPA, GBRA and other entities along with a group of stakeholders in the Plum Creek watershed have begun work on the development of a watershed protection plan for the watershed. The upper portion of Plum Creek has been designated as impaired due to elevated bacteria concentrations, the lower portion has been listed as a concern due to nutrient concentrations (total phosphorus, nitrate-nitrogen and ammonia-nitrogen).
Summer 2006	Low flows and elevated coliform bacteria concentrations prompt UGRA to issue warning of exposure to pathogens during contact recreation	1806 Upper Guadalupe above Comfort	UGRA monitors 19 river sites for bacterial quality from May to September. Due to elevated bacterial concentrations, the UGRA issued a reminder to recreationists that there is a risk of exposure during low flow periods. GBRA followed suit with a similar reminder.
October 2006	SDHS issues a fish consumption advisory for Canyon Reservoir	1805 Canyon Lake	The State Department of Health Services issued a fish consumption advisory for Canyon Reservoir due to elevated mercury found in the fish tissue of long-nosed gar and striped bass. The advisory applies only to the consumption of these two species.

GBRA PUBLIC INVOLVEMENT AND OUTREACH ACTIVITIES

The GBRA sustains a number of communication mechanisms to support the CRP in the Guadalupe Basin, striving to maintain active communication with the public to pursue the goals of public involvement and education in water quality issues. GBRA develops opportunities for direct public participation to ensure that community concerns are addressed. These include quarterly Water Resource newsletters, website updates, issuing press releases regarding various water topics, and providing presentations to the public.

The Guadalupe River Basin Steering Committee

A major communication vehicle for the CRP is the Basin Steering Committee. Composed of community leaders and interested citizens from throughout the basin, this group meets annually to review activities and advise the program on priorities for monitoring and special studies. The Steering Committee membership includes: representation from municipalities, counties, industries, homeowner organizations, Texas Soil and Water Conservation Board, Texas Parks and Wildlife Department, Texas Department of Agriculture, Texas Railroad Commission, League of Women Voters, chambers of commerce, and local/regional environmental organizations. Steering Committee meetings are OPEN TO THE PUBLIC with the primary purpose of reviewing and approving achievable basin water quality objectives and priorities, considering available technology and economic impacts, and guiding work plans and the allocation of available resources. Notice of the Steering Committee meetings is made available by mailed notices, as well as on the meeting page of the GBRA website (www.gbra.org).

Special Sub-committees for Local Water Quality Issues

In addition to the Basin Steering Committee for the CRP, the GBRA has established the Hydroelectric Lake Citizens Advisory Committee and the Coleto Creek Reservoir Advisory Committee. These groups are given the opportunity to hear, question and give input on activities to control nuisance, non-native aquatic vegetation each year as well as lake operations and safety. The committees have representatives from homeowners associations, potable water systems, bass clubs, boating sales companies, industries, as well as the Texas Parks and Wildlife Department and Texas Department of Agriculture. These committees also receive invitations to the CRP steering committee meetings.

Water Quality Monitoring Program

GBRA monitors 27 sites throughout the river basin on a monthly or quarterly basis for field and conventional parameter groups as well as bacteria and flow. (UGRA monitors similar parameter groups at sites in Kerr County on either a quarterly or summer weekly frequency – see p.36.) In addition, biological and habitat assessments, and metals samples are collected annually at selected sites. The annual monitoring schedule is based on identified need, priority, and the funding that is available and is coordinated each year with other monitoring entities such as the TCEQ, Texas Watch, U.S. Geological Survey, Texas Parks and Wildlife Department and other entities that are collecting data in the basin, in order to eliminate duplication of effort and provide the best utilization of resources.

These monitoring activities are conducted under an approved Quality Assurance Project Plan (QAPP) in order to provide the level of consistency and scientific validity needed for environmental monitoring and decision. The QAPP is critical for documenting how GBRA and UGRA plans, implements and assesses the water quality of the basin. It includes sections on the project organization, background, quality objectives, training requirements, record-keeping, methodologies and equipment maintenance. To view a map of GBRA sampling locations, go to http://www.gbra.org/CRP/MonitoringStationsMap.aspx. A quick view of the county maps can lead you to data tables that include information on sampling frequencies, parameters, and historical data. Each of these sampling locations can also be found on maps of the individual subwatersheds included in this publication.

Regional Lab

The Regional Laboratory located at the General Offices of GBRA in Seguin provides technical assistance and support to GBRA's operations, as well as municipalities, water districts, industries, engineering firms and other organizations as they comply with federal, state and local regulatory requirements that protect water quality. The Regional Laboratory is equipped to perform physical, chemical and biological analyses of water from natural streams, potable water and wastewater treatment plants, groundwater wells

and treatment residuals, utilizing current technology and equipment. The Regional Laboratory serves as a contract laboratory for the CRP.

In addition to its broad water quality planning initiatives and participation in environmental and water quality monitoring programs within the river basin, the laboratory also sponsors and trains Texas Watch water quality monitors, a statewide volunteer program created under the Texas Clean Rivers Act of 1994 to involve citizens in the testing and protection of water resources. The lab also conducts presentations for schools, civic and other organizations on water quality, environmental issues, Texas Watch and other water-related subjects. The laboratory maintains strong working relationships with federal, state and local government agencies responsible for water quality, as well as corporations and individuals capable of affecting water quality.

Preservation and Conservation Efforts

Friends for Rivers (New Braunfels) organizes annual river clean ups in the high recreation use sections of the river between Canyon Reservoir and Cypress Park in New Braunfels. GBRA maintains an active presence in helping to fund and volunteer in these in river cleanups. GBRA is also a proud sponsor of annual KidFish events at Whitewater Sports south of Canyon Reservoir and at Camp Wood on the San Marcos River.

Public Education Efforts

GBRA's award-winning *Journey Through the Guadalupe River Basin* 4th grade program, revised for school year 2005-2006, was welcomed with open arms by school districts within the basin. A number of school districts have mandated use of the program as a part of their Science curriculum. Previously more of a Social Studies unit, the revised TEKS-correlated interdisciplinary curriculum supplement places an emphasis on watersheds and water quality specifically in the Guadalupe River Basin. In addition, the curriculum touches on the water cycle, water uses in the basin, population growth, and water conservation.

Two table-top watershed models are available for GBRA Education staff to take to schools or events to demonstrate how a watershed works, and the impact of nonpoint source pollution to the watershed. One model represents the Hill Country and one represents coastal land. Use of the model provides an opportunity to discuss best management practices (BMPs) within a watershed. The state science curriculum for fourth and fifth grade science is the best fit to incorporate use of the model in the classroom.

GBRA was awarded a grant from the EPA to develop a river basin model of the Guadalupe River Basin. Currently in production, this model will also be used to demonstrate non-point source pollution and discuss BMPs, and will model elevation, river and stream flow in the Guadalupe basin. Additional information on the model will be counties, highways, cities, etc.

GBRA continues to offer teacher training for its River of Life middle school curriculum. River of Life includes discussion on the Clean Rivers Program, and hands-on activities dealing with water quality, and water and wastewater treatment. The curriculum has been distributed to all middle schools in the basin.

Other outreach activities include presentations to groups at environmental events, such as at Aquarena Center at the Groundwater Festival and area agricultural events. A continued partnership with the Seguin Outdoor Learning Center includes contributions of laboratory equipment and chemicals to support water quality investigations, and GBRA-led sessions on macroinvertebrates and water quality testing for school groups and civic groups.

Education efforts also include tours for students to the GBRA Regional Lab and to GBRA operated drinking water and wastewater facilities. In the lab, students are engaged in a demonstration and discussion of basic analysis techniques. At the treatment facilities, students are provided an overview of the treatment process, and engaged in discussion about water quality issues for these treatment processes.

For the fifth year in a row, GBRA was a partner for TCEQ-sponsored Teaching Environmental Sciences classes for area teachers at Texas Lutheran University and at Texas State University, San Marcos. Presentations dealing with water quality and quantity as well as tours to the lab and treatment facilities are provided annually to the course participants. GBRA staff also assists with training TES teachers in Texas Watch.

CRP SHOWCASE

GBRA Public Information efforts for CRP were noticeably productive in 2006. The homeowner's brochure *Don't Be Clueless About Water* was completed and printed, and a distribution plan was set in place. Two stand-alone displays were created using a modified version of the artwork and text, and were showcased at the CRP Statewide Stakeholders Conference in October.

The publication has received numerous accolades from other environmental agencies, and GBRA / TCEQ have been entertaining proposals for making the publication available for use statewide. The publication could easily be made adaptable to other basins or watersheds with minimal effort. A Plum Creek Watershed version of the brochure has been created for distribution to parents of the school children that are involved in the School Water Monitoring Project (see p. 3). A Plum Creek version of the tabletop display will be used at community events. A Middle Guadalupe Watershed version of the display has been created for use in the Texas Agricultural Education and Heritage Center in Guadalupe County.

Don't Be Clueless About Water begins by defining the term 'watershed', and then leads into an introduction of the reader's watershed. The reader then follows a path through topics such as Nonpoint Source Pollution, Household Hazardous Waste, Outdoor Chemical Use in Landscaping, Septic Tank Maintenance and Wastewater Treatment. The reader is provided tips on how to be a Good Steward of their watershed, and supplied with a list of contact information for more ideas or referral for questions.

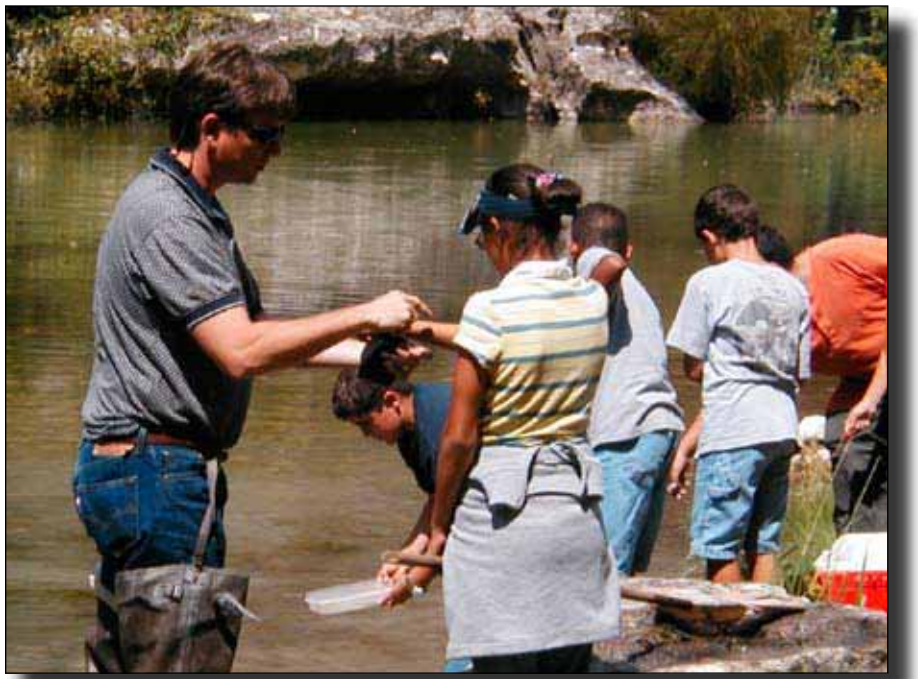
HOW CAN YOU GET INVOLVED?

GBRA promotes communication and participation from the general public. If you are interested in volunteering, or have a specific concern, send an email addressed to dmagin@gbra.org or write a letter to Ms. Debbie Magin, 933 East Court Street, Seguin, TX 78155. Indicate what topics you are interested in and provide enough information so that you can receive mailed notices of meetings and reports. In addition, the information you provide will help us develop sub-watershed groups that have specific interests and may become involved in designing and providing input on special studies. We highly encourage participation in our meetings and input on water quality issues in the basin.

Display of facts from *"Don't Be Clueless About Water"* homewoner brochure. Display is used at events throughout the basin.

UGRA PUBLIC EDUCATION AND OUTREACH ACTIVITIES

As the lead water resource planning agency for the Upper Guadalupe River Basin, UGRA partners with municipal and county governments, communities, civic groups, and citizens to preserve and protect water quality of all Kerr County streams and water bodies.



Extensive Water Quality Monitoring Programs

An active participant in the Texas Clean Rivers Program, UGRA performs routine, quarterly sampling and test analysis for ten sites in Kerr county. Furthermore, UGRA takes a lead in ensuring citizen safety through its Summer Swim-ability (Contact Recreation) Monitoring, also funded through the Clean Rivers Program. To assess the relative risk associated with full contact recreation, samples are pulled weekly from nineteen sites from Memorial Day through Labor Day. *E. coli* bacteria are measured and the results are posted on the UGRA website to ensure that the water is safe for people's swimming enjoyment.

UGRA provides opportunities for citizen stewardship and community involvement in protecting the Upper Guadalupe River resource of Kerr County. One popular activity is the UGRA Volunteer Monitoring Program. This program has been supported by over 20 volunteers who monitored 18 locations, including very popular swimming holes, on a weekly basis. This program provides important data and assists UGRA to determine potential red-flag areas for further assessment. Another community-centered program is the "Springs, Creeks, and Seeps" program, which evaluates smaller water bodies in the county for potential impairments.

As an extension to the TDML study project, UGRA is working with TCEQ to develop an implementation plan to address high bacteria counts in an impaired reach of the Upper Guadalupe River. The project includes key assessment activities that will provide better identification of *E. coli* sources as well as evaluation and implementation of control measures.

Central to these varied water monitoring programs is the UGRA Environmental Laboratory, a full service laboratory serving the entire Hill Country area. The Laboratory's analytical services include bacteriological, chemical, and biological testing of water, wastewater, soils, and sludge. The Laboratory is certified by the TCEQ for the bacteriological analysis of public drinking water and is one of the largest (by sample volume) TCEQ certified microbiological laboratories in the state. UGRA's Environmental Laboratory currently serves as a contract laboratory for the TCEQ Clean Rivers Program.

UGRA PUBLIC EDUCATION AND OUTREACH ACTIVITIES (Cont.)

Preservation and Conservation Efforts

UGRA is committed to the elimination of trash from the river and actively solicits and promotes community involvement in its Trash Free Initiative. First, UGRA arranges for and funds Low Water Crossing Weekly Clean-up at fourteen locations across the county. Over five tons of trash was removed from these low water crossings in 2006. As part of this program, UGRA offers an opportunity for business, organizations, and individuals to get involved in keeping our river clean by "adopting" a crossing to be cleaned each month. Various businesses and civic organizations contribute to the cost of cleaning the crossings.

Another cornerstone of the Trash-Free Initiative is UGRA's Annual River Clean-up Day, a community wide event to promote awareness of the importance of the Guadalupe River to the community and its proper stewardship. In 2006, eight truckloads of trash were collected at three locations by over 120 volunteers. Co-sponsor of the event is the Alamo Area Council of the Boy Scouts of America, who has selected this River Clean-up to be part of its "Good Turn for America" program.

UGRA partners with Volunteer Fire Departments for hazardous material spill containment and cleanup. Absorbent hazmat socks are provided to area fire departments for containing and cleaning up spills of pollutants in the Guadalupe River and other area water bodies.

Reclamation: Restoring the Guadalupe River Watershed

The Guadalupe Bass (State Fish) Restoration Initiative is an important project in promoting overall water quality and watershed management. UGRA is teaming up with Texas Parks and Wildlife Department to re-stock 225,000 pure strain Guadalupe Bass annually over five years into genetically contaminated areas of the Upper Guadalupe River, in an effort to reduce or replace hybrid populations. Found nowhere else in the world but Texas Hill Country, the Guadalupe Bass is a top-tier indicator of environmental quality, requiring pristine water for survival.

UGRA's Bald Cypress Riparian Stabilization and Reforestation Project was initiated to prevent bank erosion and to enhance water quality. Cypress trees have been planted along stream sides throughout Kerr County to help stabilize the banks and reforest the riparian zone. To date, the survival rate is over 85%.

Public Education to Raise Awareness of the Importance of the Guadalupe River

Part of UGRA's mission is to actively facilitate the understanding of water issues and engage the community towards maintaining and promoting the health and enjoyment of the Upper Guadalupe River Basin.

To this end, UGRA Staff provides educational programs for area schools and summertime camps to teach students about water conservation, the water cycle, and how important the Guadalupe River is to our community. The education UGRA provides can be incorporated into the teacher's lesson plan focusing on the TEKS test. UGRA also distributes the "Major Rivers" program to area school teachers upon request. Additionally, UGRA cooperates with Schreiner University in offering an Internship and Job Shadowing Program to university science-major students.

Several exciting, new initiatives are being planned for 2007. First, UGRA is developing a River Basin and Watershed science curriculum specific to Kerr County, focusing on the Guadalupe River, water quality, and the science of water. Portable teaching tools, such as scaled River Basin, Watershed, and Aquifer models will be part of this curriculum. These same teaching tools will be used for making informative presentations to adults and civic groups, but will highlight issues such as proper land management practices and water quality and safety. Additionally, a Land Management Seminar will be offered later in the year to the general public.

SUMMARY OF DRAFT 2006 ASSESSMENT

Segment No.	Segment Description	Category	Impairment, Concern or Change in Designation
1701	**Barge Canal**		**Removed NS for Dissolved Oxygen**
1801	**Guadalupe River Tidal (entire segment)**	CS	Nitrate-nitrogen; **removed NS for Dissolved Oxygen**
1802	**Guadalupe River below confluence with San Antonio River (entire segment)**		**Removed NS for Dissolved Oxygen**
1803A	Elm Creek (entire water body)	5a	Bacteria and Dissolved Oxygen
1803B	Sandies Creek (from the confluence with the Guadalupe River to the confluence with Elm Creek)	5a	Dissolved Oxygen and Bacteria
1803B	**Sandies Creek (from the confluence with Elm Creek to upper end of water body)**	5a	Dissolved Oxygen; **removed CS for ammonia-nitrogen**
1803C	Peach Creek (lower 25 miles)	5a	Bacteria
1803C	**Peach Creek (from 1.2 miles downstream of FM 1680 in Gonzales County to confluence with Elm Creek)**	5a, **5c**	Bacteria, **Dissolved Oxygen**
1804	**Lake McQueeney**		**Removed concern for chlorophyll a concentrations**
1804A	**Geronimo Creek (entire water body)**	CS, **5c**	Nitrate-nitrogen; **Bacteria**
1805	**Canyon Lake**	**CS, 5c**	**Nitrate-nitrogen; Fish Consumption Advisory (Mercury)**
1806	Guadalupe River above Canyon Lake (entire segment)	5a	Bacteria
1806A	Camp Meeting Creek (upper nine miles)	5b	Dissolved Oxygen
1810	Plum Creek (from SH 21 to upper end of segment)	5c	Bacteria
1810	Plum Creek (entire segment)	CS	Nutrient Enrichment (Nitrate, Ammonia, Orthophosphate, Total Phosphorus)
1813	**Upper Blanco River (from Hays Co 1492 to Blanco Co 406)**	**CS**	**Dissolved Oxygen**
1817	**North Fork Guadalupe River (entire segment)**	**CS**	**Dissolved Oxygen**

Changes from the 2004 assessment are in bold.
CS – concern for water quality at screening level; see page 30 for explanation of *concern*
NS – not supporting
5a, 5b, 5c – refer to page 30 for explanation of categories

TEXAS WATCH

Texas Watch is a cooperative program of monitoring and communication about the environment. It includes volunteers, the TCEQ and Texas Watch partners. GBRA and UGRA are partners in the Texas Watch program in the basin. The goals of the Texas Watch program are to collect information needed to make environmentally-sound decisions.

GBRA and UGRA support Texas Watch in the Guadalupe River Basin by:

- Providing informational sessions to promote and help establish monitoring groups.
- Providing training to monitors.
- Providing quality control sessions.
- Providing technical expertise to support, expand and maintain monitoring groups.
- Providing chemical reagents and equipment to established groups.

For information or scheduling contact:
Lee Gudgell (GBRA) lgudgell@gbra.org
Cinde Thomas-Jimenez (GBRA) cthomas-jimenez@gbra.org
Karen Morris (UGRA) ugrakam@ugra.org
www.texaswatch.geo.tx.state.edu

WEB SITES

Another mechanism used to keep the public informed is the Internet. Both river authorities have Internet web pages (www.gbra.org and www.ugra.org) that provide information to the public on topics of interest in the basin.

The GBRA web page provides links to a range of information on river flows and quality conditions, including:

- Water quality data
  Data of water quality samples collected by GBRA and UGRA. These files can be easily downloaded in pdf format.
- Special Studies Reports
  Available for download in pdf format.
- Schedule of Monitoring Activities
  A list of all the monitoring sites under a TCEQ- approved QAPP.
- Interactive Map of the Monitoring Sites
  Click on each site and find out which information is being collected for that location.
- Quality Assurance Information
  Detailed information on the type of constituents (pollutants) collected by the river authorities.
- Events Inventory
  A listing of events related to water quality in the Guadalupe and Lavaca-Guadalupe Basins.

WATER QUALITY TESTING AND STANDARDS

Before the water comes out of your tap it has gone through a systematic treatment process to remove impurities including toxins, metals and bacteria. Drinking water treatment plants have stringent requirements and standards that are regulated by the Texas Commission on Environmental Quality.

If you have a question about your drinking water you should contact your local water provider. The federal Safe Drinking Water Act (SDWA) requires water utilities to issue an annual report to customers, in addition to other notices that may be required by law. This Consumer Confidence Report (CCR) explains where your drinking water comes from, what it contains, and the health risks our water testing and treatment are designed to prevent.

After you have used the water from your tap for cooking, bathing, washing clothes and flushing of the toilet, it must be treated to remove organic materials, solids and bacteria. Some homes treat their wastewater in a septic tank. Some homes are connected to a collection system of pipes that carry wastewater to a wastewater treatment plant. Both processes treat the wastewater with microorganisms that break down the organic materials and use it as a food source. The treated wastewater from a septic tank will flow into the soil or leach field and be used by soil organisms and plants. Wastewater that is treated at a wastewater treatment plant is disinfected to remove harmful bacteria and discharged to a stream or onto the land. Discharges from a wastewater treatment plant are permitted by the TCEQ and must meet high quality standards that protect the receiving stream or land.

FREQUENTLY ASKED QUESTIONS

Q Is the Guadalupe River a good source for drinking water as compared to other drinking water sources?

A Yes. Remember, it is surface water. Therefore, it requires treatment to remove suspended solids, dirt and other organic material followed by disinfection to remove bacteria.

Q Why is there foam on the surface of the river after rainfall events?

A Stormwater runoff contains high concentrations of organic material that when agitated and aerated by high flows can create a foamy substance on the surface of the river.

Q Why does the water in the Guadalupe River appear green?

A When in high concentrations, green and blue-green algae impart a green color to the river. These "blooms" often occur after spring rains that add nutrients to the stream.

Q Why does the river have a film on it during the summer months when there is no wind?

A A film may develop on areas of low flow or stagnant water and can come from numerous sources including algal blooms and floating material collecting in backwater areas.

Q Who do I call if I see someone illegally dumping material into the river or stream?

A The TCEQ is the regulatory agency that investigates illegal dumping or discharges. You can also call GBRA. Although we are not a regulatory agency we can help in the investigation and contact TCEQ in support of the complaint.

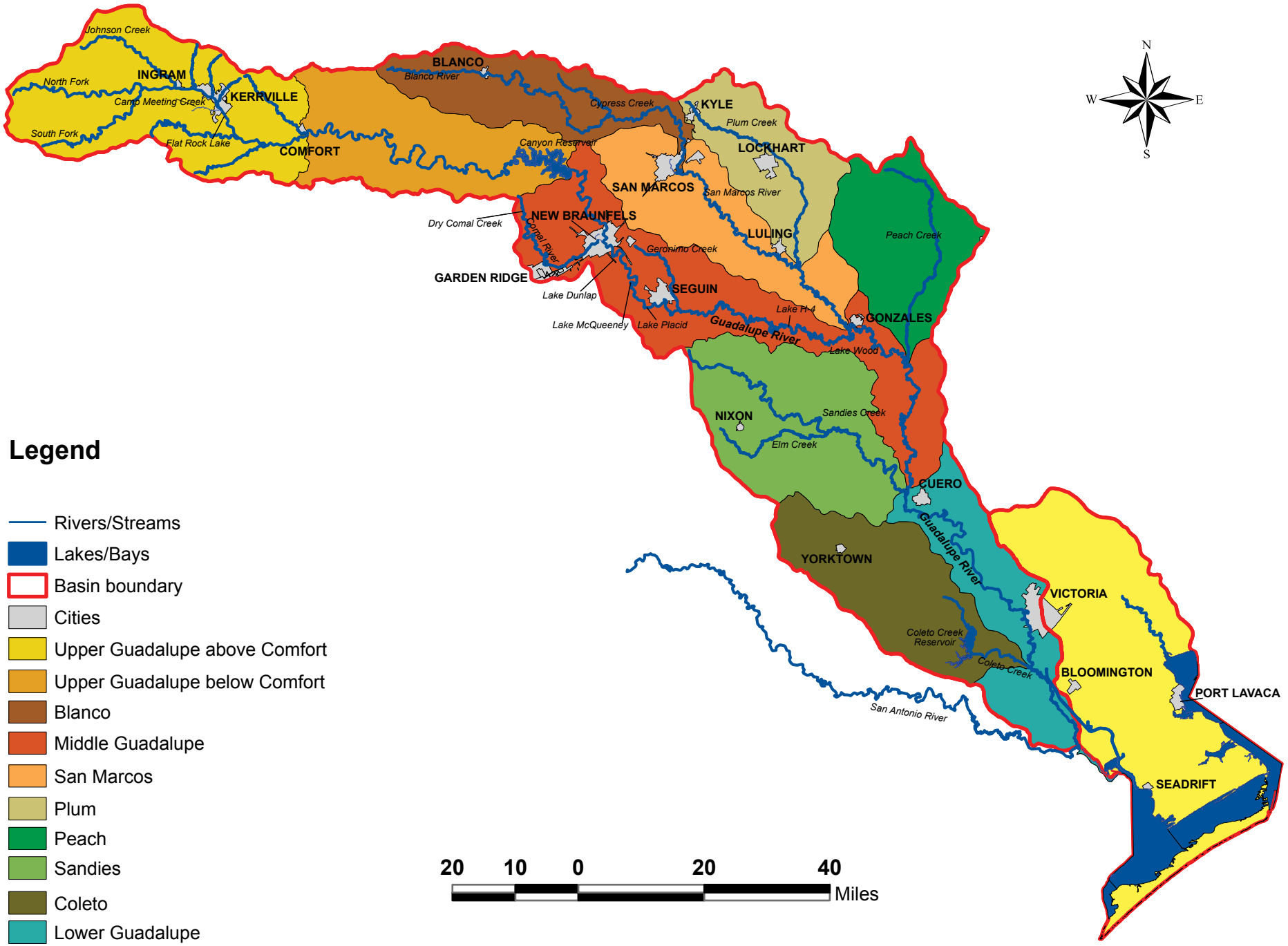
Q Why is there a concern for the endangered species in the San Marcos and Comal Rivers and springs?

A The San Marcos and Comal Rivers and springs are dependent on flow from the Edwards Aquifer. During times of low or reduced flow there is a loss of habitat for these species. Some of which are only found in the San Marcos and Comal Rivers and springs. These species are listed as endangered because they are limited in numbers putting them at greater risk for extinction.

Q Is it safe to swim in the river?

A It is safe to swim in the river as long as you swim where there is sufficient flow (no stagnant water) and no abnormal smells, color or foreign matter. Remember that rivers and streams are open waterways and will never be free from harmful bacteria like a swimming pool. In addition, it is not recommended to swim immediately following a rainfall event due to the amount of bacteria that is carried into the stream by the rainfall runoff.

GUADALUPE RIVER BASIN WATERSHEDS



Legend

- Rivers/Streams
- Lakes/Bays
- Basin boundary
- Cities
- Upper Guadalupe above Comfort
- Upper Guadalupe below Comfort
- Blanco
- Middle Guadalupe
- San Marcos
- Plum
- Peach
- Sandies
- Coleto
- Lower Guadalupe
- Lavaca Guadalupe

Prepared in Cooperation with the Texas Commission on Environmental Quality Under the Authorization of the Texas Clean Rivers Act.
May 2006

Guadalupe-Blanco River Authority
933 East Court Street
Seguin, Texas 78155
830/379-5822
www.gbra.org