2011
Clean Rivers Program
Basin Highlights Report
Guadalupe River *and* Lavaca-Guadalupe Coastal Basins

GBRA

Guadalupe River and Lavaca-Guadalupe Coastal Basin

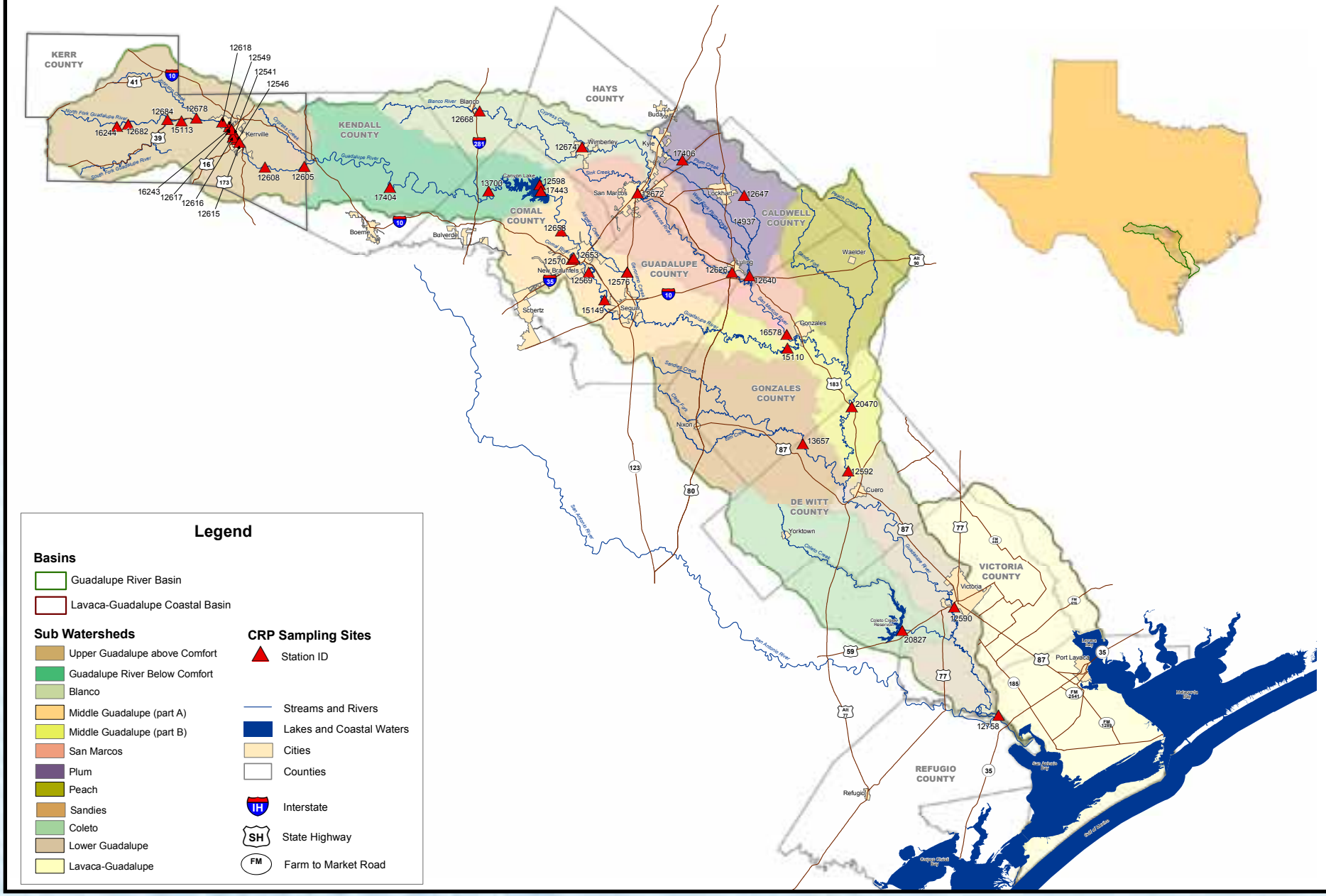


Photo by Chase Fountain © Texas Parks and Wildlife Department

Introduction

This report highlights the activities of the Guadalupe River Basin and the Lavaca-Guadalupe Coastal Basin under the Clean Rivers Program (CRP) in 2010. The CRP is managed by the Texas Commission on Environmental Quality (TCEQ). The state-wide program is funded by fees assessed to water rights and wastewater discharge permit holders. These fees are divided among the CRP partners for the administration of the each river basin's program. The Guadalupe-Blanco River Authority (GBRA), together with the Upper Guadalupe River Authority (UGRA), carry out the water quality management efforts in the Guadalupe-Blanco River basin under contract with TCEQ. The activities described in this report include water quality monitoring, a review of the 2010 Water Quality Inventory, public communication, watershed planning and stewardship activities. Information on other water quality studies, planning efforts and events that could impact water quality also are included in the *2011 Basin Highlights Report*.

This Year's Highlights

2010-11 Water Quality Monitoring Program

One of the most significant advantages of the Clean River Program is the coordination of water quality monitoring in each river basin. This coordination reduces redundancy, conserves funding, and directs resources and efforts where they are needed. Each year the CRP Guadalupe River Basin monitoring program is evaluated at a meeting of monitoring entities and partners, including TCEQ, CRP participants, watershed partnerships and other state agencies. As resources are available, modifications are made to the monitoring schedule to address specific needs in the coming year. Examples include monitoring to support TCEQ's biannual stream assessments and to support the development and implementation of watershed protection plans in the river basin. Most importantly, every effort is made to adjust the monitoring schedule to address stakeholder concerns.

GBRA Archive Photo

Coleto Creek Reservoir

In 2010, because sufficient biological and habitat data had been collected at the Peach Creek site in Gonzales County, resources for bioassessments could be redirected to Geronimo Creek in support of the watershed protection plan being developed in that watershed. Bioassessments are performed to assess the health of the biological community at selected sites. Based on sufficient data showing healthy biological communities, GBRA also discontinued bioassessments on Dry Comal in Comal County and the Guadalupe River site at Ingram in Kerr County. Bioasssessments at the Plum Creek at CR 202 site in Caldwell County and Cypress Creek near Wimberley will be continued through 2011.

Another modification to the monitoring schedule was made on Plum Creek. GBRA staff assumed the monthly monitoring of the creek at the CR 202 site in Caldwell County. The TCEQ Regional Surface Water Quality Monitoring Team had been monitoring the site quarterly. GBRA started monthly monitoring in support of the implementation of the watershed protection plan developed for Plum Creek. This effort freed resources of the TCEQ field office to be redirected for additional monitoring on the Blanco River. Additionally, GBRA has established a continuous water quality monitoring station at the Plum Creek CR202 site that provides real-time water quality data (dissolved oxygen, temperature, pH, specific conductance and turbidity) to the public, via the TCEQ Continuous Water Quality Monitoring Network.

In order to prevent a lapse in monitoring between the end of the Upper Guadalupe River Authority's (UGRA's) Total Maximum Daily Load Implementation Plan project ending in August 2010 and the start of the "Bacteria Reduction Plan for the Upper Guadalupe River" to begin in Fiscal Year 2011, nine sites have been added to the 2011 schedule. Three sites that are quarterly CRP sites will be expanded to monthly for *E. coli* and field parameters. The remaining six sites will be monitored monthly for bacterial and field parameters using CRP funding allotted to UGRA.

GBRA's original routine monitoring site on Coleto Creek Reservoir, established in 1987 as a recreational index site, was moved in September 2010 to a location adjacent to the dam. Data collected at the new site will be used to develop nutrient standards on the reservoir. The site will be visited monthly and depth profiles will be conducted quarterly. The dam site will be used as GBRA's recreational index on the reservoir.

The complete water quality monitoring schedule for the Guadalupe River Basin can be accessed at http://cms.lcra.org.

This Year's Highlights (cont.)

Upper Guadalupe River Bacteria Impairment Update

The Upper Guadalupe River Authority (UGRA) partnered with the Texas Commission on Environmental Quality (TCEQ) on a CWA § 319(h) grant to develop a plan to address the bacteria impairment in the Upper Guadalupe River. The majority of implementation measures outlined in the plan will be put in to practice under a second grant called the "The Bacteria Reduction Plan for the Upper Guadalupe River" which is scheduled to begin in September 2011 pending approval. However, several measures to reduce sources of bacteria have been initiated to date including the installation of eight pet waste stations in Kerrville. UGRA also sponsored a Texas AgriLife Extension Service Watershed Steward workshop in August 2010 which helped nearly one hundred local citizens better understand watersheds.

Photo by Janet Thome, GBRA

Status of Geronimo Creek Watershed Protection Plan

The Texas State Soil and Water Conservation Board (TSSWCB), the Guadalupe-Blanco River Authority and the Texas AgriLife Extension Service are partnering with local landowners and citizens within the Geronimo Creek watershed to protect and improve water quality through the development and implementation of a watershed protection plan (WPP). The development of a WPP in this area is designed to restore waters impacted by nonpoint source pollution. Geronimo Creek and its tributary Alligator Creek, flow through Comal and Guadalupe Counties, near the cities of New Braunfels and Seguin.

The almost 70-square-mile Geronimo Creek watershed lies within the larger Guadalupe River Basin. The upper portion of the Alligator Creek watershed lies in the extra-terratorial jurisdiction (ETJ) of New Braunfels. Alligator Creek begins on the west side of IH-35 and flows southeast, travelling through a rapidly developing area of the Austin-San Antonio corridor. The lower portion of the Geronimo Creek watershed is in the ETJ of Seguin. This area of the watershed is also projected to see tremendous growth, largely due to the intersection of IH-10 and State Hwy. 130 to the east.

Geronimo Creek has been monitored by GBRA as part of the Clean Rivers Program since late 1996. The creek was monitored at the SH-123 crossing until August 2003, at which time the routine monitoring site was moved to the Haberle Road crossing. The new site was a previous TCEQ monitoring site as well as an ecoregion reference site.

The 2008 Texas Water Quality Inventory listed Geronimo Creek (Segment 1804A) with a concern due to elevated nitrate-nitrogen concentrations because all 60 measurements exceeded the screening level of 1.95 mg/L. In addition, the stream is listed as impaired because the geometric mean for *E. coli* bacteria (162 organisms per 100 milliliters) exceeded the contact recreation stream standard of 126 organisms per 100 milliliters. As part of this WPP process, GBRA staff monitored at an additional 19 sites throughout the watershed. The original funding called for a 12-month monitoring schedule, but because of a severe drought during the monitoring period, that schedule was extended to 18 months.

As development and population growth continue, the percentage of urban land use will rise and play an increasingly dominant role in the hydrology and water quality of Geronimo Creek and its tributaries. Data gathered during routine water quality sampling of Geronimo Creek indicates the stream is impaired for elevated bacteria concentrations and has nutrient enrichment concerns for nitrate-nitrogen. High bacteria concentrations do not support contact recreation use and high levels of nitrogen can cause algal blooms and excessive growth of aquatic vegetation which can, in-turn, lead to lowering the available oxygen in the water for fish to survive. To date, dissolved oxygen levels do not appear to be affected by elevated algae or growth of aquatic vegetation.

Watershed planning is driven by local stakeholders and includes the following key tasks: 1) identify desired water quality conditions and measurable goals, 2) prioritize appropriate management practices and needed education and awareness programs to achieve those goals, 3) assist in the development of the WPP, 4) lead implementation of the plan at the local level, and 5) communicate implications of the WPP to other interested constituents within the watershed.

This Year's Highlights (cont.)

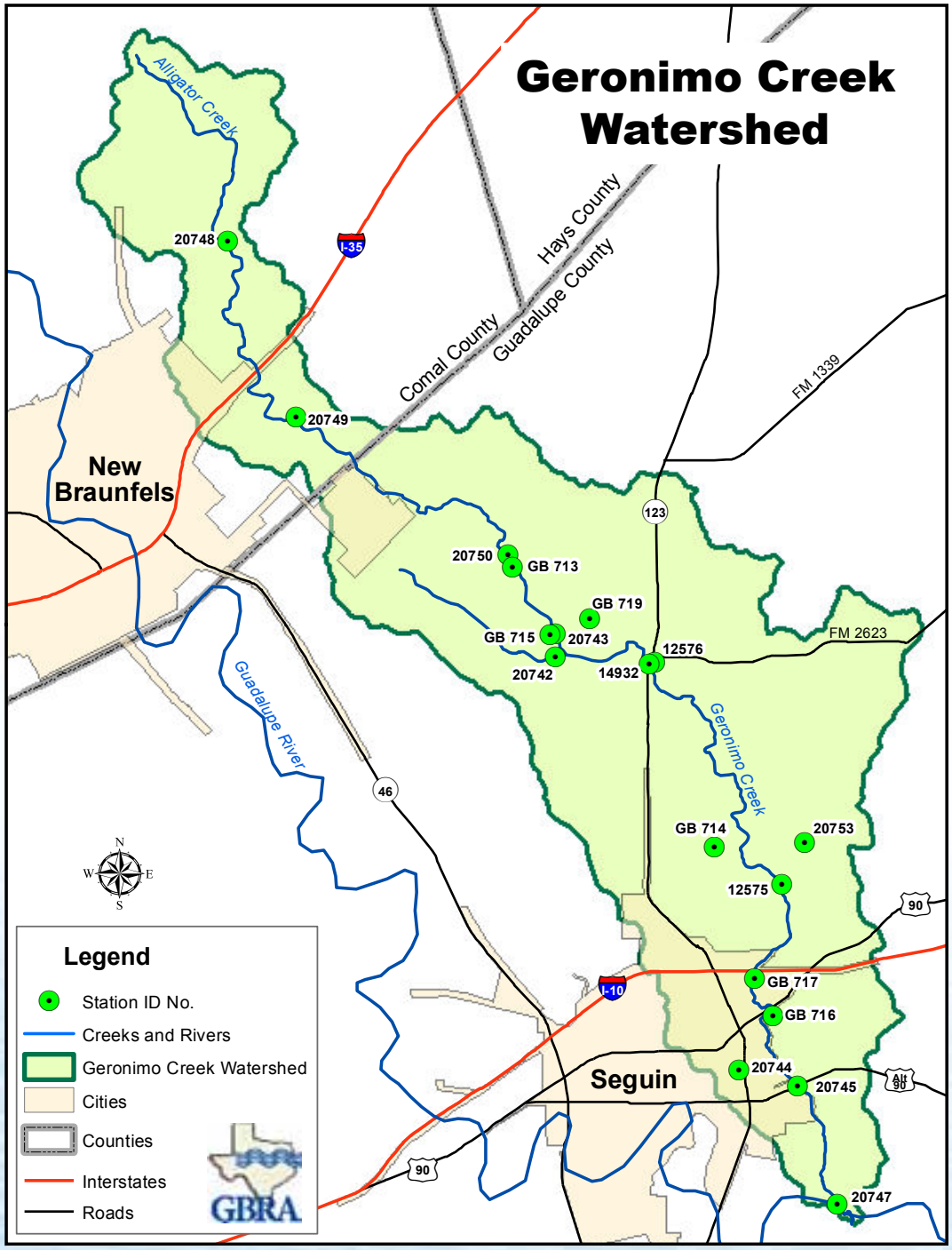
Status of Geronimo Creek Watershed Protection Plan (cont.)

A stakeholder committee made up of 25 local citizens, representing landowners, cities, counties and special interest groups have met both as a whole committee and in topical work groups. The topical work groups covering urban, agricultural and wastewater issues directed inputs for modeling of the creek to determine the major sources of the bacterial impairments. The urban group felt that urban runoff and pet populations were the major sources of bacteria in the urbanized areas of the watershed; the consensus of the agricultural work group was that feral hogs, wildlife and various livestock were major sources in the rural areas. Because the only wastewater discharge in the watershed is at the confluence of the creek and the Guadalupe River, the wastewater work group focused on failing septic systems and malfunctioning wastewater collection lines as possible sources of the bacterial and nutrient impairments.

Some of the management measures that the stakeholders will be recommending in the watershed protection plan include pet waste stations in the urbanized areas, along with outreach and education focusing on the impacts of pet waste; best management practices and workshops, such as water quality management plans and riparian management, for agricultural producers in the rural portions of the county; workshops and distribution of information for landowners on management and control of feral hogs; and financial assistance to the cities to fund engineering for improvements to storm water collection systems.

The TSSWCB is providing funding to GBRA and the Texas AgriLife Extension Service for this watershed planning process through a Clean Water Act §319(h) grant from the U.S. Environmental Protection Agency.

All information on the Geronimo Creek WPP can be found at www.geronimocreek.org.



This Year's Highlights (cont.)

Spill and Fish Kill on Plum Creek

The Texas Parks and Wildlife Department (TPWD) and the TCEQ investigated a large fish kill on Plum Creek reported by the Hays County Road Department on Nov. 1, 2010. GBRA joined the investigation by providing water quality field data and collecting water samples at various locations along the creek. The fish kill was the result of a malfunction and major upset at the City of Kyle wastewater treatment plant operated by AquaTX, an outside contractor. Pumps at the lift station at the head of the plant failed to turn on automatically. Approximately 1 million gallons of poorly treated wastewater was released from a manhole and their outfall into the creek near Heidenreich Road, causing severe dissolved oxygen depletion and a spike in the ammonia-nitrogen concentration. Nearly 3,000 fish were killed. Prominent in the kill were small channel catfish, bluegill and longear sunfishes, and western mosquitofish, but some large flathead and channel catfishes and common carp were also observed. The slug of poorly oxygenated water stayed intact for 5.6 miles due to the lack of additional inflow, low number of riffle zones to provide aeration and slow stream velocity. Along with high organic loading, the spill contributed extremely high concentrations of *E. coli* bacteria to the stream. Counts as high as 5.7 million organisms / 100mL were recorded downstream of the spill. Fortunately, the water quality in Plum Creek had returned to normal conditions by the time the stream reached the crossing with SH 21 in Uhland, Caldwell County. *(TPWD fish kill report – Steve Twidwell.)*

Photo by Lee Gudgell, GBRA

Hays County Natural Resources Program to Join as CRP Contributor

On October 26, 2010, the Hays County Commissioners Court approved a county-wide water quality monitoring program in Hays County. Initially the program's focus will be collecting water quality data at additional sites not currently monitored under CRP within the County. Eric Van Gaasbeek, Environmental Health Specialist with Hays County Development Services department, will be working with GBRA and LCRA staff to identify monitoring locations in their jurisdiction, based on existing data, recreational use and proximity to current and future development. The county's program will include sites in the Upper San Marcos watershed and will support newly drafted watershed protection activities. The *San Marcos Newstreamz* article on Jan. 4, 2011, states that Hays County's rate of growth outpaced state, national and regional growth rates. The county's population is over 155,000, up 57 percent since 2000. Brooke Leftwich, Environmental Compliance Specialist with the county's Natural Resources Program said, "This couldn't be a better time to start getting baseline data for sites within Hays County. We are looking forward to working with GBRA and the Clean Rivers Program to provide additional data for our local rivers and streams."

The respective CRP Quality Assurance Project Plans will be amended to include data collection efforts so that the data will be available for use in the TCEQ's stream assessment process. GBRA will provide training to Hays County staff and serve as a technical resource. Staff of the Hays County Natural Resources Program, along with Hays County commissioners, are to be commended for stewardship of the county's water resources.

TCEQ's Watershed Action Planning Process in Development

TCEQ's Water Quality Planning Division is developing a management tool to coordinate the planning, facilitation and tracking of the process to address water quality issues. Some planning is occurring between various TCEQ water programs, river authorities, and other state agencies but not to the degree required to utilize staff resources and funding to restore water quality. CRP partners hold annual stakeholder meetings to hear their concerns on watershed issues. The coordinated monitoring process is well-established and is an effective tool in the utilization of monitoring resources. TCEQ is considering expanding these annual meetings to include discussions on watershed issues associated with impairments, concerns and special interest watersheds. Watersheds can be evaluated from the local perspective to document "what is going on here?" Local watershed discussions would be held with the goal of identifying sources that may be contributing to the impairment or concern. These meetings would be a part of an overall planning process that takes the information gathered at the annual meetings, such as characterization of the watersheds of interest, research needs, funding sources, potential stakeholders and recommended actions, and integrates the local information into statewide interagency strategy discussions. The "process" tool would facilitate the prioritization of strategies. It would identify funding opportunities as well as track of watershed actions.

Cypress Creek Project for Watershed Protection Finishes First Phase

In 2009, the Rivers Systems Institute staff at Texas State University-San Marcos began a locally-driven watershed protection project on Cypress Creek, located in the city of Wimberley in Hays County. Funding necessitated that the plan be developed in phases. In phase one, the Cypress Creek Project focused its efforts on understanding watershed conditions, listening to stakeholder concerns and perspectives, and developing a sound scientifically-based understanding of pollutant loads, frequency, magnitudes, and sources. The River Systems Institute gathered a local watershed stakeholder group that, through a substantial watershed committee and subcommittee process, resulted in a better understanding of the interrelatedness of water resources and the economy.

The first phase of the Cypress Creek project included the development of a Decision Support System (DSS) that provides stakeholders and regulatory agencies with a watershed-scale analysis of potential impacts from intense urbanization and increasing demands for water resources. Surface and groundwater resources in the Hill Country area are threatened by urbanization. There are concerns about the impacts of development on nonpoint source pollution to local surface waters, compounded by potential reductions in spring flows due to declining aquifer levels which threatens the viability of Cypress Creek as a flowing stream. The DSS, a geospatial assessment tool, can be used to determine which areas are most sensitive to development pressure, and where best management practices and other conservation measures may be sited most effectively.

Phase two of the Cypress Creek Project will have a different focus. It will result in the development of the locally-approved watershed protection plan by December 2011. This phase will be more task driven, and will require more participation and ownership from local stakeholders. Phase two will combine the watershed characterization developed in Phase one with the work of three stakeholder work groups: education and outreach, technical, and policy and implementation strategies. The end result will be an understanding of the types of tools and management practices that can be employed in different areas and the cost/benefits analysis for stakeholders to evaluate when and where they could be utilized.

To obtain information on the DSS, contact Adrian Vogl at avogl@txstate.edu.

Organizations Work Together to Protect Jacob's Well

The Nature Conservancy of Texas, the Hays County Commissioners Court and the Wimberley Valley Watershed Association (WVWA) collaborated to purchase 50 acres near Wimberley to permanently protect Jacob's Well. Jacob's Well is a perennial spring that sustains the flow of groundwater into Cypress Creek, which serves as a tributary to the Blanco River. Flowing from the Trinity Aquifer, the spring is the second-longest underwater cave in Texas. The spring water from Jacob's Well feeds the famous Blue Hole swimming area and regional park on Cypress Creek. Hays County purchased the property for $1.7 million using $850,000 of county revenue and $850,000 loaned by the Nature Conservancy, which will also hold a conservation easement on the property.

The 50 acres are adjacent to the 46-acre Jacob's Well Natural Area, which is owned and managed by the WVWA. As part of this transaction, the WVWA will convey 31 acres of its holdings, including the land containing the well, to Hays County, creating an 80-acre preserve that will be managed by the county *(Nature Conservancy)*.

The property will continue to be used for nature tourism, low-impact educational and recreational activities, all of which will be conducted in accordance with a management plan to be agreed upon by Hays County and the WVWA. WVWA will continue management of the Natural Area and further develop the aquifer research and environmental education and outreach programs.

Photo by David Baker

Tours of the Jacob's Well Natural Area are every Saturday at 10 a.m. The JWNA Education Center is located off of Jacob's Well Road at 221 Woodacre Drive. For more information go to www.jacobswellspring.org or call (512) 722-3390.

This Year's Highlights (cont.)

Plum Creek Planning Hits the Mark

Plum Creek Stewardship Is Recognized Model

There is little case to be made that the Plum Creek watershed — one of the major watersheds in the Guadalupe River Basin — is "special." But when discussions turn to water quality monitoring in Texas, Plum Creek is likely the most frequently discussed watershed in the state, largely due to ongoing water quality stewardship efforts.

Plum Creek, classified by the TCEQ as segment 1810, is located in portions of Caldwell and Hays Counties within the Guadalupe River Basin in south central Texas. The stream originates in the City of Kyle and flows 52 miles through the Texas Blackland Prairie and East Central Texas Plains ecoregions, past the cities of Lockhart and Luling, to its confluence with the San Marcos River. The 248,949-acre watershed also includes a small portion of Travis County.

The watershed historically has been dominated by livestock and row crop agriculture, with oil and gas production also an important component of the economy in certain areas. In recent years, rapid urbanization in the northern portion of the watershed near Interstate 35 has dramatically changed the environmental and economic characteristics of the area. Anticipated development accompanying the completion of State Highway 130, which bisects the watershed, likely will continue this trend.

Plum Creek has been designated by TCEQ for high aquatic life use, fish consumption use, general use, primary contact recreation use, and aquifer protection use in some portions. Since 2004, portions of Plum Creek have been listed as having the primary contact recreation use impaired by excessive indicator bacteria. *E. coli* levels must not exceed the geometric mean criterion of 126 colony-forming units per 100 milliliter (cfu/100mL). The primary contributors of bacteria in Plum Creek are nonpoint pollution source (NPS) in nature; including urban runoff, septic system failures, livestock, pets, wildlife, and invasive species such as feral hogs. However, point sources like wastewater treatment facilities have also contributed to *E. coli* loads along certain portions of the segment. Wastewater treatment facilities typically do not contribute to the bacterial load in the form of direct discharges of poorly treated wastewater but in the form of accidental overflow or leaking sewer lines.

Plum Creek Watershed Partnership

It became apparent that something had to be done to address water quality problems in the watershed. Historically, the TCEQ would step in, develop and implement a Total Maximum Daily Load program. However, a new approach - the development of a stakeholder-driven watershed planning process - was considered and ultimately chosen. In 2005, the Regional Watershed Coordination Steering Committee, facilitated by the TSSWCB selected Plum Creek for a voluntary effort to improve water quality, and engaged the Texas AgriLife Extension Service as a facilitator and partner. The Plum Creek Watershed Partnership was formed to guide the planning process and address the bacteria and nutrient concerns in the stream.

Led by a steering committee that included GBRA staff, the partnership worked with citizens, businesses and officials in the watershed to restore the health of Plum Creek. The tenacious efforts of stakeholders resulted in the final 2008 Plum Creek Watershed Protection Plan (WPP) — a first in the state to be accepted by the U.S. Environmental Protection Agency (EPA).

Reclassification of Plum Creek in 2010 Texas Integrated Report

TCEQ assigns a category to each impaired water body to provide information about the water quality status and management activities on that water body. In the 2008 Texas Water Quality Inventory and 303d List of Impaired Water Bodies, Plum Creek was classified as a category 5 water body because it did not meet applicable water quality standards (WQS). The Plum Creek Watershed Partnership, TCEQ and the TSSWCB have petitioned the EPA to reclassify Plum Creek as a 4B water body. Category 4 represents water bodies that are not meeting water quality standards but does not require a TMDL because other pollution control requirements are reasonably expected to result in attainment of the water quality standard in the near future.

The *Plum Creek WPP* identifies the criterion as the water quality targets which management measures to be implemented are designed to achieve. Load duration curves (LDCs) were used to understand general pollutant loading and to estimate load reductions needed to

Plum Creek Planning Hits the Mark (cont.)

achieve WQS. LDCs were developed utilizing historical water quality and flow data in order to examine the assimilative capacity of Plum Creek and the existing loading of *E. coli*.

Through a cooperative interagency effort, the Plum Creek Watershed Partnership developed the *Plum Creek WPP* outlining strategies that, if implemented, will improve and ultimately restore water quality in the creek. Based on a spatial analysis of different sources of *E. coli*, stakeholders identified management measures to reduce bacteria entering the stream. These practices have been tailored to address specific land uses. Since potential sources differ in distribution and density across the watershed, management practices vary between sub-watersheds. Practices and programs implemented or planned for implementation cover all land use and potential nonpoint pollution sources, including urban, wastewater, agricultural, and wildlife.

The responsible party, implementation milestones and estimated financial cost for individual management measures and outreach/education activities are presented in the *Plum Creek WPP*, along with load reductions expected from the full implementation of all management measures prescribed in the WPP. Since the work on the watershed protection plan began in 2005, efforts aimed at improving water quality have included funding and resources totaling over $2.5 million have been brought to the watershed.

Where the primary contributors of pollutants are nonpoint source pollution in nature, as is the case in Plum Creek, achieving water quality restoration is difficult and requires a significant, long-term effort from all sectors. Due to factors such as spatial and temporal variability in weather and the implementation of specific best management practices (BMPs), there is an expected lag time between implementation of BMPs and measurable improvements in water quality. These same factors make it difficult to detect trends, particularly when dealing with relatively short periods of time. Nonetheless, full implementation of the *Plum Creek WPP* is expected to result in achievement of primary contact recreation standards. The *Plum Creek WPP* was developed based on a 10-year implementation schedule, and was published in February 2008 with implementation scheduled through the end of calendar year 2018. The *Plum Creek WPP* outlines a schedule for adoption of BMPs by diverse audiences and various responsible parties throughout the watershed. These outcomes will be achieved through the leadership and commitment of the Plum Creek Watershed Partnership Steering Committee, as facilitated by Texas AgriLife Extension Service, and by engagement and cooperation of other local stakeholders.

Photo courtesy of Texas AgriLife

Urban Stormwater Management Measures

The cities of Kyle and Lockhart have enacted pet waste ordinances and have or will install pet waste stations in parks and public areas. These stations were supported by TCEQ §319(h) funds in Kyle and city funds in Lockhart. Public education campaigns in each area are in place to encourage use of the pet waste stations. TCEQ §319(h) funds have been allocated to conduct urban stormwater assessments in Kyle and Lockhart. These analyses will map current stormwater flows and conveyance systems, identify needs, and determine optimal placement of additional stormwater controls. None of these areas are currently regulated by TCEQ as municipal separate storm sewer systems (MS4s). The City of Kyle received TCEQ §319(h) grant funding to retrofit two existing stormwater detention basins that receive runoff from a significant portion of the city to provide water quality benefits. The City of Lockhart received TCEQ §319(h) funding to conduct an illicit discharge survey and install filters on storm drain inlets. The cities of Buda, Kyle, Lockhart, and Luling initiated street sweeping programs in February 2009 with city funds. The City of Lockhart has committed to managing waterfowl populations in City Park and other locations at appropriate levels and will relocate animals to reduce bacteria loading to local tributaries.

Wastewater Management Measures

Several wastewater treatment facilities operated by GBRA in the Plum Creek Watershed have initiated voluntary bacteria monitoring of effluent with their own fiscal resources. The cities of Kyle, Lockhart, Luling, and Buda have budgeted city funds to replace old and degraded sewer pipes and other components of their wastewater collection systems, and continue to replace problem areas as needed. The City of Lockhart has replaced approximately 4,000 linear feet of sewer. The City of Kyle has replaced approximately 4,660 linear feet of sewer main and extended new service lines to approximately 50 homes at a cost of about $432,000. The City of Luling extended first-time sewer service to homes and businesses with 16,672 linear feet of sewer main and service lines. The City of Buda installed 2,652 linear feet of new wastewater pipe which replaced 1,500 linear feet of degraded sewer lines for a cost of about $216,000; the City of Buda expects to replace 8,523 linear feet of pipe over the next three years at a projected cost of $1,467,000.

Plum Creek Planning Hits the Mark (cont.)

Invasive Species Management Measures

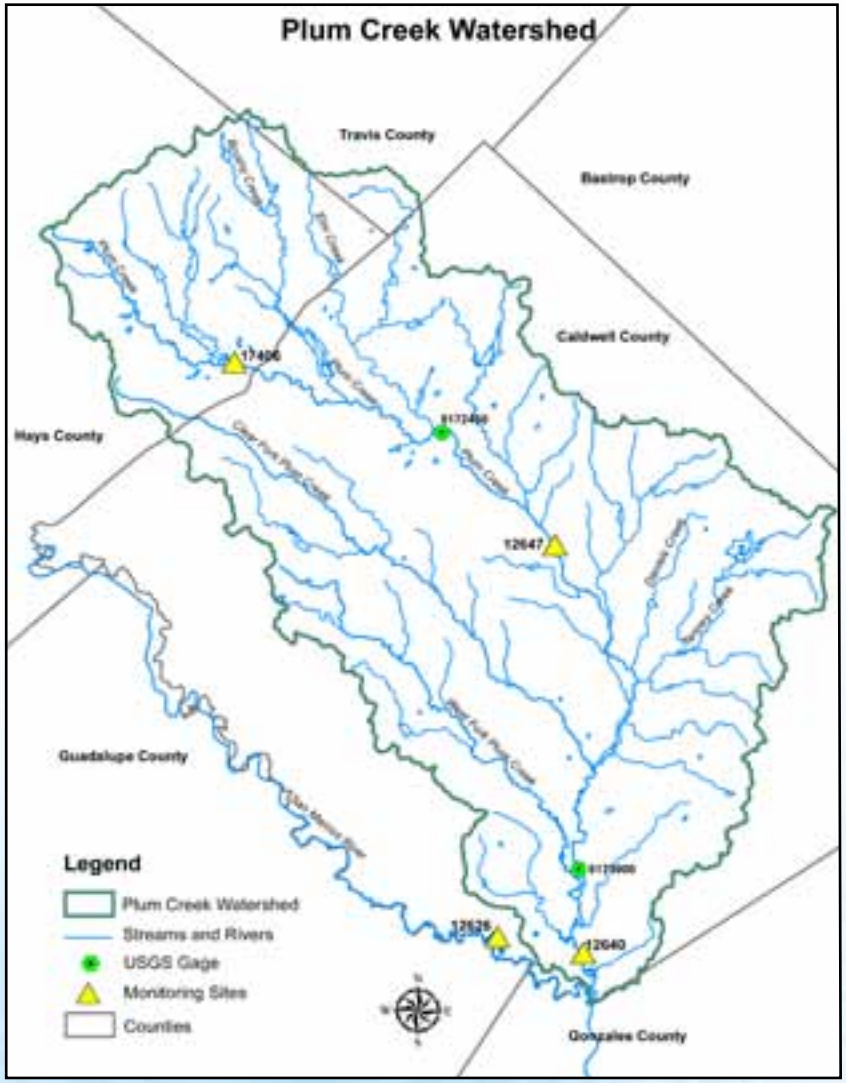
Feral hogs were identified by the partnership as a significant source of bacterial impairment and degradation of water quality in Plum Creek. TSSWCB §319(h) funds were utilized to hire an Texas AgriLife Extension Service Assistant based in the watershed to conduct one-on-one and group landowner outreach on feral hog management techniques. Texas Department of Agriculture funding to Texas Wildlife Services has supported aerial control of feral hogs in the watershed. Two aerial hunts were conducted, removing 372 hogs on 40,000 acres. An on-line feral hog activity reporting system was developed by Texas AgriLife Extension Service, with TSSWCB §319(h) funds, to support identification of target areas for implementation of control activities.

Photo courtesy of Texas AgriLife

Feral hogs wallow in the creek as a means to beat the Texas heat.

Agricultural NPS Management Measures

With TSSWCB §319(h) funding, the Caldwell-Travis Soil and Water Conservation District (SWCD), in cooperation with the Hays County SWCD, hired a Technician to provide technical assistance to agricultural producers for the development and implementation of TSSWCB-certified Water Quality Management Plans (WQMPs). The focus is on reducing bacteria loading from livestock operations in targeted areas across the watershed. Also through TSSWCB §319(h) funding, the SWCDs are providing financial assistance to agricultural producers for implementing certain BMPs prescribed in WQMPs which will achieve bacteria load reductions. Texas AgriLife Extension Service has promoted interaction between the Plum Creek Watershed Partnership and the U.S. Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) Local Work Groups to blend the goals of the *Plum Creek WPP* with the resource concerns and conservation priorities for the Environmental Quality Incentives Program (EQIP). BMPs that have been funded through the WQMP Program and EQIP in the Plum Creek watershed include cross fencing pasture and hayland planting, livestock watering facilities and assorted waterwell drilling, and prescribed grazing.



Plum Creek Planning Hits the Mark (cont.)

Water Quality Monitoring Component

GBRA continues to conduct routine monitoring at three sites on Plum Creek with resources dedicated by TCEQ through the Texas Clean Rivers Program (CRP). A 27-month intensive targeted monitoring project on tributaries, springs, wastewater effluent, urban stormwater runoff, and additional mainstem instream sites funded through a TSSWCB §319(h) grant has recently been completed by GBRA. With state general revenue, TSSWCB is continuing to fund the mainstem and tributary portions of this regime through December 2010. GBRA will continue this comprehensive monitoring regime for three additional years with FY2010 CWA §319(h) funding from TSSWCB. This monitoring will be used to assess the instream effect of implementing the strategies in the *Plum Creek WPP*. GBRA annually conducts stream biological assessments near the Uhland and Luling monitoring stations. These surveys will be continued to determine if water quality trends result in measurable changes in the biological communities in Plum Creek.

Outreach and Education Programs

Implementation of watershed protection projects in Plum Creek includes elements of outreach and education. Informing the public of the projects, their benefits and how each stakeholder can participate or promote the project is critical to the project's effectiveness as well as the overall watershed protection plan's success.

Texas AgriLife Extension Service has delivered two Texas Watershed Steward workshops in the watershed with funding support from a TSSWCB §319(h) grant. Texas AgriLife Extension Service, GBRA, and TSSWCB, in collaboration with other partner agencies, have produced countless publications, press releases, and newsletters directed to watershed stakeholders. In addition, multiple websites have been developed as information and education resources for the public. Through ongoing efforts of the GBRA, approximately 3,000 students and 79 teachers from eight schools throughout the watershed have participated in a Plum Creek water quality curriculum that incorporates classroom instruction and water quality monitoring. GBRA, using TCEQ CWA §106 funding, and Texas AgriLife Extension Service, using TSSWCB §319(h) funding, developed watershed protection brochures that have been distributed throughout the area. TPWD and Texas AgriLife Extension Service partnered to conduct a stream and riparian management workshop in the watershed in October 2010.

Urban stormwater education programs include Nonpoint Education for Municipal Officials (NEMO) workshops, non-regulatory site assessments of water supply facilities, wastewater treatment facilities, private companies, and municipal operations facilities and numerous educational events to provide training to urban citizens on proper nutrient and pesticide management. Texas AgriLife Extension Service conducted a Sports and Athletic Field Education (SAFE) workshop for personnel from area parks departments and school athletics departments. The TCEQ §319(h) grants to the cities of Kyle and Lockhart include outreach efforts such as storm drain marking and NPS education for the public.

Award-winning on-line educational modules were developed by the GBRA with TCEQ CWA §106 funds to provide information on wastewater treatment; septic system maintenance; and disposal of fats, oils, and grease. Eight septic system maintenance workshops targeting homeowners and septic system practitioners and inspectors in the watershed have been conducted by Texas AgriLife Extension Service with funding from TCEQ CWA §106 funds.

Texas AgriLife Extension Service has conducted several training events for agricultural producers on best management practices for proper grazing management, fertilizer management, and pesticide management, as well as offering annual county-based soil and water testing.

One of the most popular educational opportunities offered in the watershed is the annual feral hog management workshop hosted by Texas AgriLife Extension Service, with funding from a TSSWCB §319(h) grant to educate and train agricultural producers, landowners and land managers on control techniques. Additionally, Texas AgriLife Extension Service has developed a series of seven publications addressing management strategies and techniques for feral hog control that are tailored to the Plum Creek watershed; these publications have been disseminated in both hardcopy and electronic forms to landowners in the watershed.

The essence of successful watershed planning and management is a commitment to Adaptive Management. Adaptive Management is a type of natural resource management in which decisions are made as part of an ongoing science-based process. Adaptive

Plum Creek Planning Hits the Mark (cont.)

Outreach and Education Programs (cont.)

management involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. The Plum Creek Watershed Partnership is committed to adaptive management of the *Plum Creek WPP*. Over the course of project implementation, instream monitoring data provided by GBRA will be compared with interim milestones and water quality criteria to determine progress in achieving WQS. If water quality improvement is not being demonstrated within the proposed timeframes, efforts will be made to increase adoption of BMPs and/or adjust strategies or focus areas if and when necessary.

Sustaining the Plum Creek Watershed Partnership and Implementation Efforts

Current funding for the Plum Creek WPP's Watershed Coordinator position ends August 2011. As projects to implement the plan move forward, the Plum Creek Watershed Partnership has determined that a local Watershed Coordinator placed in Plum Creek is necessary for long-term project success. The Watershed Coordinator will continue and expand implementation efforts in the watershed by facilitating partnership meetings, assisting with acquisition of funding through grant proposal development, conducting/supporting delivery of educational programs and activities, tracking implementation, and reporting water quality trends.

Meetings have been held to discuss long-term sustainability of the partnership. Partnership entities discussed the need to continue the Watershed Coordinator position and using local funding to help support it. Entities included in the negotiations are the cities of Lockhart, Luling, Kyle, Buda, Caldwell and Hays Counties, Plum Creek Conservation District, GBRA, the Hays County and Caldwell-Travis Soil and Water Conservation Districts, Texas AgriLife Extension Service and the TSSWCB.

An interlocal agreement between the parties was determined to be the first step in establishing a means for support and management of the Watershed Coordinator position. GBRA agreed to draft an agreement and provide it to the group for review, and the Texas AgriLife Extension Service agreed to provide a draft job description and proposed budget for the position. Participants have reviewed the interlocal agreement and agreed that a new CWA §319 grant proposal should be submitted to the TSSWCB. A cost structure based on both land area and population was proposed for the $120,000 per year grant. All entities agreed to have their legal representatives review the interlocal agreement and consider how they could assist with providing a portion of the 40 percent match requirement ($48,000/year). GBRA submitted the §319 grant proposal to the TSSWCB in the fall of 2010 for consideration for funding in September 2011.

Photo by Janet Thome, GBRA

Plum Creek Planning Hits the Mark (cont.)

TCEQ Approves Changes to Texas Surface Water Quality Standards

The Federal Clean Water Act (CWA) requires states to review and revise surface water quality standards every three years. The rule revisions give TCEQ the opportunity to provide clarity and update the current standards. Initially, site-specific standards were set for individual water bodies with limited data to establish uses and criteria. As in past revisions, the current revisions allow for updates to current standards that utilize additional data and evaluations. The standards are used by TCEQ to develop and authorize discharge permits, establish targets for water quality and to assess whether water bodies are impaired in respect to federal guidelines. The standards protect public health, enhance water quality and meet the goal of the CWA to restore and maintain the chemical, physical, and biological integrity of the nation's waters.

Photo by Janet Thome, GBRA

In July 2010, the new standards were adopted by TCEQ and sent to EPA for their approval. Adopted changes included the addition of numerical nutrient criteria for reservoirs, including Canyon Reservoir. The nutrient standards are developed to protect reservoirs from excessive growth of aquatic vegetation due to elevated nutrient concentrations and are based on *chlorophyll a* concentrations assigned to the water body. The standard set for Canyon Reservoir is 5 micrograms per liter *chlorophyll a*. The reservoir will be assessed as meeting the criteria if the long-term median *chlorophyll a* concentrations fall below that standard. Of the 168 samples collected near the Canyon Lake Marina since 1996, only 10 samples approximately 6 percent, have exceeded the 5 micrograms per liter water quality standard.

In the 2010 revisions, TCEQ set a site-specific standard for temperature for the upper parts of the San Marcos and Comal rivers. The temperature criteria for these water bodies have been lowered from 80° F to 78° F.

One of the most significant and controversial revisions to the standards dealt with recreational use categories. In previous Basin Highlights Reports and steering committee meetings, stakeholders were given an overview of the proposed changes to the recreational use categories to include the addition of the new designations of *Secondary 1* and *Secondary 2* categories. Along with those designations, TCEQ proposed new numeric recreational criteria. The new categories provided for higher *E. coli* concentrations to indicate impairment at each designation. The table below is taken from the overview of the water quality standards available at http://www.tceq.state.tx.us/assets/public/permitting/waterquality/standards/docs/WQS_Overview_Major_Revisions.pdf.

After receiving numerous public comments, TCEQ retained the primary contact recreation criteria of 126 colonies per 100 milliliter. The designation of primary contact recreation will apply to all classified stream segments, fresh and tidal. Secondary and noncontact recreation standards will only apply after a recreational Use Attainability Analysis (UAA) has been performed. The new recreational UAA methodology includes coordination with local entities and stakeholders, simple surveys to assess recreational use and comprehensive use attainability assessments on the segment. On unclassified segments, primary contact recreation use is assumed unless there is 1) local knowledge that primary contact recreation is unlikely to occur, 2) the center of the stream is less than 0.5 meter deep, and 3) there are no pools of greater than 1 meter depth. Assessment of all stream segments where there is historical data will use geometric means rather than single-sample criterion and will exclude unrepresentative samples with respect to flow and location as proposed.

Uses	***E. coli*** (fresh water – geometric mean colonies/100mL)
2000 Standards:	
Contact Recreation	126
Non-contact Recreation	605
2010 Standards:	
Primary Contact	126
Secondary Contact 1	630
Secondary Contact 2	1030
Noncontact Recreation	2060

Table of Water Quality Impairments and Concerns from the 2010 305(b) Texas Water Quality Inventory and 303(d) List of Impaired Water Bodies (February 5, 2010)

Segment Number	Water Body	Impairment or Concern	Category (if assigned)	Year first listed
1801	Guadalupe River Tidal	Depressed Dissolved Oxygen	Note 1	
1802	Guadalupe River below San Antonio River	Nitrate-Nitrogen	Note 1	
1803A	Elm Creek	Depressed Dissolved Oxygen	5a	1999
1803B	Sandies Creek	Depressed Dissolved Oxygen; Impaired Biological Habitat and Communities; Bacteria	5b and 5c	1999
1803C	Peach Creek	Depressed Dissolved Oxygen; Bacteria; Aluminum; Chlorophyll-a	5b and 5c	2002
1803F	Denton Creek (tributary of Peach Creek)	Depressed Dissolved Oxygen; Bacteria;	5b	2010
1803G	Sandy Fork	Bacteria	5b	2010
1804A	Geronimo Creek	Bacteria; Nitrate-Nitrogen	5c	2006
1805	Canyon Lake	Mercury in Edible Fish Tissue	5c	2006
1806	Guadalupe River above Canyon	Bacteria; Depressed Dissolved Oxygen	4a	1999
1806A	Camp Meeting Creek	Depressed Dissolved Oxygen	5b	
1806D	Quinlan Creek	Bacteria	5a	2010
1806E	Town Creek	Bacteria	5a	2010
1810	Plum Creek	Bacteria; Nitrate-Nitrogen; Othrophosphorus; Total Phosphorus; Depressed Dissolved Oxygen	4b	2004
1811A	Dry Comal Creek	Bacteria	Note 1	
1813	Upper Blanco River	Depressed Dissolved Oxygen	Note 1	
1814	Upper San Marcos River	Total Dissolved Solids	5c	2010
1817	North Fork Guadalupe River	Depressed Dissolved Oxygen	Note 1	

Note 1 - No category assigned if listed for a use concern or screening level concern rather than use impairment.

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GBRA

Guadalupe-Blanco River Authority

flowing solutions

WQ/BHR-11/Spring2011/Cap-500