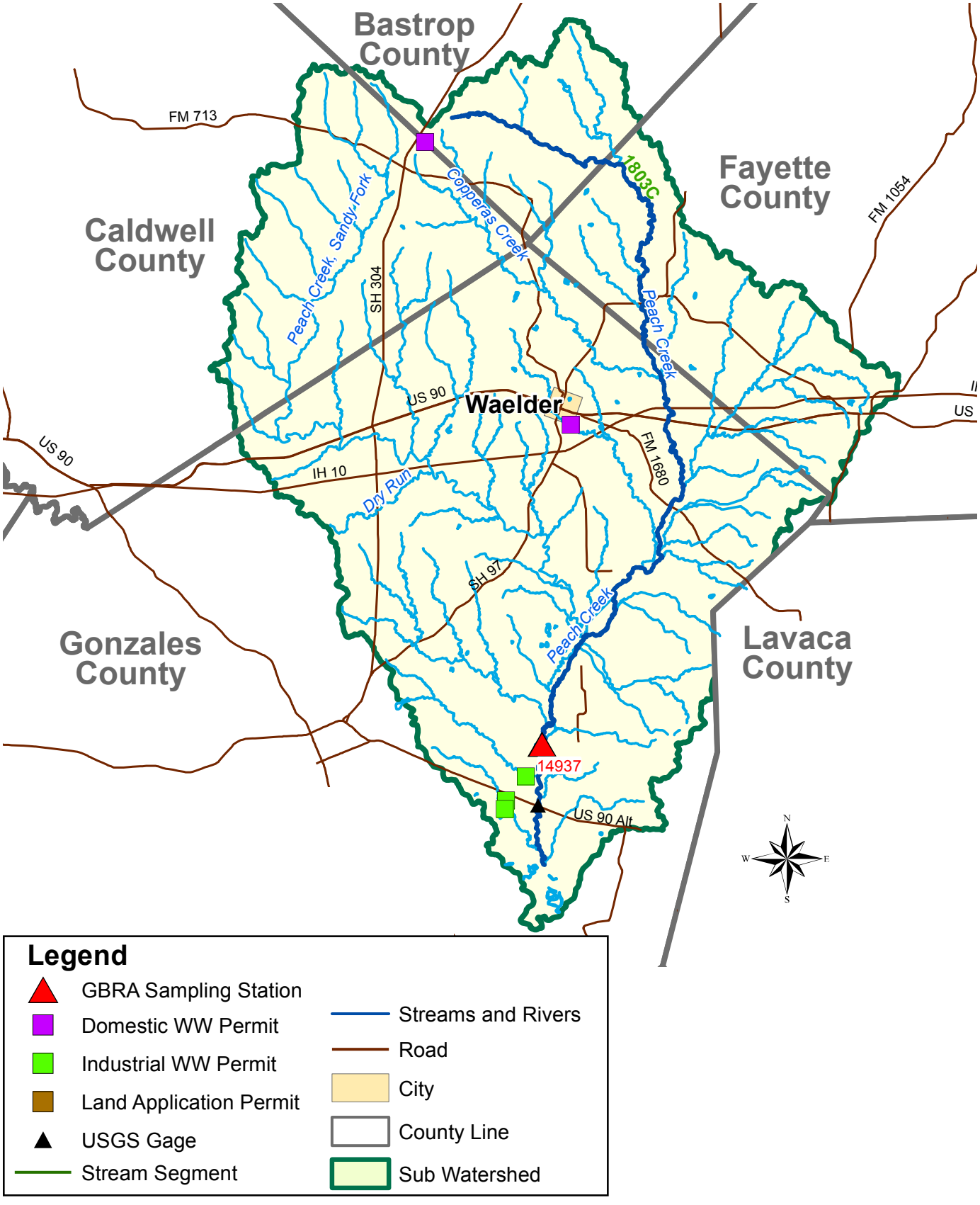
Peach Creek Watershed



Peach Creek Watershed

River Segments, Descriptions and 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.

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

EcoRegions: Texas Blackland Prairies, Post Oak Savannah

Vegetation Cover: Shrublands 13.9%, Grass/Herbaceous 23.4%, Deciduous Forest 34.1%, Pasture/Hay 21.1%

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

Land Uses: Recreation, extensive cattle and poultry productions, light industry and agricultural crops

Water Body Uses: Aquatic life, contact recreation, and fish consumption

Soils: Dark red sandstone and tan and grey sandstone

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

Photo by Janet Thome

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Peach Creek, a tributary of Segment 1803, the Guadalupe River below the San Marcos River, extends from its confluence with the Guadalupe River in Gonzales County, northward, with portions of the watershed in Fayette, Bastrop and Caldwell counties. The segment is separated into three assessment units: the lower 25 miles; the portion that extends from FM 1680 in Gonzales County to the confluence with Elm Creek in Fayette County; and, the remainder of the water body. GBRA has been monitoring Peach Creek (station no. 14937) monthly since 1996. The GBRA station is located in the lower assessment unit. Peach Creek was listed as impaired for bacteria in 2000. A **Total Maximum Daily Load Study** (TMDL) performed by TCEQ confirmed the impairment in the lower two assessment units and found that the upper assessment unit is not impaired for bacteria. The TMDL developed in 2008 modeled the watershed to determine the amount of load reduction that would be necessary to bring the stream back into compliance with stream standards but has not been adopted. After looking into the operation of the wastewater plants discharging to the creek, it was determined that the sources of bacterial loading are most likely from nonpoint sources, such as failing septic tanks, livestock and wildlife. The study determined that a 47 to 100 percent reduction in non-point source bacterial loading is necessary to bring Peach Creek into compliance with stream standards. However, TCEQ recognizes the potential for bacterial contributions from these wastewater facilities so there are waste load allocations assigned to the wastewater plants that require that they maintain adequate disinfection. To assure that there is a reduction of bacteria in the waste, the cities have bacterial monitoring requirements in their permits. There are five point sources that have permits to discharge treated water to the segment, two of which could potentially contribute to the bacterial impairment. The cities of Waelder and Flatonia operate wastewater plants that are facultative lagoon systems that do not include chemical disinfection. TCEQ believes that the lagoon process holds the wastewater with sufficient time for reduction in bacteria by solar radiation and other natural processes. Both cities currently have satisfactory permit compliance histories with TCEQ.

Photo by Janet Thome

The proposed Total Maximum Daily Load for Bacteria in Peach Creek report can be accessed at http://www.tceq.state.tx.us/implementation/water/tmdl/34-peachcreekbacteria.html. The Texas State Soil and Water Conservation Board, along with the Gonzales County Soil and Water Conservation District, have funds available to provide technical and financial assistance to landowners and ag producers for the development of water quality management plans (WQMPs). The WQMPs are written specifically for each landowner's property and uses, with the goal to reduce the bacterial loading to Peach Creek. The funding includes cost sharing for water quality management practices that give livestock alternatives to watering directly in the creek or work to retain storm water off pastureland. These practices include fencing, stock ponds, troughs and water wells, as well as brush management, riparian herbaceous cover and forest buffers.



Photos by Janet Thome

The GBRA routine monitoring station at CR 353 exhibits wide swings in water quality. The median concentration for **dissolved oxygen** is 6.7 milligrams per liter (mg/L), ranging from a minimum of 2.1 mg/L to a maximum of 13.5 mg/L. During the period of record the dissolved oxygen dropped below the standard for the minimum dissolved oxygen concentration (4.0 mg/L) 4 times. This segment is currently listed on the state 303(d) list for depressed dissolved oxygen. The **temperature** varied between 5.4°C to 28.8°C, with a median temperature of 22.4°C. The **specific conductance** ranged between 146 micromhos per centimeter (umhos/cm) and 1420 umhos/cm, with a median conductivity of 628 micromhos per centimeter. The median **pH** of the station was 7.8, ranging from 6.8 to 8.4 standard pH units, never falling outside the stream standard range of 6.5 to 9.0 standard units.

The median concentration for **chloride** was 53.8 mg/L, ranging from 5.68 mg/L to 170 mg/L, falling outside the stream standard of 100 mg/L used for assessment 19 times out of 112 data measurements. Peach Creek exhibited a wide range in **sulfate** concentrations, ranging between 7.62 mg/L and 327 mg/L, with a median concentration of 32 mg/L. The sulfate concentrations fell outside the stream standard of 50 mg/L 45 times out of 112 measurements. There is a slight downward trend in sulfate concentrations over time as seen in Figure 1. The same wide range in concentrations is seen with **total hardness**, which has a median 70.4 mg/L and ranges between 20.5 mg/L and 424 mg/L from 2002 to 2012. Total hardness concentrations on the Peach Creek have also experienced a significant downward trend over the last 10 years as seen in Figure 2. As seen in Figure 3, the ionic constituents, represented by conductivity, are negatively

Figure 1.

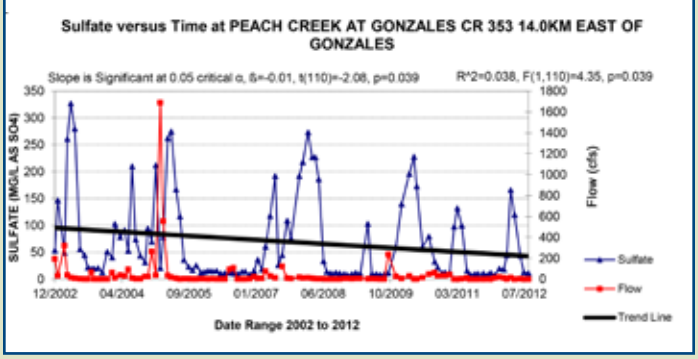
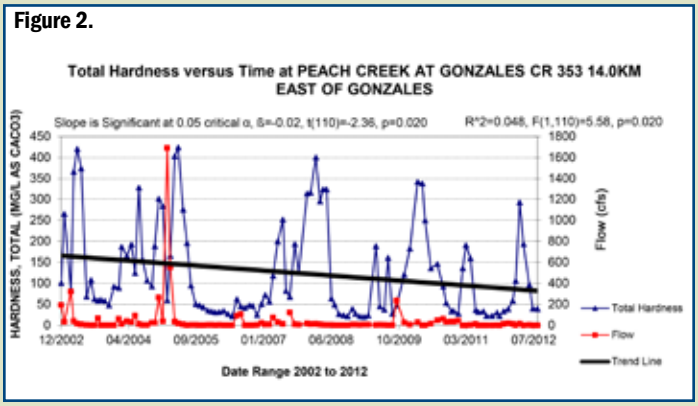


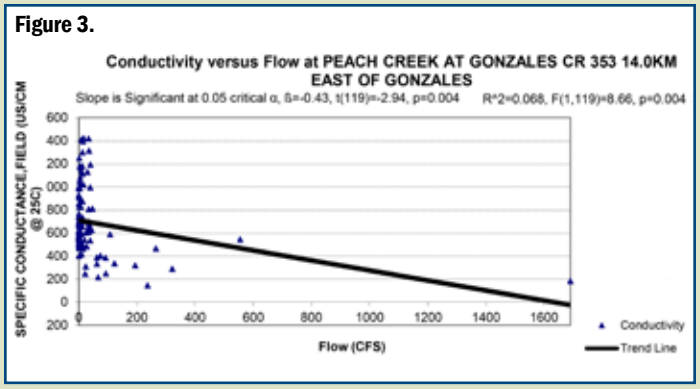
Figure 2.



Peach Creek Watershed

River Segments, Descriptions and Concerns

Figure 3.



correlated with flow. The constituents that make up the majority of the dissolved solids also correlate with each other, meaning that when the hardness and chloride are elevated, the sulfate follows the same pattern. Two of the other three permitted dischargers in the watershed are from clay mining operations and may be linked to the wide swings in the dissolved constituents. These discharges are intermittent and while within the permitted allowances could explain the wide swings in concentrations.

Most locations in the Guadalupe River basin have relatively high hardness concentrations with one exception, Peach Creek. The toxicity of certain **metals** is dependent on the hardness of the stream. The metals toxicity criteria that are hardness-dependent are cadmium, chromium, copper, nickel, lead and zinc. The hardness concentration at the 15th percentile is 31.62 mg/L in Peach Creek as compared to an average a little over 200 mg/L in other parts of the basin. It is at this percentile that the toxicity criteria for Peach Creek are calculated. The acute and chronic toxicity criteria are considerably lower for Peach Creek than at other locations in the river basin. Also, the highest concentrations of aluminum, arsenic, chromium, nickel and zinc in the basin are found at the CR 353 station. Currently, Peach Creek does not exceed the standards for acute and chronic toxicity but the concentrations that have been found do warrant continued monitoring.

Nitrate nitrogen, ammonia nitrogen and total phosphorus, were analyzed at the GBRA monitoring location on Peach Creek. Over the period of record, the median concentration of **nitrate nitrogen** was 0.12 mg/L, ranging from less than the Limit of Quantification (LOQ) to 1.32 mg/L. At no time did the nitrate nitrogen concentration exceed the screening criteria of 1.95 mg/L. The median **ammonia nitrogen** concentration was 0.1 mg/L, ranging from 0.02 mg/L to 0.44 mg/L which was a one-time occurrence in the data. Four sampling events showed the concentration of ammonia nitrogen over the screening concentration of 0.33 mg/L. The median **total phosphorus** concentration was 0.24 mg/L, and ranged from less than the LOQ for the method to 0.69 mg/L.

Peach Creek is a slow, meandering stream with pools. Median **flow** at the GBRA station at FM 353 is 4.3 cubic feet per second (cfs), ranging from 0.00 cfs to 1,690 cfs.

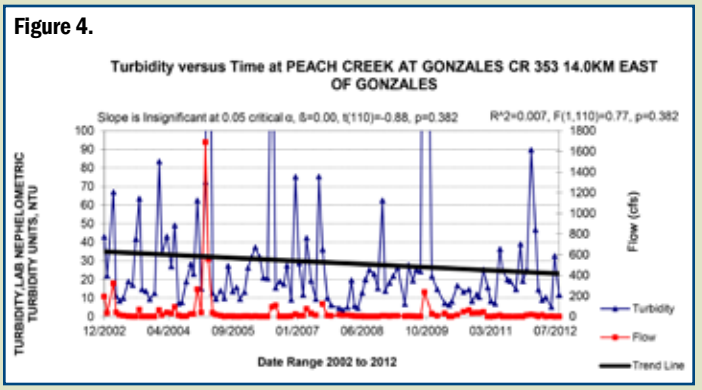
Photos by Janet Thome

Over the period of record the stream stopped flowing about 2.5% of the time. The approximate depth at the sampling location is 2.5 to 3.0 feet, many stream reaches in the upper portion are known to go dry. The pools are typically 2 to 5 feet in depth.

Because there is evidence of primary contact recreation at the monitoring location (station no. 14937), Peach Creek was assessed using the water quality standard for primary contact recreation. The stream standard for contact recreation is a geometric mean of 126 colonies per 100 milliliters. The geometric mean for E. *coli* bacteria at CR 353 is 214 MPN/100 mL.

The substrate at the GBRA monitoring location on Peach Creek ranges from sandy to small cobble. The water is **turbid** (median = 19.0 nephlometric turbidity units) and can have a slight brown tint from tannins that leach from decaying plant material. The **suspended solids** ranged from <1 mg/L to 394 mg/L, with a median of 8.3 mg/L. The median **chlorophyll *a*** concentration is 1.3 micrograms per liter (ug/L) and ranged from less than the LOQ to 9.8 ug/L. There were no monitoring events that were above the screening concentration of 14.1 ug/L. Reviewing the data to look for links between turbidity and flow, a significant correlation was found. However, the period of time illustrated in Figure 4 shows that turbidity can stay elevated with no corresponding peaks in flow. The data was reviewed and there were no elevated chlorophyll *a* values associated with algal blooms during these periods. One possible link to the turbidity could be the extreme flood events prior to each period of sustained turbidity shown on the graph. The inundation of the banks causes loss of grasses along the shoreline that would provide stabilization and prevent or minimize erosion and loss of sediment.

Figure 4.



Peach Creek Issues and Concerns			
Water Quality Issue	**Affected Area**	**Possible Influences/Concerns**	**Possible Actions Taken/to be Taken**
Bacteria	Peach Creek	WWTF facultative lagoons; urban runoff; pet waste; septic systems; livestock; wildlife and feral hogs	Implementation of the proposed Total Maximum Daily Load; 24-hr Dissolved Oxygen measurements
Chlorophyll *a*			
Depressed Dissolved Oxygen			
Aluminum			