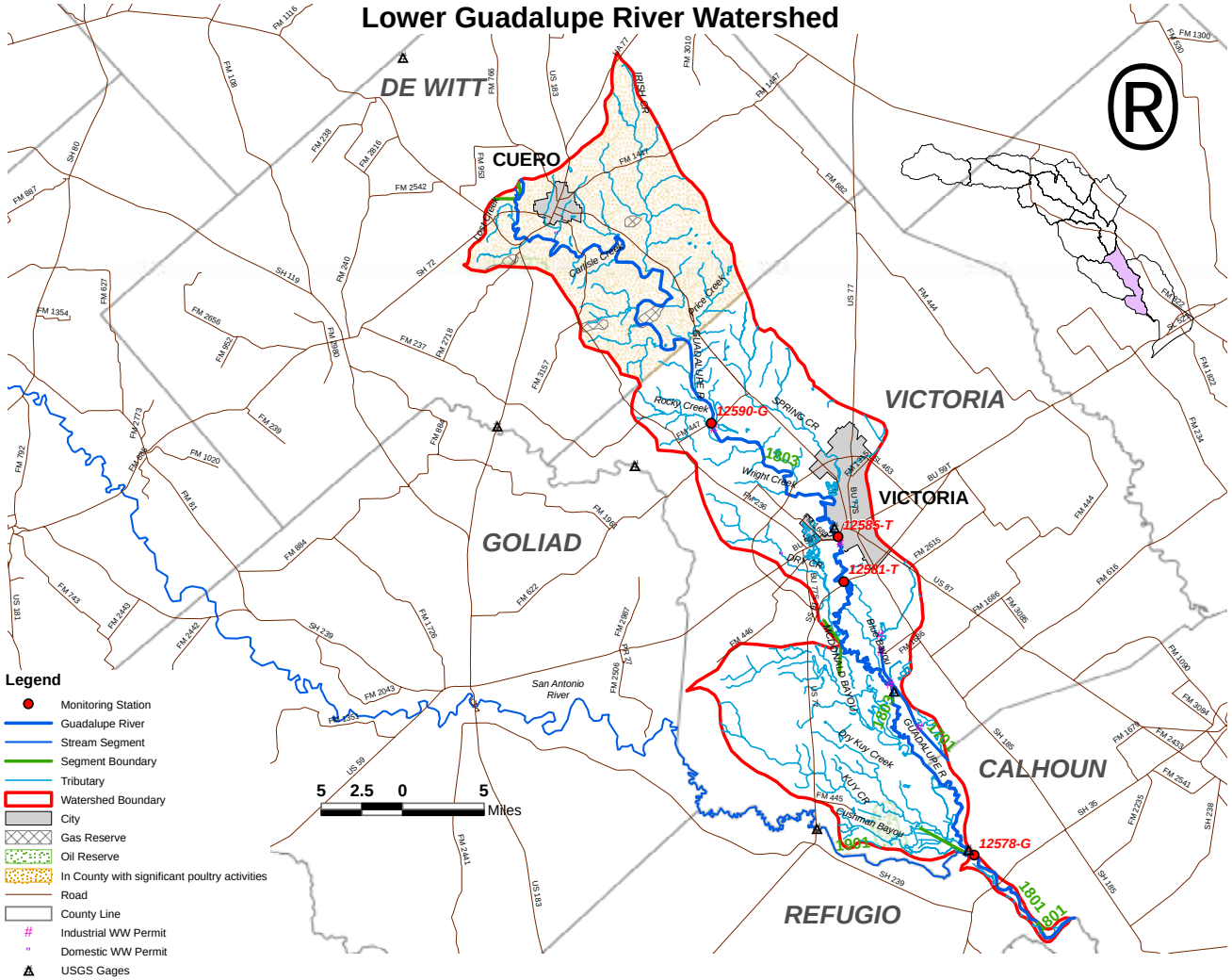

Monitoring Stations – Lower Guadalupe

12595-G	Guadalupe River at FM 766 west of Cuero
12590-G	Guadalupe River at Nursery
12578-G	Guadalupe River at Salt Water Barrier
12577-T	Guadalupe River at Tidal Bridge

Sampling sites are labeled in red followed by the letter G (GBRA), T (TCEQ), U (UGRA) or W (Wimberley) indicating who is the monitoring entity.

Lower Guadalupe River 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%
Grass/Herbaceous - 22.6%
Row Crops - 4.2%
Deciduous Forest 14.8%
Shrublands - 21.1%
Evergreen Forest - 5.7%
Wetlands - 10.2%

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

The **Lower Guadalupe** is made up of three river segments. Segment 1801, Guadalupe Tidal; Segment 1802, Guadalupe River below the San Antonio River; and, Segment 1803, the Guadalupe River below the confluence with the San Marcos River. Additional discussion on Segment 1701, the Victoria Barge Canal, is included in this section.

Guadalupe Tidal

Segment 1801, Guadalupe Tidal, extends from one-half mile downstream of the GBRA Salt Water Dam to where the river enters Guadalupe Bay in Calhoun County. This eleven mile stretch is a typical marshy, tidal river. (The Salt Water Dam is a set of two inflatable fabridams, used during times of low river flow to prevent salt water intrusion by tides.) The TCEQ Region 14 office has monitored at the tidal bridge over the Guadalupe River two to four times per year since 1990. Unfortunately, the data set did not include flow data with each constituent, so it is difficult to attribute extremes in water quality to extremes in flow. Compounding the problem with relating flow to parameter data is the fact that before August 2000 the US Geologic Survey reported flow as gage height rather than as cubic feet per second (cfs). After that date, the flow is given as cubic feet per second. Wherever possible, historical knowledge of flow and comparison of gage heights during those periods to gage heights that have corresponding flow in cfs were considered when looking at extremes in data. An example can be seen in the data taken in September 2002. One of the highest values reported for total phosphorus, enterococcus, *E. coli* and total suspended solids were recorded at the TCEQ tidal bridge site in September 2002. Although the flow that the USGS reported during the September sampling event did not seem unusually high, in July 2002, the upper Guadalupe River experienced one of its most devastating floods. The USGS gage in this segment does not accurately reflect true flows when flows are greater than 2,500 cfs. The September data set was most likely still influenced by flood flows coming from upstream.

Water Quality

Segment 1801 is made up of one assessment unit. The segment was listed with concerns on the 2008 draft Texas Water Quality Inventory for depressed dissolved oxygen and nitrate nitrogen. The inventory cites that the segment exceeded the dissolved oxygen grab criteria of 5.0 milligrams per liter (mg/L) 6 times out of the 37 data points assessed. The median concentration for dissolved oxygen was 6.53 mg/L, ranging from 3.9 mg/L to 12.3 mg/L.

Nitrate nitrogen exceeded the screening concentration of 1.1 mg/L 26 out of 28 sampling events. The median concentration was 1.98 mg/L, ranging from less than detection to 4.72 mg/L. The exceedence of the nitrate screening criteria is due to the concentration of nitrate nitrogen coming from the San Antonio River. GBRA established a monitoring site on the lower San Antonio River at Fannin in 1987, in part, to help explain impacts of flows coming from this "tributary" of the Guadalupe River. The GBRA San Antonio River site had a median concentration of 5.15 mg/L over the period of historical monitoring performed by GBRA from 1987 to 2007. The San Antonio River is effluent-dominated with the city of San Antonio and other smaller cities downstream discharging to the stream. Prior to major upgrades to the wastewater plants that serve the city of San Antonio, the stream routinely violated the drinking water standard of 10 mg/L nitrate nitrogen. Since the upgrade of the city of San Antonio's Dos Rios Wastewater plant and the installation of a major water reuse program that diverts some of the city's wastewater effluent to industrial users, concentration of nitrate nitrogen in the San Antonio River has been reduced. However, the San Antonio River still enters the Guadalupe River above the screening concentration for nitrate nitrogen (1.1 mg/L). The nitrate nitrogen concentration upstream, in segment 1803, ranged from 0.85 mg/L at the Guadalupe River at FM 766 in DeWitt County to 0.7 mg/L at the Hwy 59 Bridge in downstream of Victoria (very limited data set collected by USGS.) Figure 1 shows that there is no trend, increasing or decreasing, in the nitrate nitrogen concentration over time.

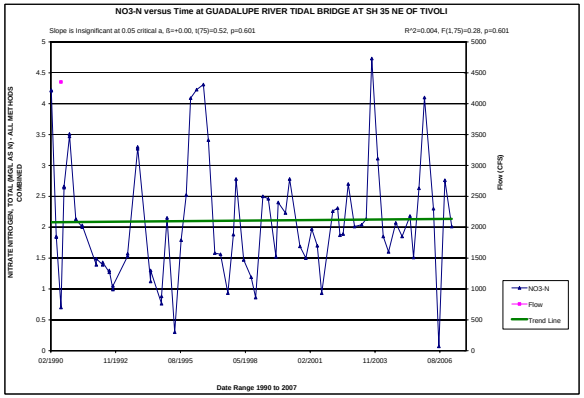

Figure 1. Guadalupe River at Tidal Bridge (12577)– nitrate nitrogen over time.

Surprisingly, segment 1801 only exceeded the screening concentration of 0.66 mg/L for total phosphorus one time (0.92 mg/L) in the data set used by the TCEQ assessment team. Figure 2 shows that conditions are improving in respect to the phosphorus concentration that is mostly due to the upgrade of the city of San Antonio's Dos Rios Wastewater plant and the installation of a major water reuse program that diverts the majority of the city's wastewater effluent to industrial users.

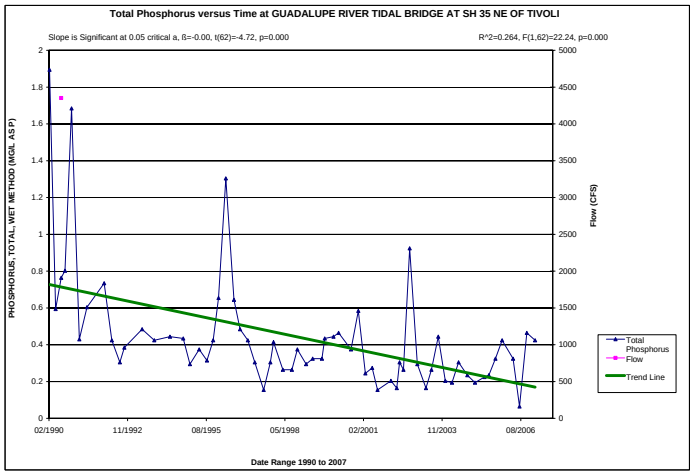

Figure 2. Guadalupe River at Tidal Bridge (12577) – phosphorus concentrations showing slight decline over time.

The median concentration for the **specific conductance** was 714 micromhos per centimeter (umhos/cm), ranging from 371 to 8062 umhos/cm. The extreme high conductance was recorded in January 2002 and there was no known associated flow extremes, high or low, during that time. The next highest values are a series of three measurements in the low 1000 umhos/cm that occurred in 1996. 1996 was one of the driest years during the period of record. These higher conductivity results are most likely due to the higher ratio of wastewater to baseflow in the river because these concentrations are too low to be from tidal influence.

The median pH was 7.99, ranging from 7.5 to 8.9. The temperature ranged from 8.9 °C to 31.9 °C, with a median temperature of 25.6 °C. The total suspended solids ranged from 4 to 774 mg/L, with a median concentration of 74 mg/L. Ammonia nitrogen did not exceed the screening concentration during the period of record. Chloride concentrations ranged from 28 to 147 mg/L, with a median concentration of 64 mg/L. Sulfate concentrations ranged from 23 to 93 mg/L, with a median concentration of 51 mg/L. The monitoring site was monitored for fecal coliform in the early years and then converted to ***E. coli*** and enterococcus in the 2001. The concentrations of all bacteria groups only exceeded the stream standard one time each, in the data set in September 2002 when the river was experiencing the effects of flooding upstream.

Stakeholder Concerns

No specific stakeholders concerns have been voiced at Clean Rivers Program meetings but issues that impact this segment include reduction in fresh water flows due to upstream demands and wastewater reuse, impacting the bay and estuary and threatening the habitat of the whooping crane, an endangered species that winters near San Antonio Bay; and log jams that create impedances that force the rivers and streams in the segment to leave their channels and flow across property.

Guadalupe River Below the San Antonio River

Segment 1802, **Guadalupe River below the San Antonio River**, is a 0.4 mile section of river that extends from the confluence of the Guadalupe River and the San Antonio River in Refugio County to 0.5 mile downstream of the Salt Water Barrier. In this stretch, the Guadalupe River is a slow moving coastal river that is characterized by log jams and fractured flow patterns. Currently, the flow from the San Antonio River may be entering the Guadalupe River in a different location due to past log jams that have created cuts over to Elms Bayou. GBRA, along with other entities in the area, including the Refugio and Calhoun counties, the US Corp of Engineers, and NRCS, will be investigating the area and the flow patterns to determine if the actual confluence of the two rivers has changed.

Water Quality

Segment 1802 is made up of one assessment unit. GBRA has one historical monitoring site in Segment 1802. The "Salt Water Barrier" site (GBRA SWB), site number 12578, has been sampled monthly since 1987. The flow was recorded as gage height until the year 2000, where mean daily flow or instantaneous flow in cubic feet per second is now being recorded for each sampling event.

The segment was listed with concerns on the 2008 draft Texas Water Quality Inventory for nitrate nitrogen, with 30 out of 83 measurements exceeding the screening concentration of 1.95 mg/L. In the GBRA data set and combining all methods reported, the median concentration for nitrate nitrogen was 1.9 mg/L, ranging from 0.18 to 16.9 mg/L. As described in the summary for Segment 1801, segment 1802 is also highly influenced by the contributions of the effluent-dominated stream, the San Antonio River, during low flows and by dilution when there are high flows from flood events upstream (figure 3).

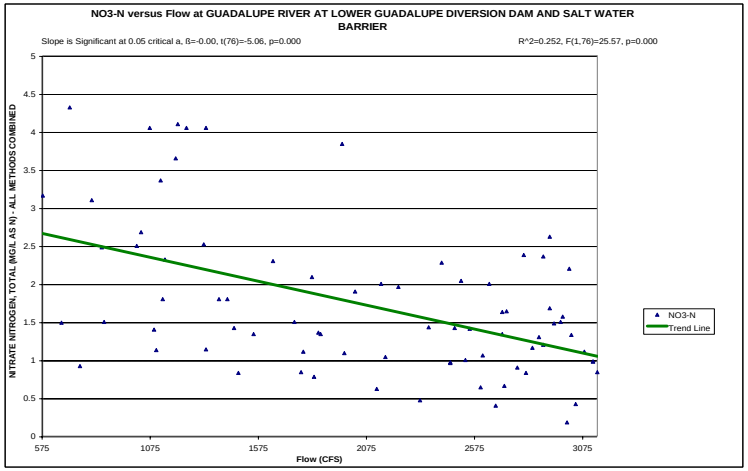

Figure 3. Fluctuations in nitrate concentrations at the GBRA site at the Salt Water Barrier (12578), due in part to contributions from the San Antonio River and to dilution during high flow events.

Figure 4 shows a decreasing trend in total phosphorus, similar to the downward trend seen in Segment 1801. The decreasing concentrations may be associated with an improvement in wastewater treatment in both watersheds over time. There is no correlation with flow. The median concentration was 0.46 mg/L, ranging from less than method detection to 4.32 mg/L.

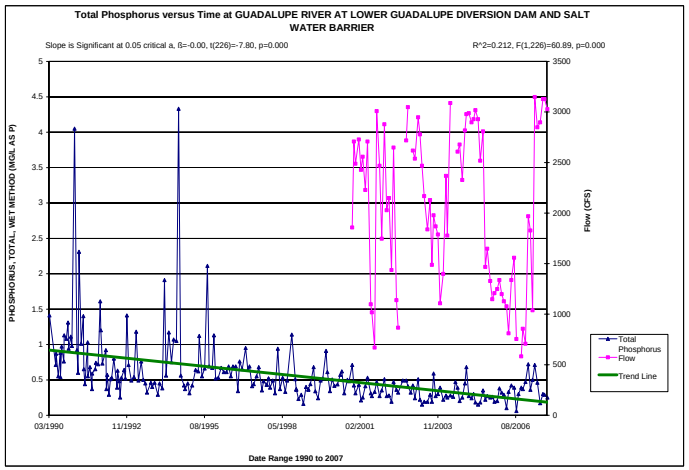

Figure 4. Decreasing trend in phosphorus concentration over time at the GBRA SWB site on the Lower Guadalupe (12578).

The water quality at the GBRA SWB site was very similar to the TCEQ monitoring location at the Tidal Bridge in Segment 1801, since both are downstream of the San Antonio River, the largest influence to the water quality in this portion of the river. The temperature ranged from 9.97°C to 32°C, with a median temperature of 23.1°C. The pH ranged from 7.5 to 8.9, with a median pH of 7.99. The total suspended solids had a median concentration of 76 mg/L, ranging from 7.1 to 1572 mg/L. The chloride and sulfate concentrations had median concentrations of 59.2 and 50.7 mg/L, ranging from 7.4 to 140 mg/L and 0.5 to 107 mg/L respectively.

The bacterial analysis of Segment 1802 included fecal coliform and ***E. coli***, but not enterococcus. The *E. coli* concentrations ranged from 2 to 3300 organisms per 100 milliliters, with higher concentrations correlated with higher flow events. The chlorophyll a ranged from less than method detection to 38.3 micrograms per liter, exceeding the screening concentration of 14.1 ug/L 19 times out of 135 sampling events. There was no statistical correlation with flow.

Metals in water were analyzed at the GBRA SWB site. The data can be reviewed in the *Metals in Water* section of this document. The SWB site, the most downstream site, monitored by GBRA for metals in water, has one of the highest concentrations of each metal detected in the river basin, usually slightly less than those detected at Peach Creek. The concentrations at the SWB are not near the acute or chronic metals criteria because the hardness of the water reduces the toxic nature of the heavy metals. The concentrations at this site are not unexpected because being at the farthest end of the basin we would see the cumulative contributions of all tributaries and discharges to the river. One note to make, based on concerns by others across the state, the concentration of aluminum in April 2007 may be due to questionable field equipment and laboratory analyses provided by the contractor.

Stakeholder Concerns

No specific stakeholders concerns have been voiced at Clean Rivers Program meetings for segment 1802 but issues that have been raised over the years include reduction in fresh water flows due to upstream demands and wastewater reuse, impacting the bay and estuary and threatening the habitat of the whooping crane, an endangered species that winters near San Antonio Bay, and log jams that create dams that force the rivers and streams in the segment to leave their channels and flow across property.

Three mile log jam on lower San Antonio River.

Guadalupe River below the confluence with the San Marcos River

The **Guadalupe River below the confluence with the San Marcos River**, Segment 1803, begins in Gonzales County, flowing downstream to the confluence with the San Antonio River in Refugio County. The river flows through Gonzales, DeWitt, Victoria, Refugio and Calhoun counties. This portion of the Guadalupe River is a slow-moving, coastal river with a silty substrate, and lined with pecan bottoms. Because of the change in elevation, the upper reaches of the Guadalupe River located in the hill country are shallow and turbulent. Conversely, the lower Guadalupe River flows through low hills and flat plains, with very little turbulence. Segment 1803 is subject to flooding during which the river often leaves its banks and inundates the riparian areas along the river. While high flows during flooding events scour the inundated areas in the upper segments of the river, the flood waters in the lower basin, spread out over the land that is along the river, deposits silt and carries material, such as logs, downriver.

Segment 1803 is divided into five assessment units: the lower 25 miles (1803_01); from the confluence with the Coleto Creek 25 miles upstream (1803_02); from the confluence with the Sandies Creek upstream 25 miles (1803_03); from 25 miles upstream of the confluence with Coleto Creek to the confluence with Sandies Creek (1803_4); from 25 miles upstream of the confluence with Sandies Creek to the upper end of the segment (confluence with the San Marcos River) (1803_05).

Land Use and Wastewater Discharges

GBRA has an historical site near Cuero ("FM 766"; Site no. 12595) in Segment 1803. GBRA has monitored this site monthly since 1990. The FM 766 site is located in assessment unit 1803_03, approximately at the halfway point down the segment. Also in Segment 1803, in assessment unit 1803_02, GBRA maintains a quarterly monitoring site upstream of the city of Victoria, near the community of Nursery. The site at Nursery (site no. 12590) has been monitored since late 1999. GBRA has recently discontinued monitoring at a quarterly site on the Guadalupe located near the Invista (formerly I.E. Dupont deNemours, Inc.) industrial site. After reviewing the flow, it was determined that the sampling location was in the mixing zone of the industrial discharge and not representative of the flow and water quality of the segment. The site has not been replaced because of the lack of public access locations in the area. The area downstream of the industrial plant is in large tracts of private land with no public access points. The next closest monitoring site was a site maintained in the early 1990s by the US Geological Survey located downstream of the city of Victoria at Hwy 59.

The land use in the upper portion of Segment 1803 is primarily agricultural, with row crops, pastures, hog, chicken and cattle operations. The cities of Gonzales and Cuero are located in the upper portion, both of which have wastewater plants that discharge into the segment. The city of Gonzales operates a wastewater facility that is permitted to discharge 1.5 million gallons per day (MGD), with limitations of 10 milligrams per liter (mg/L) biochemical oxygen demand, 15 mg/L total suspended solids and utilizes ultraviolet light for disinfection of the effluent. The city of

Cuero plant is designed and permitted to treat 1.5 MGD. The facility has permit limitations of 20 mg/L biochemical oxygen demand and 20 mg/L total suspended solids. The city of Victoria is located further downstream and is the largest city in the watershed, with a population of greater than 60,000. The city is served by two wastewater treatment plants operated by GBRA. The Victoria Willow Street plant is designed and permitted to treat 2.5 MGD. The facility is a combination trickling filter/activated sludge facility, with permit limitations of 20 mg/L biochemical oxygen demand and 20 mg/L total suspended solids. The Victoria Regional plant is designed and permitted to treat 9.6 MGD. Its effluent limitations include 20 mg/L carbonaceous biochemical oxygen demand and 20 mg/L total suspended solids.

In addition to the municipal wastewater systems, there are industrial discharge permits issued in the segment. There are two power plants that serve the city of Victoria and surrounding area that use flow from the Guadalupe River as once-through cooling, discharging warm water back to the mainstem. The power plant located in the city of Victoria must monitor and record the daily maximum flow, temperature and rise in river temperature, along with river stage. The second facility is located upstream of the city and near the community of Nursery. Invista has discharge permits, in addition to injection wells and a wetlands area, that treat and dispose of different waste streams on their plant site.

Water Quality

There are two sites on Segment 1803 with sufficient historical data for trends analyses and review, the GBRA's monthly site near Cuero ("FM766") and the GBRA site upstream of the city of Victoria near Nursery ("Nursery"). The Nursery site is only monitored quarterly and was established in late 1999. The USGS monitoring location at Hwy 59 downstream of Victoria has a very limited data set from the early to mid-90s. The data can be used for comparison to the upstream locations but not for trend analysis.

The median **flow** that was recorded during the historical monitoring at the FM766 site in the upper portion of the segment was 2487 cubic feet per second (cfs) and at Nursery, the median flow during sampling was 1610 cfs. This difference in flow is not due to a loss in water but mostly due to difference in the size of the data sets. The temperature ranged from 9.8 °C to 33.7°C, with a median temperature of 23°C at the FM766 site. The range of temperature measured at the Nursery site was similar, 9.7 °C to 31.7 °C. The median pH for the FM766 site was 8.03, and 7.91 at Nursery. Neither sites exceeded the stream standard range of 6.5 to 9.0. The conductivity at the FM766 ranged from 205 to 691 micromhos per centimeter (umhos/cm), and ranged from 302 to 688 umhos/cm at the Nursery site, with medians of 539 and 558 respectively.

There is very little change in nutrient concentrations between the two stations. Neither station exceeded the screening concentration for ammonia nitrogen of 0.33 milligrams per liter (mg/L), and had very similar ranges in concentration. The median concentration for nitrate nitrogen was the same at both locations. The FM766 site exceeded the screening concentration for nitrates 2 times out of 208 measurements and the Nursery site exceeded the screening concentration only once. There is very little correlation of nitrate concentration with flow. Figure 5 shows the change in nitrate and flow over time at the FM766 site. Where higher than normal flow events can explain some peaks in nitrate, there are more times where the nitrate fluctuates without changes in flow. The same flucuations in nitrates are seen at the Nursery site as well.

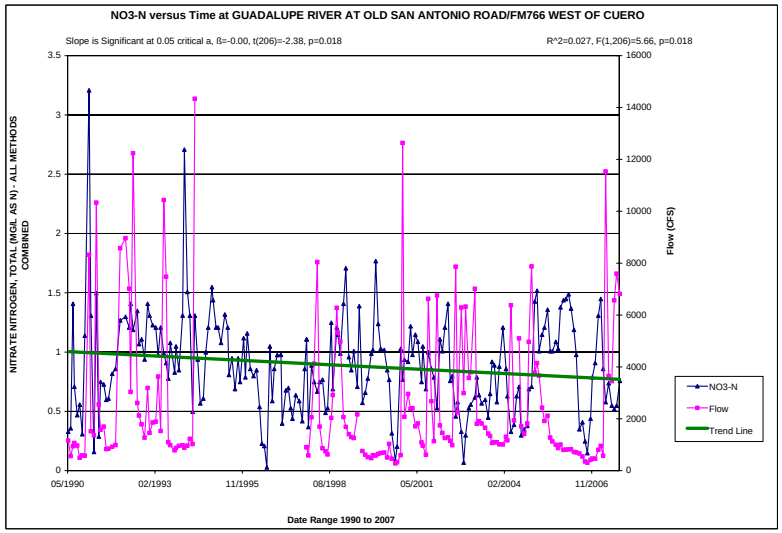

Figure 5. Fluctuations in nitrate nitrogen concentrations at the GBRA site at FM 766 (12592) are not easily explained by flow.

Total phosphorus has a positive correlation with higher flows at the FM766 site as seen in figure 6. The source of the total phosphorus is most likely the suspended

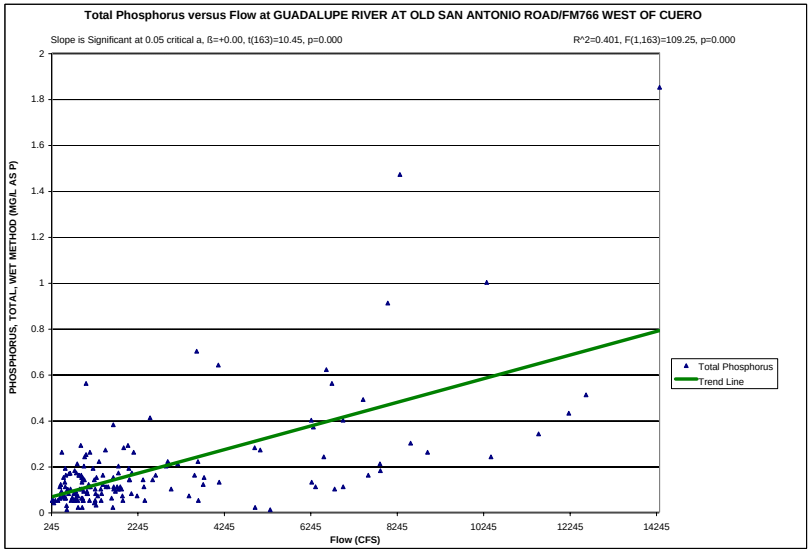

Figure 6. Total phosphorus positively correlates with high flow events at the GBRA FM766 (12592) monitoring location.

material that is carried in during high runoff events. To support this likelihood, figure 7 shows the statistical correlation between suspended solids and flow. The suspended material is made up of sediment and organic material which contains phosphorus, in the form of inorganic phosphates that are added to the fields as fertilizer and organic phosphorus, bound in plant material and soil. The same relationships are seen at the Nursery site as well. The median total suspended solids concentration at the FM766 site was 24 mg/L, ranging from 3.7 to 1036 mg/L. The Nursery site had a median concentration of 30.8 mg/L, ranging from 8.3 to 948 mg/L.

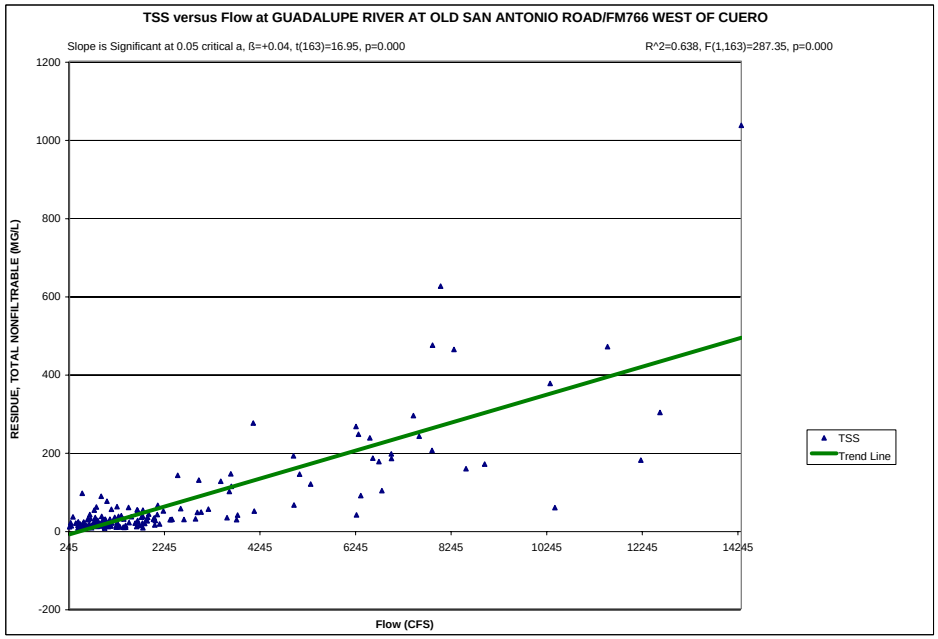

Figure 7. Total suspended solids correlates with flow at the GBRA FM 766 site (12592), bringing in phosphorus in the form of phosphates from fertilizers and as organic phosphorus in silt and organic material.

Flow has the opposite effect on dissolved constituents, diluting the natural background concentrations of chloride and sulfate (figure 8). The median concentrations of chloride at the FM766 site was 27.8 mg/L, ranging from 7.2 to 64 mg/L, and never exceeding the stream standard of 100 mg/L. The median concentration for sulfate at the FM 766 was 30.4 mg/L, ranging from 3.4 to 45.8 mg/L. The concentrations for these dissolved constituents were similar at the Nursery site.

The ***E. coli*** geometric mean at the FM766 was 44 organisms per 100 milliliters. Exceedences of the stream standard for contact recreation occurred 14 out of 134 measurements, or 10.4% of the time. The *E. coli* geometric mean at the Nursery site was slightly higher, at 87 organisms per 100 milliliters, and exceedences of the stream standard for contact recreation occurred 7 out of 33 sampling events. The difference between sites is most likely due to the differences in the small size of the data set for the Nursery site and not to a consistent source of bacteria. Chlorophyll a concentrations at both sites were the same, with median concentrations of 2.7 micrograms per liter. The ranges differed slightly, with a higher concentrations occurring at the FM766 site. The site exceeded the screening concentration for chlorophyll a 3 out of 133 measurements. The Nursery site did not exceed the screening concentration in the period of record. As with other constituents monitored, the differences between sites are most likely due to the smaller size of the data set.

Stakeholder Concerns

Stakeholder concerns in this segment include impacts of poultry operations, primarily in the Sandies and Elm Creek watersheds; impacts from bacterial and nutrient contributions from non-point source runoff, ranging from small cow/calf operations to confined animal feed lots; potential for spills and leaks from the many chemical pipelines that cross the river; impacts from in-situ uranium mining; and, impacts of endocrine disrupting chemicals associated with agricultural operations, such as synthetic growth hormones and antibiotics, as well as those that fall in the group of chemicals referred to as “personal care products”, such as lotions, pain relievers and insect repellents. The bacterial impairments on Sandies and Elm Creeks are being investigated in the total maximum daily load project that is finishing up in 2008. The potential for spills and leaks is difficult to address. TCEQ regional offices are responsible for responding to spills, as well as the Texas Parks and Wildlife Department’s Spills and Kills Team. Specific to the Guadalupe Basin, GBRA sends letters each year to the fire and emergency management offices of each county, requesting that GBRA be notified if there is spill or leak response required in their county. Our field crew will respond in order to offer assistance in monitoring the stream, to provide historical water quality information as well as gather current information that can be relayed to operations and water users downstream of the spill and to keep the events inventory up to date for future reference. In-situ uranium mining is discussed in the section on the Coleto Creek watershed, segment 1807.

Investigation into the potential for endocrine disrupting chemicals in the watershed is very costly and there are very few laboratories available to analyze for that large suite of compounds. As technology improves, the compounds are more easily detected, but there is little known as too what concentrations in surface water should raise a red flag. In the future, CRP and GBRA will discuss the need for these analyses and whether the funding for those analyses is available.

Victoria Barge Canal

Segment 1701, the Victoria Barge Canal, extends from the turning basin downstream to the confluence with the San Antonio Bay. The TCEQ Region 14 has one monitoring location in the Barge Canal. The site has been monitored from 1990 through 1997, discontinued for a period of 4 years and reinstated in 2001. The regional office crew monitored the site quarterly.

The barge canal is used by industries for barge traffic . Additionally, several industries, such as Union Carbide and BP Chemical, discharge permitted waste to the waterbody. The water body has been listed with concern for nitrate nitrogen and chlorophyll a concentrations on the 2008 draft Texas Water Quality Inventory. The designated use is listed as non-recreational. The impairment for aquatic life support because of dissolved oxygen concentrations was lifted after diurnal monitoring collected additional data and showed sufficient dissolved oxygen to support aquatic life use.

Water Quality Monitoring

Field parameters were collected over the period of record, and through the water column, at depths of 0.3 meter (m) through 5 m. The following table shows the median values for each field parameter by depth, measured over the period of record:

Depth	Conductivity	pH	Dissolved Oxygen	Temperature	Salinity
0.3 m (surface)	6500	8.1	7.6	26	3.6
0.31 – 1.0 m	6232	8	7.52	28.6	3.4
1.1 – 2.0 m	6201	8	7.15	27.5	3.4
2.1 – 3.0 m	3365	8.25	7.75	27.7	2.4
3.1 – 5.0 m	2485	8.25	7.2	29	1.8

The canal is brackish, uniform in pH, temperature and dissolved oxygen through the water column, and showing some density stratification from surface to bottom.

Conventional parameters were collected at the surface, within 0.3 meters. The total suspended solids ranged from 4 to 186 milligrams per liter (mg/L), with a median concentration of 42 mg/L. The suspended solids appeared to be increasing through 1997, but after the site was reinstated the solids appear to have stabilized (Figure 1).

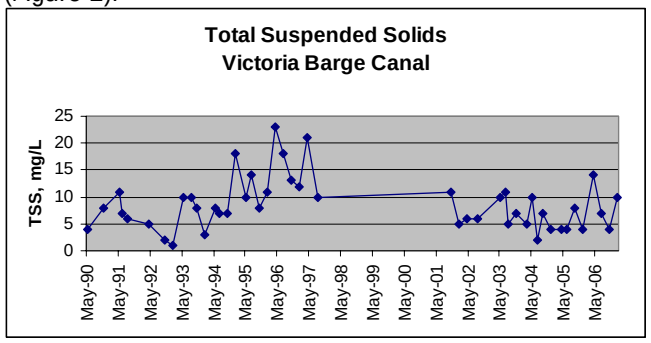

Figure 1. Total suspended solids in the Victoria Barge Canal (12536).

In 2006 the Texas Water Quality Inventory listed the barge canal with concerns for nitrate nitrogen. The nitrate nitrogen concentrations ranged between 0.01 to 1.4 mg/L, with a median concentration of 0.18 mg/L. The ammonia nitrogen concentrations ranged from below method detection to 10.11 mg/L, with a median concentration of 0.065 mg/L. The site exceeded the screening concentration three times, one being 10.11 mg/L in May 1994. This value appears to be a one time occurrence. Total phosphorus concentrations ranged from 0.06 to 0.34 mg/L, with a median concentration of 0.16 mg/L. The majority of the total phosphorus was in the orthophosphate (dissolved) form. The median concentration of the orthophosphate over the same period of record was 0.12 mg/L. Over the 14 years worth of quarterly data, there is very little change in the phosphorus concentrations and no significant trend is indicating a degrading water quality (figure 2).

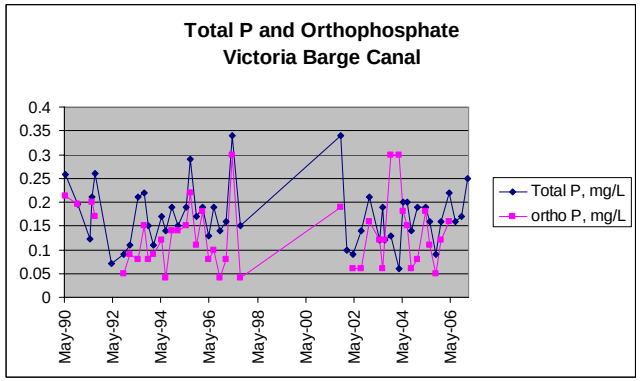

Figure 2. Total and orthophosphate concentrations in Victoria Barge Canal (12536).

Chlorophyll a concentrations ranged from less than detection to 68.1 micrograms per liter. Ten measurements fell outside the screening concentration of 14.4 micrograms per liter, or 22% of the time. In figure 3, there appears to be a slight upward trend in the chlorophyll a. Data collected before the site was discontinued in 1997 had a lower detection limit of 1.0 microgram per liter. After the site was reinstated the detection limit for the chlorophyll a method was raised to 10 micrograms per liter.

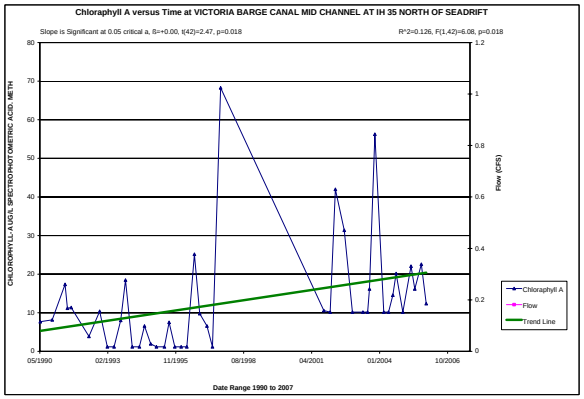

Figure 3. Data shows a slight upward trend in chlorophyll a concentrations over time at the Victoria Barge Canal site (12536).

Stakeholder Concerns

No stakeholders have voiced concerns with the Barge Canal. General concerns for water quality and the impact of barge traffic, chemical pipelines and industrial discharge quality would apply.