

BASIN HIGHLIGHTS REPORT TEXAS CLEAN RIVERS PROGRAM

GUADALUPE RIVER BASIN and the LAVACA-GUADALUPE COASTAL BASIN Spring 2001

This report highlights recent activities in the Guadalupe and Lavaca-Guadalupe River Basins under the Clean Rivers Program (CRP). The CRP is managed by the Texas Natural Resource Conservation Commission (TNRCC), 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 TNRCC.

DATA COLLECTION

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. This year's Coordinated Monitoring meeting was conducted April 10, 2001.

As decided in the 2000 Coordinated Monitoring Meeting, GBRA monitored eighteen sites monthly and five sites quarterly for field, conventional, flow and bacteria parameters (see Figure 1). Ten sites in Kerr County were also monitored quarterly under a subcontract with UGRA for the same parameters. GBRA analyzed biological and habitat parameters semi-annually at eighteen sites, ten in Kerr County and eight in the GBRA district. Nine sites--one in Kerr County and eight in the GBRA district -- were sampled for metals. Twenty-two stations in Kerr County were monitored for fecal coliform (FC) and *E. coli* (EC) on a weekly basis, from May through August. GBRA added a new site near Victoria at Arenoso Creek. This site was added for data collection prior to installation of a sludge disposal facility. The Coordinated Monitoring Meeting resulted in some updates as reflected in the list of GBRA monitoring sites (Table 1) and TNRCC sites (Table 2). Figure 1 shows these sites plus areas of 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.

All data are collected under the guidelines of a Quality Assurance Project Plan (QAPP) developed and approved in coordination with TNRCC, in order to provide the level of consistency and scientific validity needed for environmental monitoring and decision making for river basins across the state. The QAPP is a document required by the TNRCC that provides very thorough documentation of all aspects of sample collection, analysis and data management procedures. The QAPP includes sections on the project organization, background, quality objectives, training requirements, record keeping, methodologies, and equipment maintenance. Also included are sections outlining data management, validation, and verification. By having the important details specified, it has been possible to consider the monitoring data from all agencies together, enhancing the overall value of the data collected. Although QAPPs for the Clean Rivers Program do not require Environmental Protection Agency approval, the TNRCC

requires that data collection under CRP be comparable to other data collected by TNRCC and be consistent with EPA requirements.

SPECIAL STUDIES

Special Studies are an integral component of the Clean Rivers Program. Through coordinated monitoring meetings and active public communication, the GBRA determined specific needs for targeted assessment. The six areas of assessment include:

- an on-going study of sediment conditions in the hydro-lakes with particular emphasis on the effect of the October 1998 flood;
- analysis of unique water quality conditions in small streams;
- completion and dissemination of an examination of how development affects stormwater runoff in four of the major urban areas;
- special pathogen and herbicide monitoring (carried over from an earlier Steering Committee request);
- MTBE sampling; and
- enhanced monitoring of 303(d) listed water bodies.

In the recent past the CRP has supported an analysis of the possible need for point source nutrient removal to help control accelerated aquatic plant growth on the hydroelectric generation lakes. The basic conclusion of that work was that while wastewater nutrient removal would be desirable during low flow periods, it would be hard to justify because of the large cost and relatively infrequent need. However, use of the effluent for irrigation during dry periods does seem useful and cost-effective. One of the reasons that point source nutrient removal was of questionable value was that many of the problem plants could obtain nutrients from the sediments.

Because of the significant role played by sediments in supplying nutrients to nuisance vegetation, the CRP has supported some basic data collection efforts in the basin lakes. These include the UGRA and Flat Rock lakes in Kerr County, and Lakes Dunlap, McQueeney, Placid and Wood (H-5) further downstream. This effort begun in the fall of 1999 has completed three sampling runs. Figure 2 plots the available data with the reservoirs arranged from upstream near Kerrville to downstream near Gonzales. The pre-flood observations in 1997 only exist on Lake Dunlap. While the amount of data is as yet limited, some observations are potentially worth noting. First, there does not appear to be a major change in Lake Dunlap sediments pre- and post-flood. Only with the Total Phosphorus data does there appear to be a major change, where high sediment concentrations near the NBU outfall appears to be replaced by more uniform and higher levels throughout the reservoir. With TKN and possibly TOC there appears to be a trend towards lower concentrations from up to downstream. Whether this is related to landuse or to small differences in the impoundments (e.g. the residence time for the Kerr County reservoirs is greater than for the reservoirs in the lower river) is unknown at this writing.

Another project conducted last year was a broader presentation of urban growth effects analysis in the major basin communities of New Braunfels, San Marcos, Seguin and Victoria. These cities will be subject to new stormwater permitting regulations. The technical work was completed the previous year and efforts this year have been towards communicating accordingly. This project is discussed under the last section of this document, Communicating Results.

FIGURE 2
SEDIMENT QUALITY DATA COLLECTED FROM IMPOUNDMENTS OF GUADALUPE RIVER

U: UGRA Lake, F: Flatrock Lake, D: Lake Dunlap, M: Lake McQueeney, P: Lake Placid, H: Lake Wood

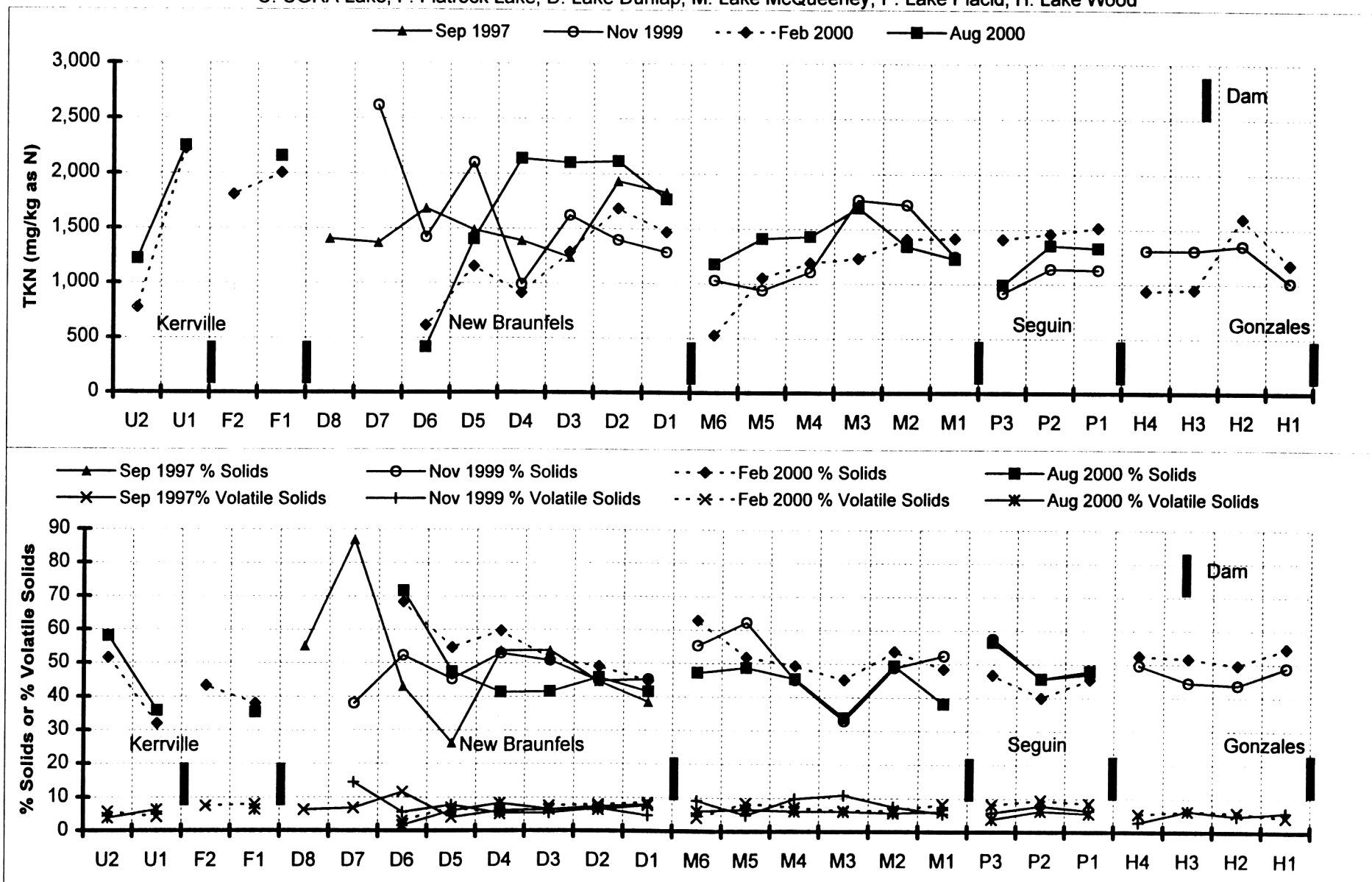
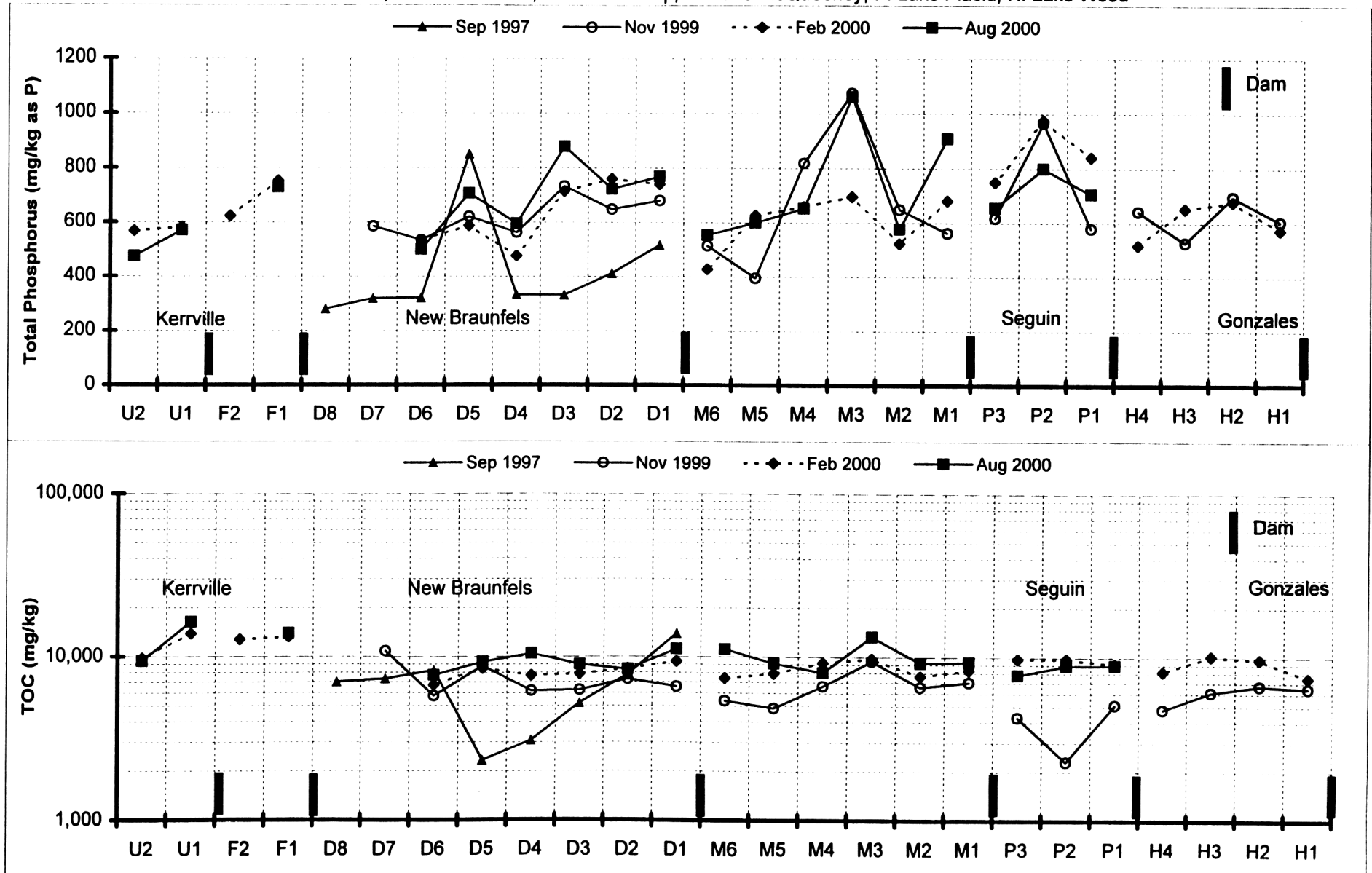


FIGURE 2 (CONCLUDED)
SEDIMENT QUALITY DATA COLLECTED FROM IMPOUNDMENTS OF GUADALUPE RIVER

U: UGRA Lake, F: Flatrock Lake, D: Lake Dunlap, M: Lake McQueeney, P: Lake Placid, H: Lake Wood



The third special project now underway is an analysis of water quality conditions in small streams to help develop proposed water quality criteria that may be more appropriate to the particular conditions. The study evaluates existing data collected in the basin to develop proposed criteria, both for the smaller creeks that are now unclassified and for existing waters where greater sophistication may be needed. The study is being conducted to lay the groundwork for site-specific dissolved oxygen (DO) criteria for some of the stream segments in the basin. An alternative to using a single concentration value is the use of DO deficit or percent saturation. There appears to be little discussion in the literature on the use of these alternative parameters. However, some states have used percent saturation in their DO criteria. The DO data in the basin are being analyzed in relation to the physical characteristics of the sampling locations such as the type of the water body (run, pool, or riffle), flow velocity, flow depth and amount of shade, which all contribute to the variability of DO level in the stream. The study is scheduled to complete in summer 2001. Water quality data for contact recreation should also be assessed in the context of the stream condition. This issue has been addressed in the statewide Bacteria Indicator Study discussed in the following section.

MTBE, methyl tributyl ether, has been used for 25 years as a gasoline additive to boost octane and reduce engine emissions. Ironically, MTBE replaced lead in gasoline to help improve air quality, but has inadvertently caused water quality concerns because of its hydrophilic and carcinogenic properties. To ensure the safety of the water supply, GBRA sampled for MTBE at five sites located at potable water intakes during the months of February and May to September, 2000. No MTBE was detected in any of the six samples taken at the following sites:

- The Canyon Regional Water Authority Clear Springs Water Treatment Plant on Lake Dunlap,
- The Springs Hill WSC Water Treatment Plant on Lake Placid,
- The City of Luling Water Treatment Plant on the San Marcos River,
- The Gonzales County Water Supply Corporation Water Treatment Plant on Lake Wood, and
- The Calhoun County Canal diversion from the Guadalupe River (City of Port Lavaca Water Treatment Plant).

DATA ANALYSIS FOR TRENDS AND CONCERNS

Part of GBRA's mission is to ensure the quality of water in the authority's ten county district. GBRA does this by analyzing collected data for trends and concerns. Part of the concern since the previous Basin Highlights report has been the listing of water bodies in the Guadalupe River basin on the 303(d) list. The 303(d) list is a federally mandated listing of water bodies that do not meet or are not expected to meet water quality standards for their designated use. For those water bodies not meeting water quality standards, a Total Maximum Daily Load (TMDL) study is required to determine how to bring the water body back into compliance. A TMDL determines the amount of pollutant a water body can assimilate and still meet water quality standards. Thus, if a water body does not meet its standard, some form of corrective action should occur.

The 2000 303(d) list included a number of Guadalupe basin segments, mostly listed because of dissolved oxygen (DO) being occasionally lower than the standard to assure optimum

conditions for aquatic life, or fecal coliform (FC) levels that sometimes exceed the criterion for contact recreation. Additionally, one segment was listed for sulfate criterion exceedance. The listed streams include both segments that have assigned uses and criteria, and unclassified streams where the only use and criteria available are for the closest segment downstream.

STREAM SEGMENTS ON 2000 303(D) LIST

Segment	Name	Impairment
1801	Guadalupe River Tidal	DO
1803A	Elm Creek (Unclassified)	DO, FC
1803B	Sandies Creek (Unclassified)	DO
1804B	Peach Creek (Unclassified)	FC
1806A	Camp Meeting Creek (Unclassified)	DO
1811A	Dry Comal Creek (Unclassified)	FC
1814	Upper San Marcos River	Sulfate
1815	Cypress Creek	DO

Dissolved Oxygen

One of the first steps in the TMDL process is to collect additional data for the listed water bodies to be sure there is an actual impairment. The TNRCC Surface Water Quality Monitoring team suggested diurnal monitoring for dissolved oxygen concentrations as the data used to originally evaluate the sites were very limited. In order to properly validate the listings, evaluation required five diurnal monitoring events within April and September. The sites were Cypress Creek (segment 1815); Camp Meeting Creek (segment 1806A); Elm Creek (segment 1803A); and Sandies Creek (segment 1803B).

Cypress Creek, segment 1815, is listed for occasionally low dissolved oxygen values. As shown in Figure 3, the available data for Cypress Creek at FM 12 in Wimberley show no measurements below the segment criterion of 6 mg/L. This listing appears erroneous and GBRA is working with TNRCC to clarify the situation. While the DO conditions appear excellent, some of the FC and EC data are above their criteria. The FC data do not meet the older 1999 screening criterion, whereas the EC data do appear to meet the new contact recreation criteria.

Camp Meeting Creek, an unclassified stream in southeast Kerr County, is listed for DO occasionally being lower than the criterion. As shown in Figure 4, the criterion of 6 mg/L is only met in about 50% of the available measurements. Note however that no data are available since 1994 and that the criterion is not specific to Camp Meeting Creek (an unclassified water) but is that for the Guadalupe River above Canyon, segment 1806. Both Cypress Creek and Camp Meeting Creek will be monitored for diurnal dissolved oxygen concentrations, flow and biological monitoring from April to September, 2001, to get more information and support either possible de-listing of these water bodies or further TMDL action.

Figure 5 shows DO data for two stations on Sandies Creek, an unclassified stream east of Smiley in Gonzales County. Because of lower DO values seen on Sandies Creek and the need for more information, it was decided to perform diurnal DO observations with a datasonde, a

FIGURE 3
DISSOLVED OXYGEN FOR CYPRESS CREEK
SEGMENT 1815

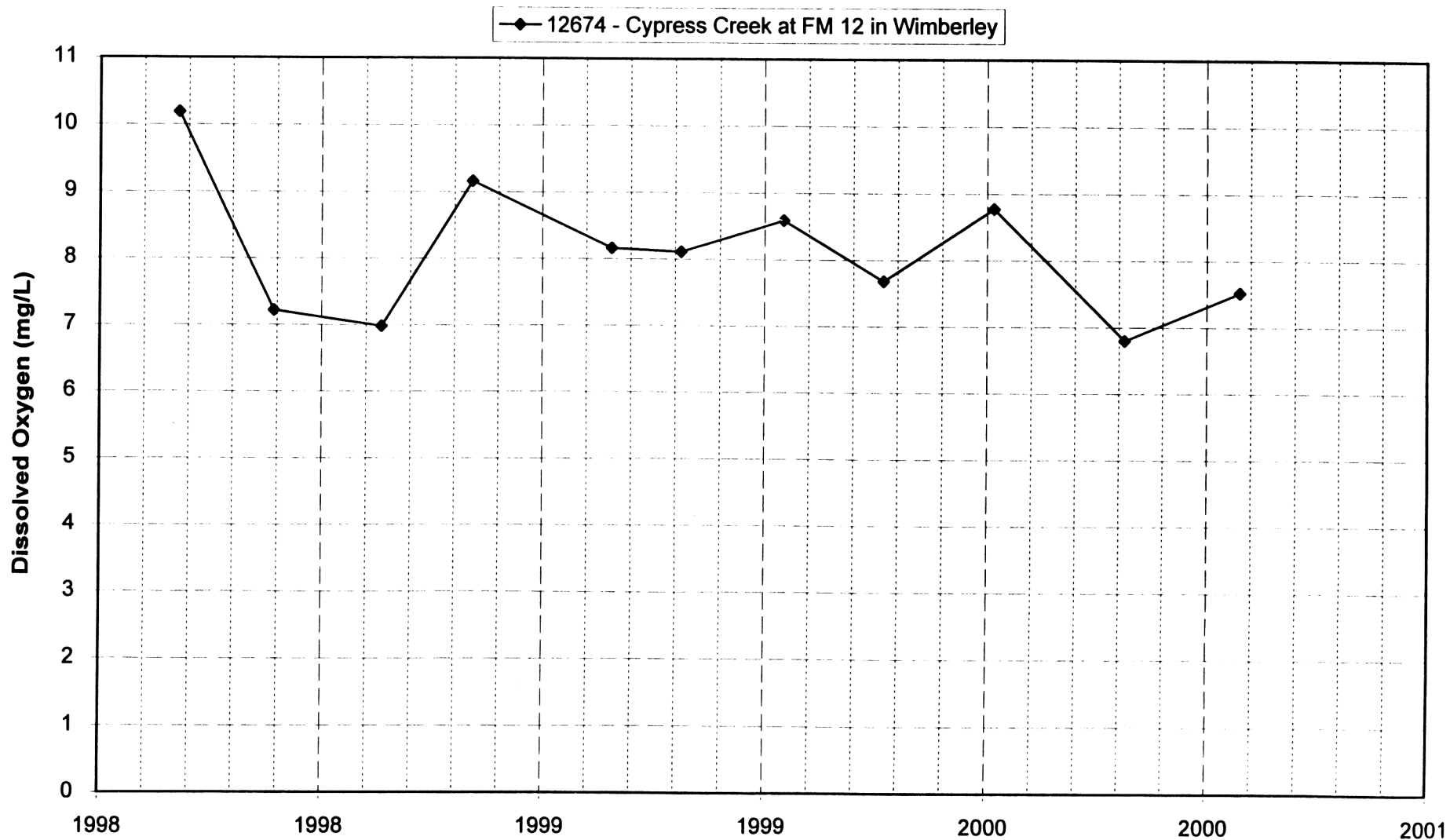


FIGURE 4
DISSOLVED OXYGEN FOR CAMP MEETING CREEK
SEGMENT 1806A

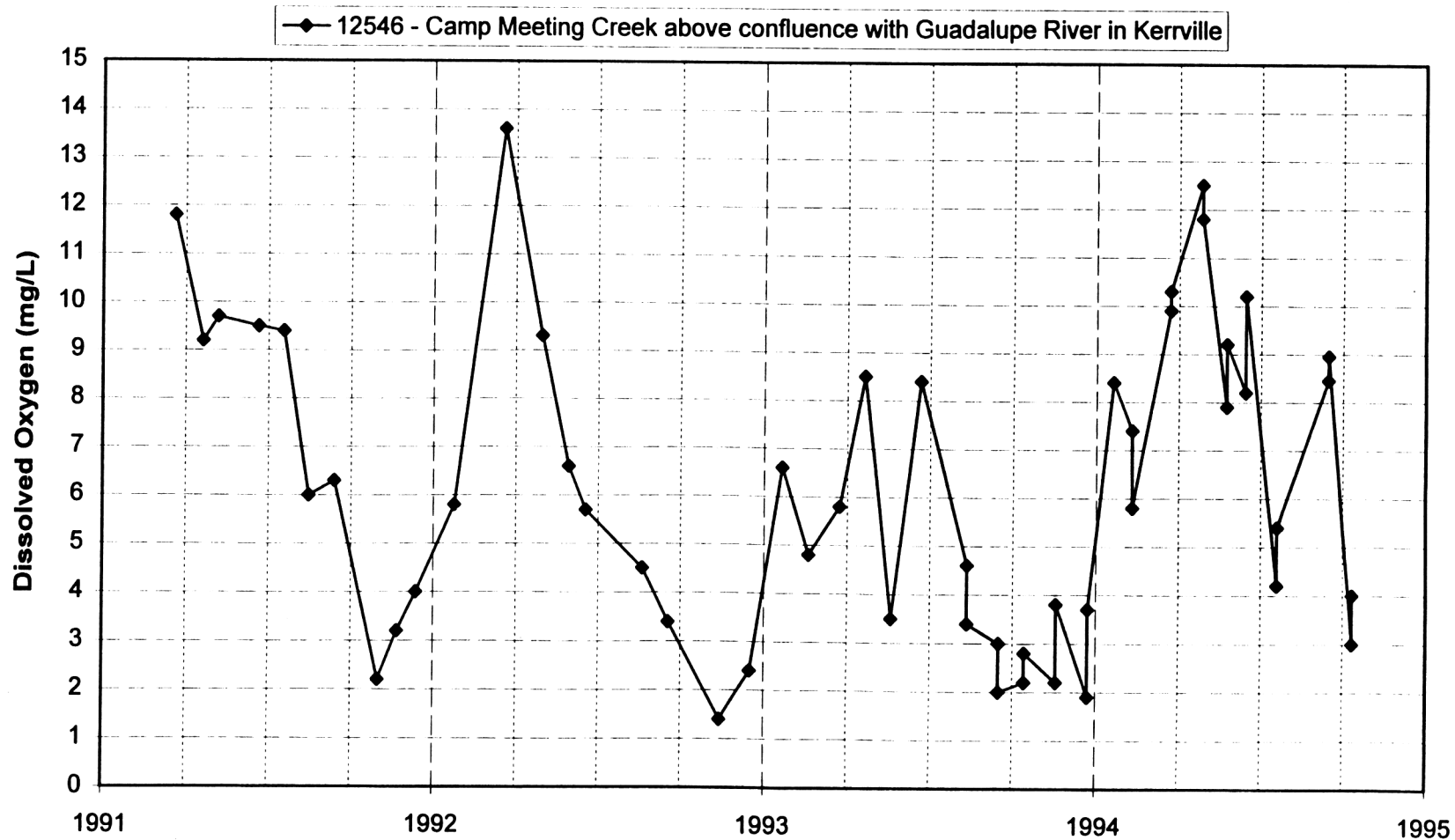
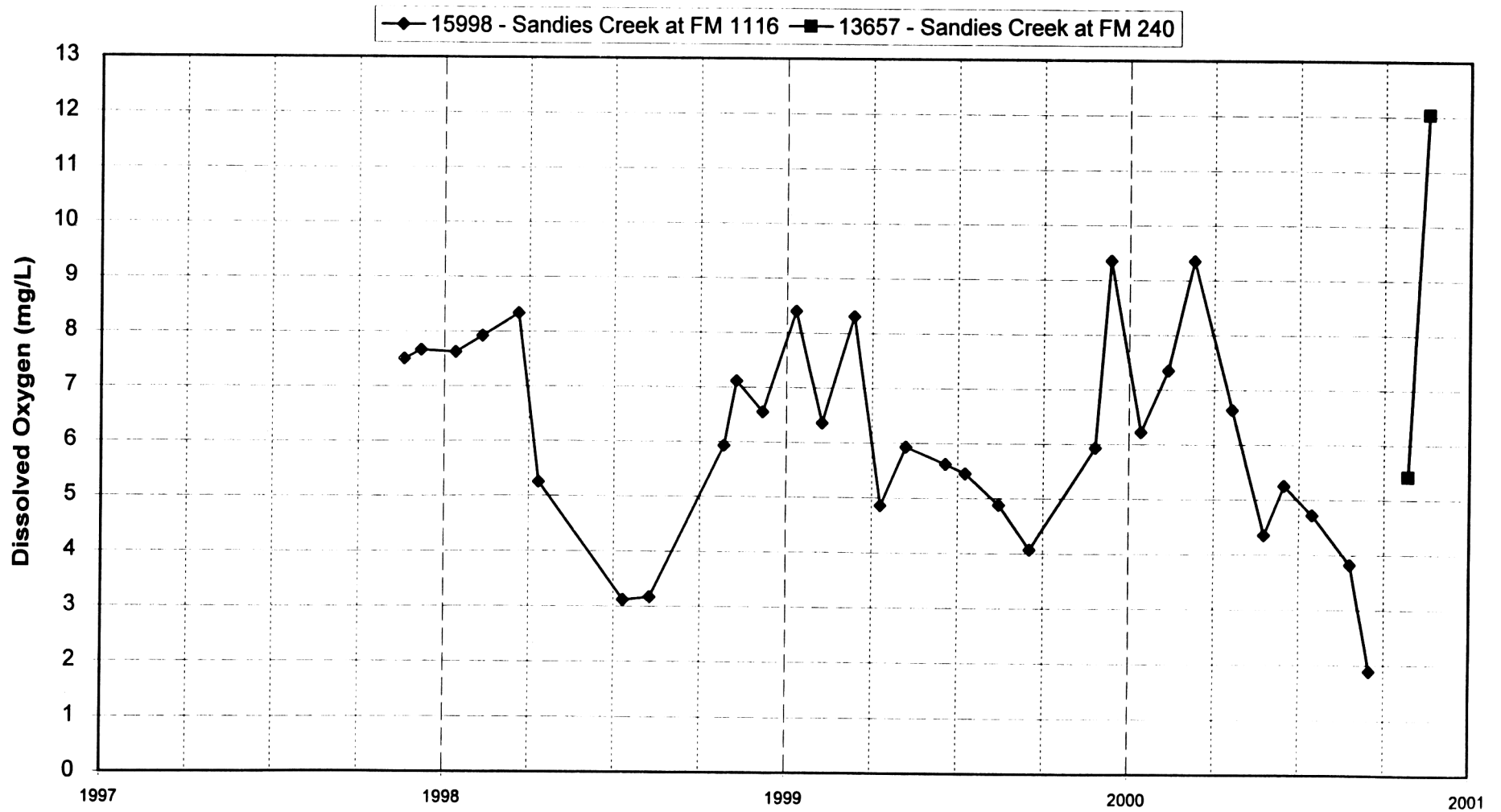


FIGURE 5
DISSOLVED OXYGEN FOR SANDIES CREEK
SEGMENT 1803B



device left in the water that records DO and other parameters for at least a 24-hour period. Figure 6 shows that DO data obtained at station 15988, Sandies Creek at FM 1116. Diurnal fluctuations in DO were minor, always less than 2 mg/L, probably reflecting a high degree of shade from trees. The DO criterion used is 5 mg/L that is assigned to segment 1803, Guadalupe River below San Marcos River. DO dropped below 5 mg/L in the summer months, but never below 3 mg/L. This unclassified stream, which is very different for the Guadalupe River, would appear to meet criteria for Intermediate Aquatic Life Use support.

Elm Creek is listed for both dissolved oxygen and bacteria. This unclassified stream has limited data for DO collected in 1997-1998, as shown in Figure 7. Similar to Sandies Creek, the data were collected during low flow conditions and high temperatures. GBRA expected to collect diurnal DO data from May to September, but data collection only occurred in May, as from June to September there was no flow at the site. During the one diurnal data collection, DO dropped below 5 mg/L from 8:00 in the evening until the next morning at 6:00 a.m., during the period of aquatic plant respiration.

The tidal section of the Guadalupe River, segment 1801, is listed for dissolved oxygen based on data from the SH-35 bridge (station number 12577). As shown in Figure 8, the data vary widely, but generally values are measured between 5 and 11 mg/L. The criteria for this segment is 5 mg/L, and as seen in the figure, most values are above the criterion. The period of record for the listing (1994-1998 inclusive) shows a number of measurements below the criterion, yet data outside this period do not. This listing may be erroneous, and further data collection and analysis will determine any long-term trend.

Bacteria

A large number of stream segments in Texas were inappropriately listed in the 303(d) process based on the old water quality standards for contact recreation. Acknowledging the need for more appropriate measures of bacterial contamination, the state completed a two-year study in which the GBRA played a significant role. The primary objective of the statewide Bacterial Indicator Study was to analyze existing data, monitoring procedures and decision-making methods, and make recommendations for changes as appropriate. The major study recommendations were:

- Adopt the EC and *enterococci* geometric mean criteria recommended by EPA in 1986 for freshwater and saltwater respectively to replace over time the existing FC criteria. The EC geometric mean criterion is 126 cfu/dL.
- The frequency of monitoring should be related to the level of contact recreation use and tailored to local situations, and not mandated to be 5 times in 30 days.
- For streams with highly variable flows and conditions, monitoring should take place on a scheduled basis, but only data collected when conditions were suitable for contact recreation should be used for screening for meeting the contact recreation criteria.

These recommendations to change the indicators and criteria were considered in the revision process of the Texas Surface Water Quality Standards. The first two were incorporated, but the recommendation to limit assessments in smaller streams to times when conditions were suitable for contact recreation was deferred until the next standards revision after more data are obtained.

FIGURE 6
DIURNAL DO RESULTS FOR SANDIES CREEK, STATION 15988

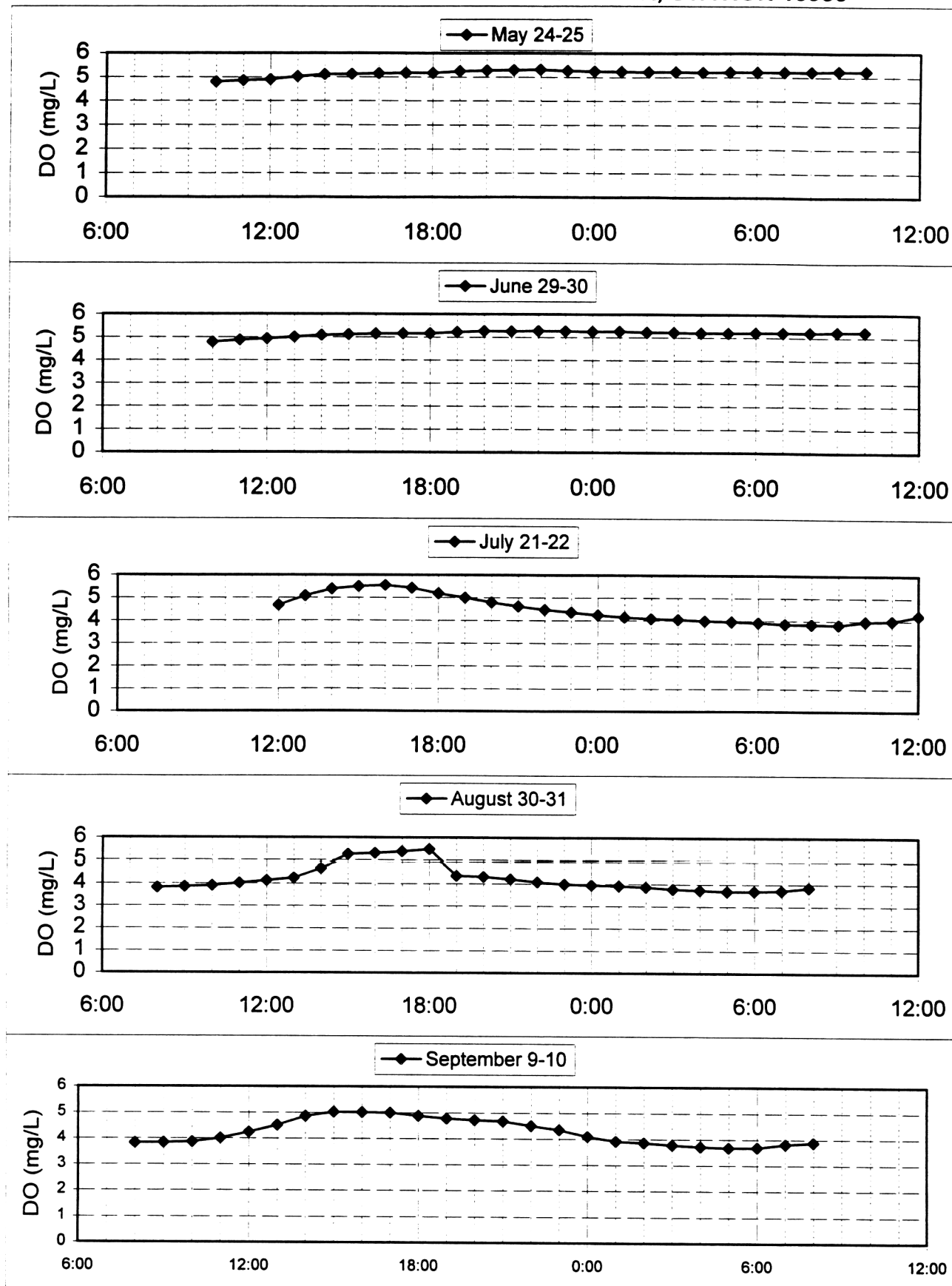


FIGURE 7
DISSOLVED OXYGEN FOR ELM CREEK
SEGMENT 1803A

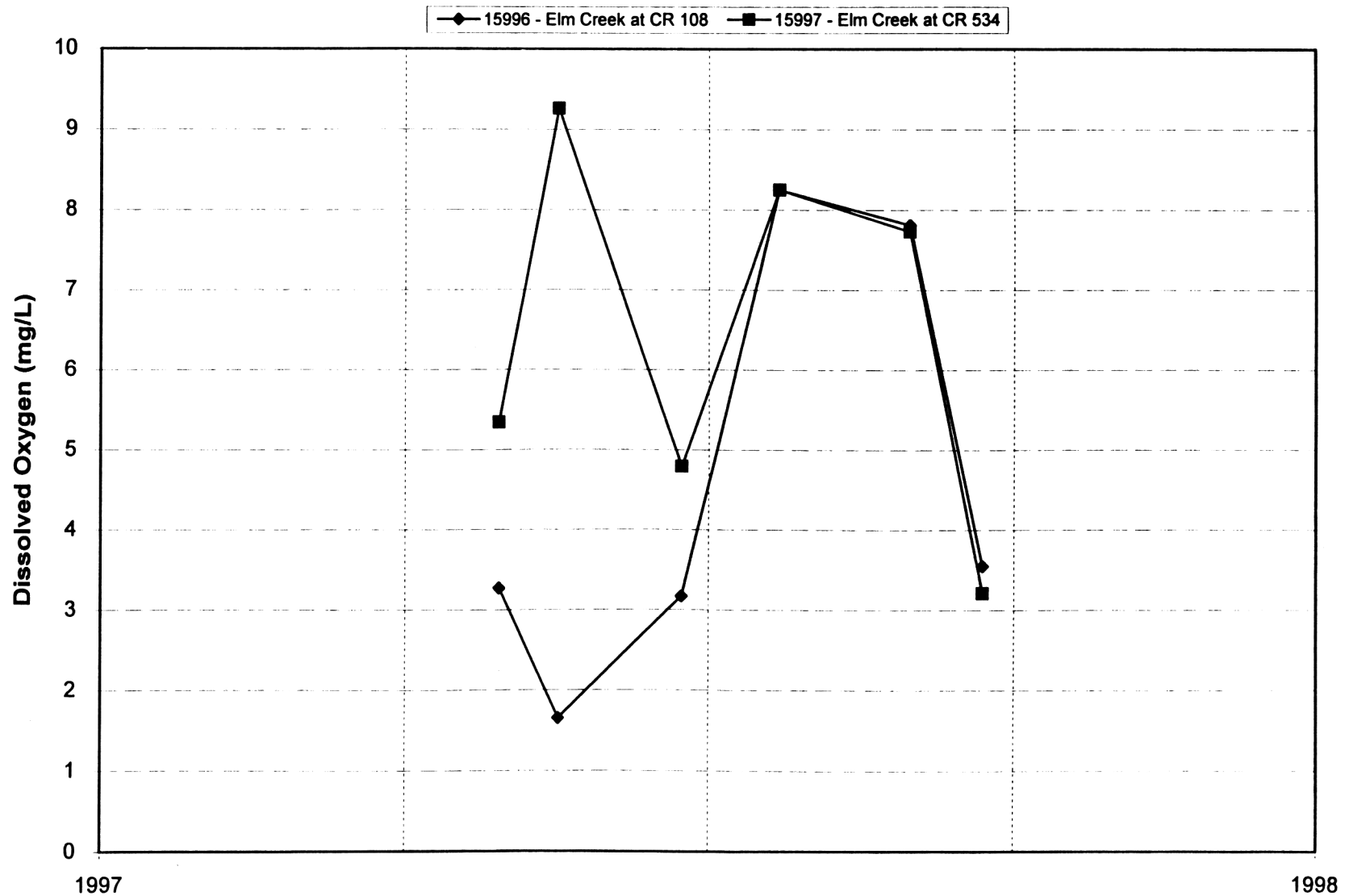
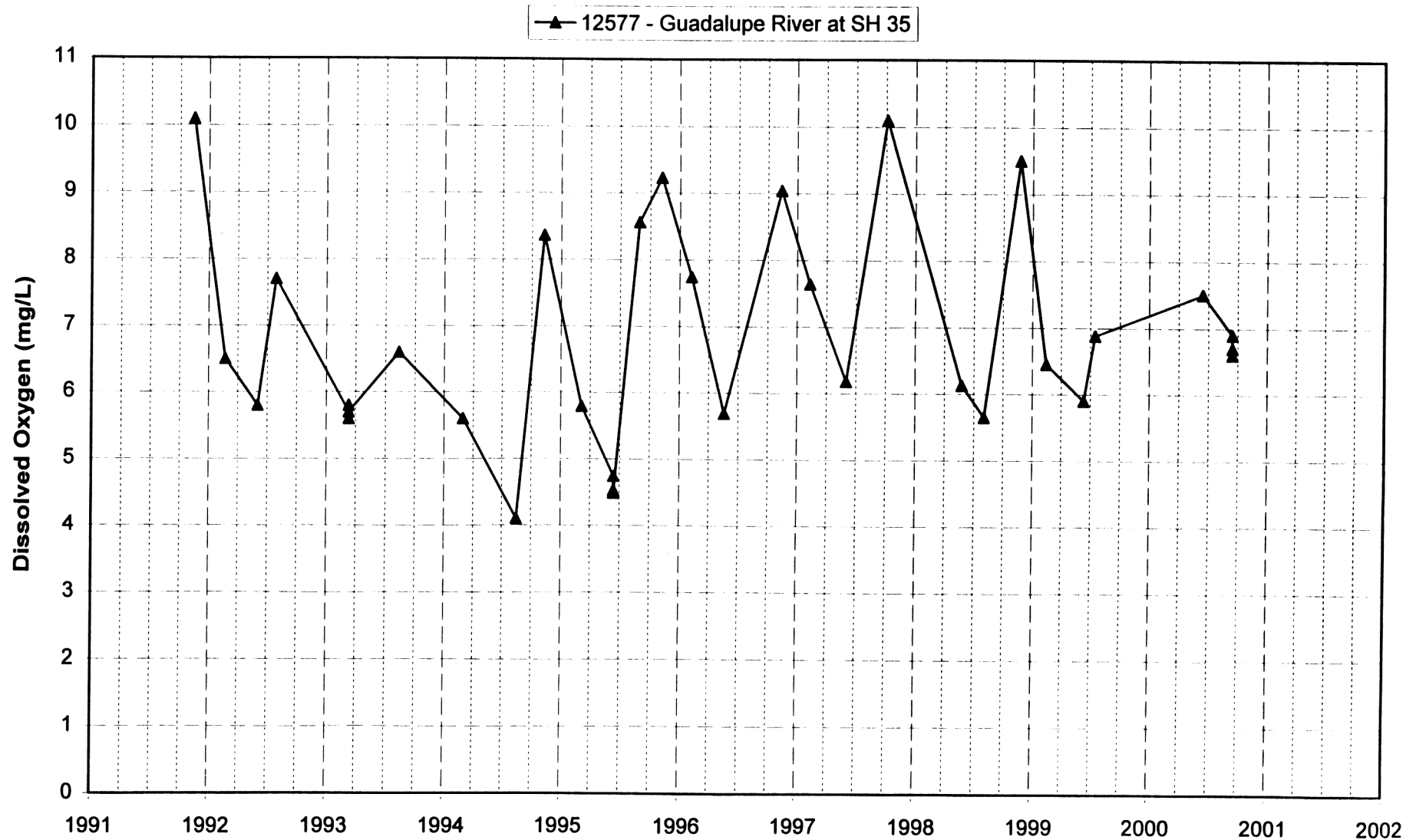


FIGURE 8
DISSOLVED OXYGEN FOR GUADALUPE RIVER TIDAL
SEGMENT 1801



Water bodies in the Guadalupe River Basin listed for bacteria exceedances include Peach, Dry Comal, and Elm Creek, all unclassified, small streams. Data for Peach Creek at CR 353 are shown in Figure 9. The FC and EC data show similar trends. In the 2000 sampling year, the EC values are lower than those taken in previous years. Dry Comal Creek, an unclassified stream in New Braunfels, is also listed for bacteria. As shown in Figure 10, the FC data vary above and below the criterion, with a rather distinct difference starting in 1998. During this time period, a wastewater collection line was repaired, and this corrective action appears to be showing in the data. With the repair and the subsequent data collection showing improved water quality conditions, this segment may meet the criterion and therefore be removed from the 303(d) list. Figure 11 shows the limited available data for Elm Creek at CR 108 and CR 534. Additional data are needed to determine any trends.

Sulfate

The Upper San Marcos River is the only segment in the Guadalupe River Basin listed for sulfate. However, the Blanco River is showing a trend of sulfate values above the criterion for this site (see Figure 12). The sulfate criterion for the Blanco River is 35 mg/L. High sulfate values have occurred at station 12668 at FM 165. This station has a short period of record, starting in 1996. Just downstream of the Blanco River in the Upper San Marcos (Figure 13), the sulfate levels are yet lower than the Blanco River, possibly showing the natural variation in these smaller hill country streams. The TNRCC has adjusted the Surface Water Quality Standards from 25 mg/L to 50 mg/L, to reflect these natural background conditions. Currently the EPA is reviewing the standards revisions. When the sulfate criterion in the Upper San Marcos segment is approved by EPA, the listing for the San Marcos River is expected to be removed. Although the Blanco River is not listed, this may be a concern with the next listing cycle and may require further analysis to determine if the sulfate values are indicative of natural variation or might be caused by anthropogenic effects such as brine from improperly plugged wells

COMMUNICATING RESULTS

The CRP in the Guadalupe Basin continues active communication with the public. The GBRA maintains a number of communication mechanisms to support this CRP effort. GBRA develops opportunities for direct public participation to ensure that community concerns are addressed. These include quarterly Water Resource Reports, issuing press releases regarding various water topics, and making public presentations to schools and other interested groups. The UGRA has a similar level of public outreach on water quality issues.

A major communication vehicle for the CRP is the Basin Steering Committee. This group, composed of community leaders and interested citizens from throughout the basin meets annually to review activities and advise the program on priorities for monitoring and studies. The Steering Committee membership include: 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 and chambers of commerce. Steering Committee meetings are 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 meetings of the Steering Committee is made available by way of mailed notices, as well as on the meeting page of the GBRA and UGRA websites.

FIGURE 9
BACTERIA DATA FOR PEACH CREEK
SEGMENT 1804B AT CR 353

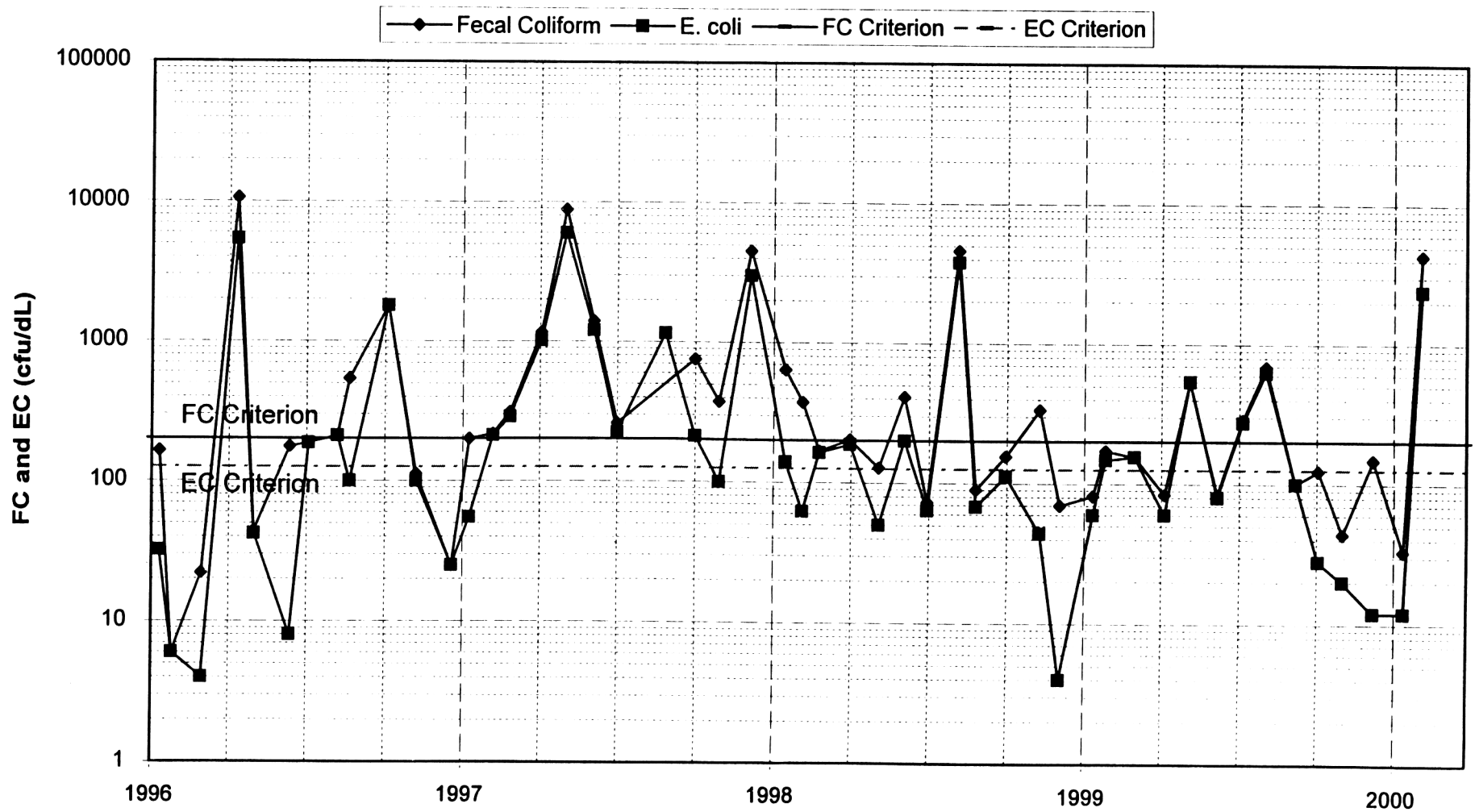


FIGURE 10
BACTERIA DATA FOR DRY COMAL CREEK
SEGMENT 1811A
AT SEGUIN ST., NEW BRAUNFELS, TX

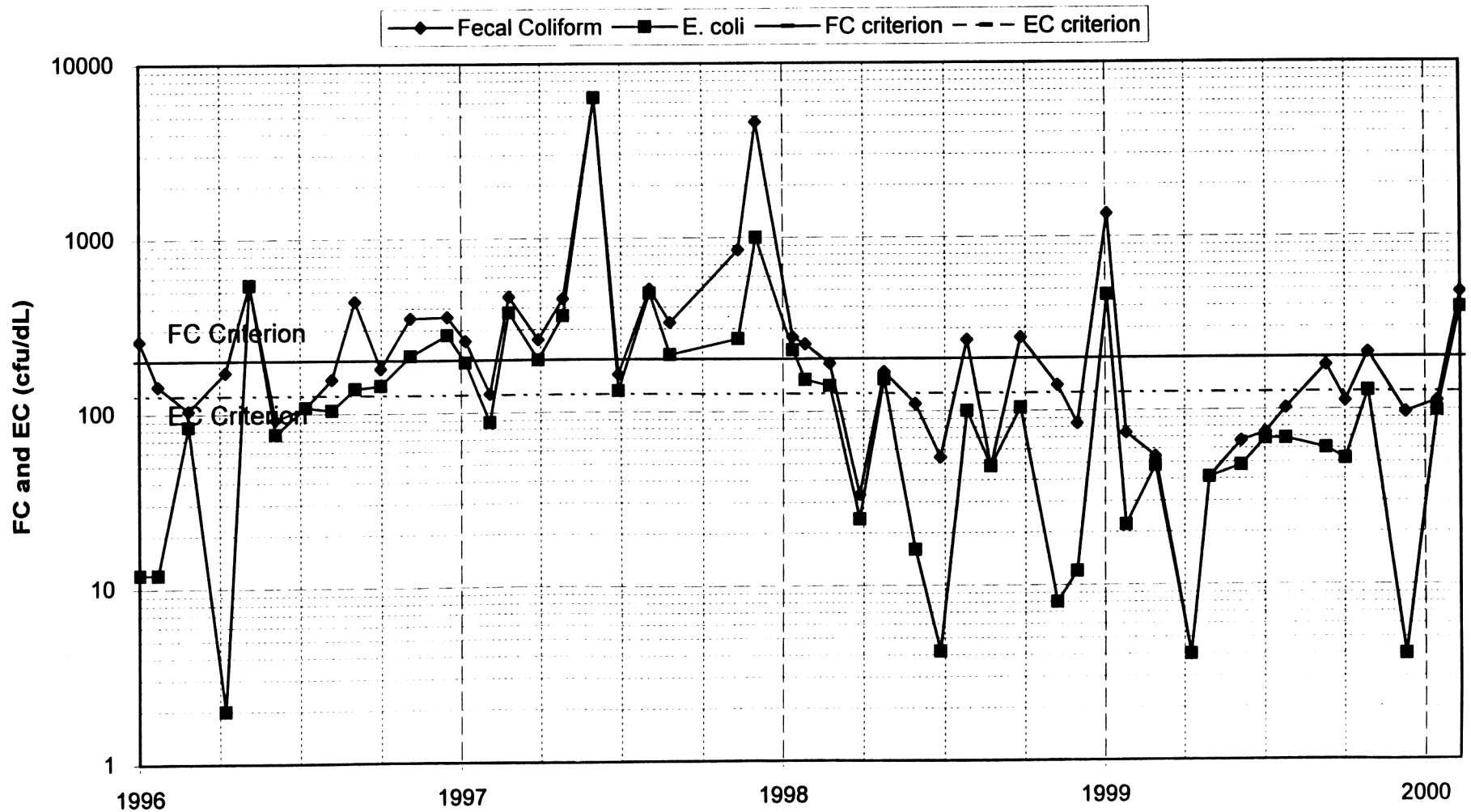


FIGURE 11
FC DATA FOR ELM CREEK
SEGMENT 1803A

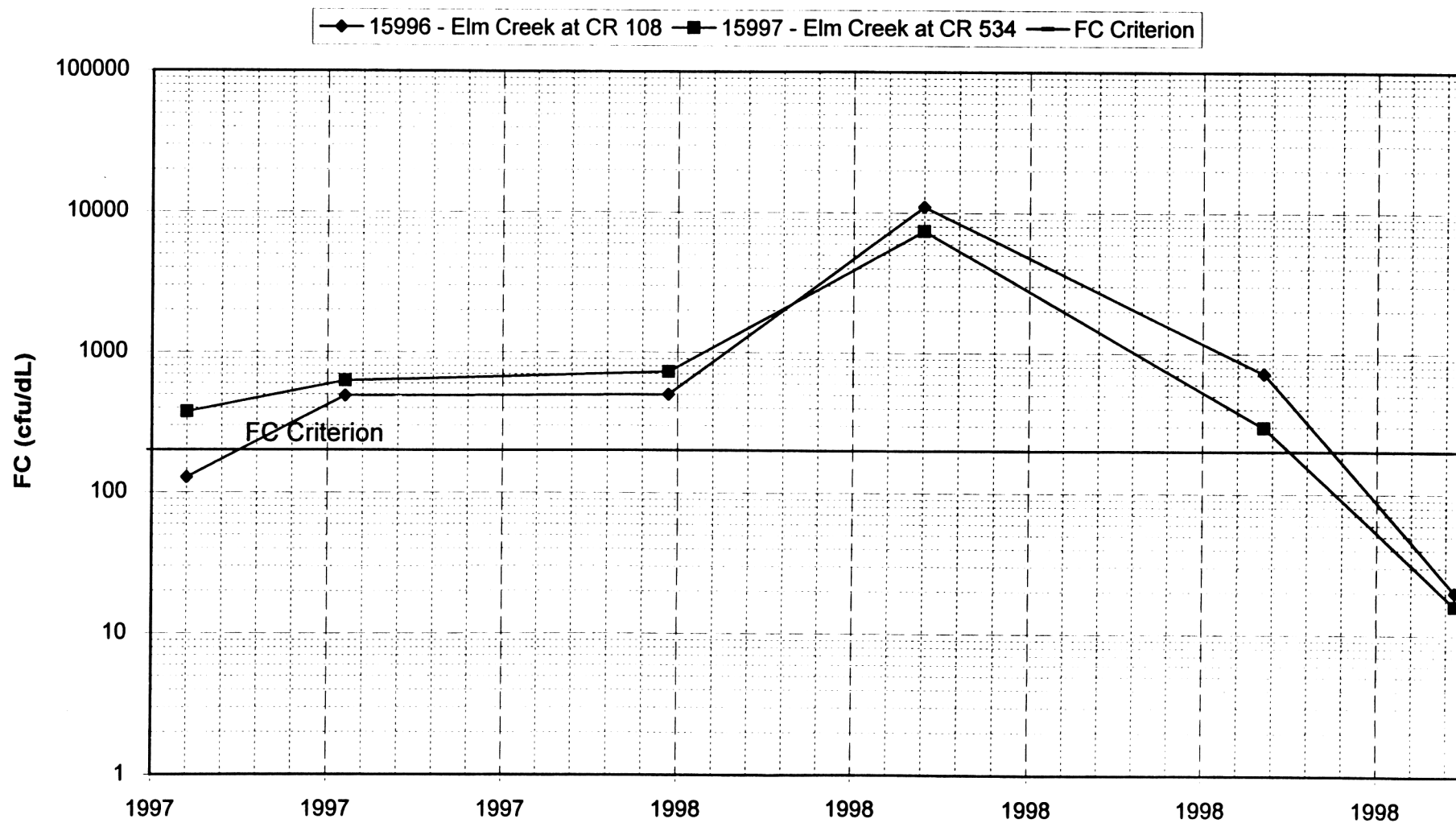


FIGURE 12
SULFATE FOR THE BLANCO RIVER
SEGMENT 1813

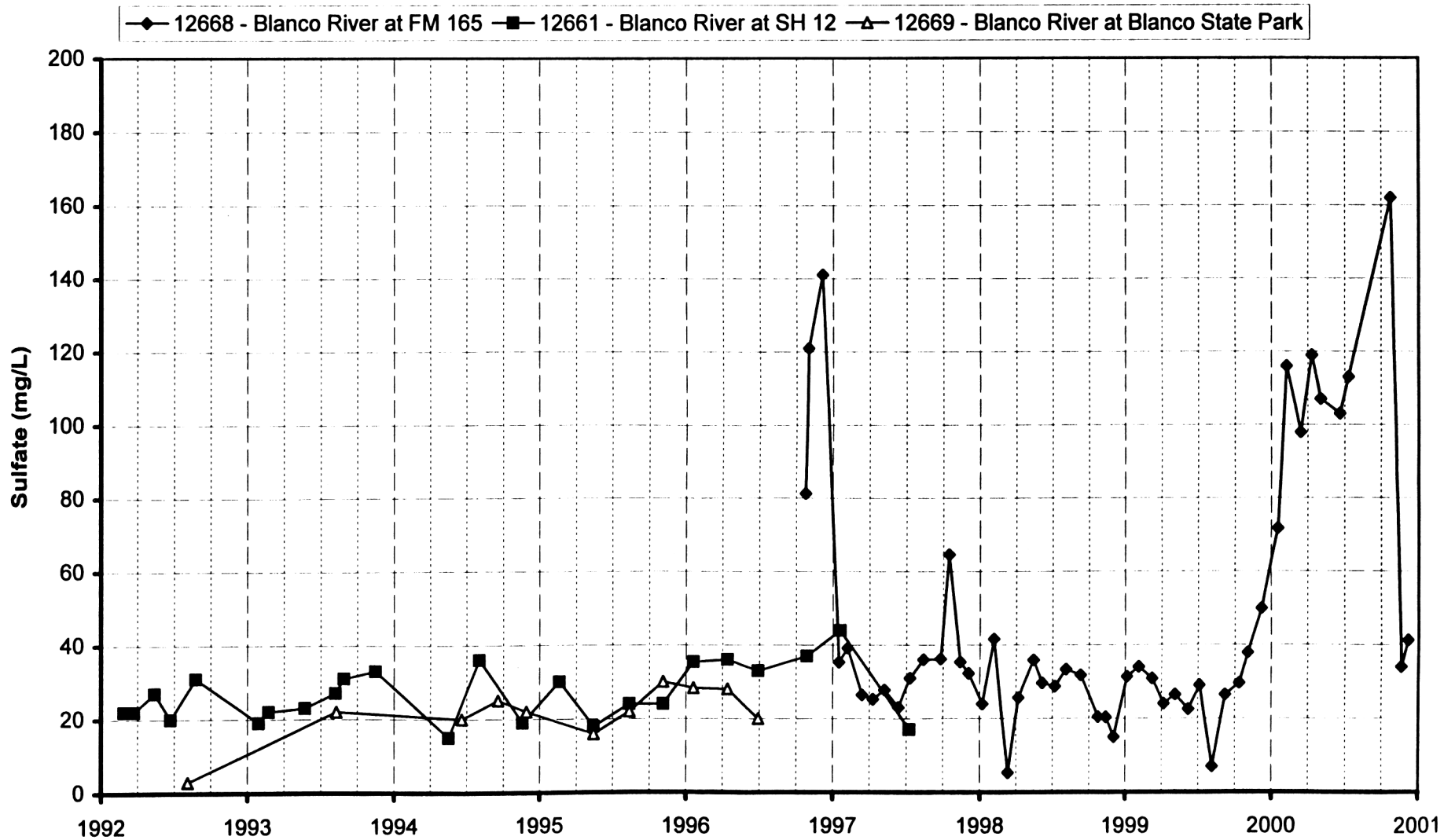
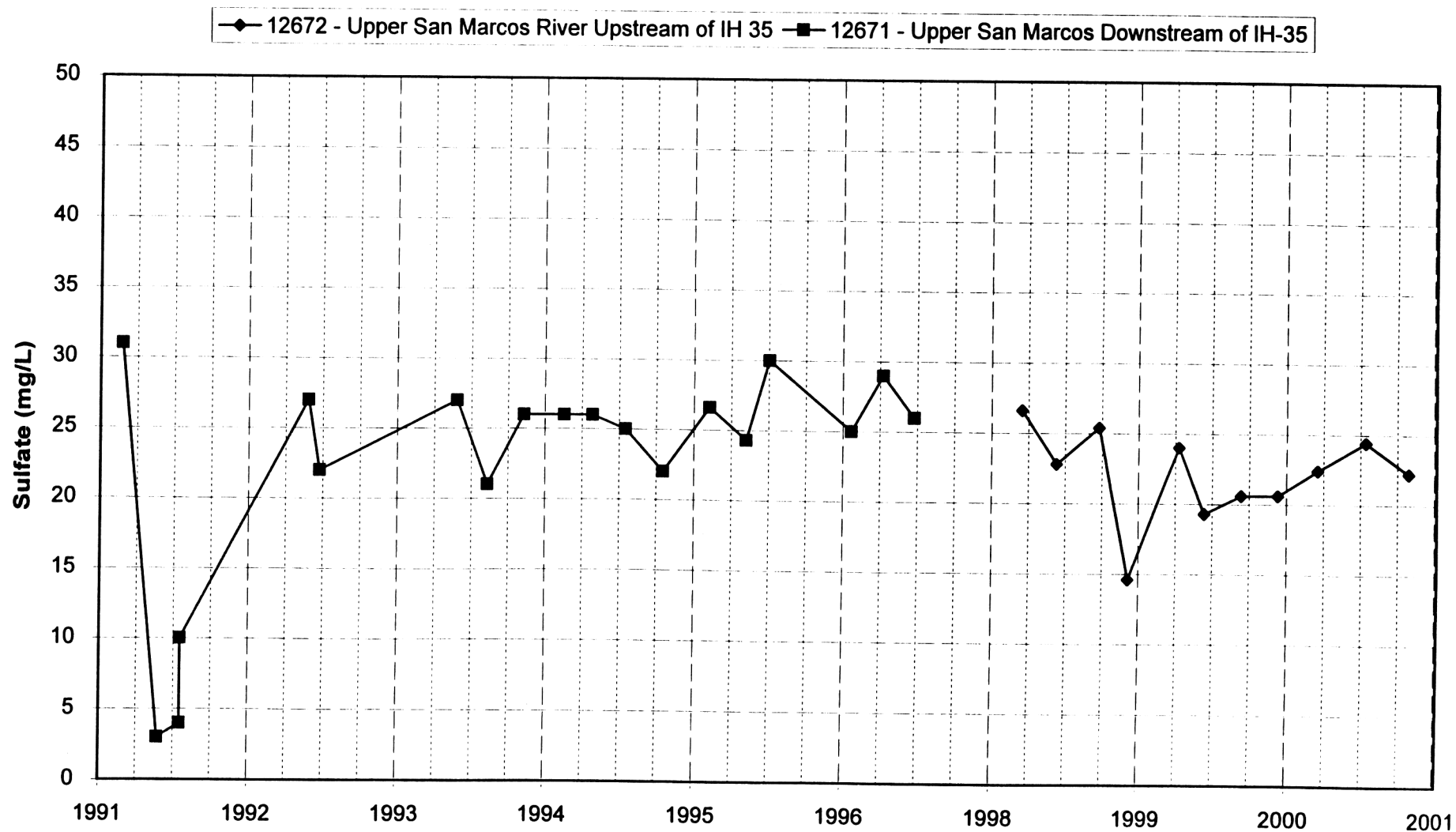


FIGURE 13
SULFATE FOR UPPER SAN MARCOS RIVER
SEGMENT 1814



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

As mentioned in the Special Studies section, the GBRA completed an analysis of urban growth effects in the major basin communities of New Braunfels, San Marcos, Seguin and Victoria. The major elements of this study included quantifying increases in impervious cover since 1960, calculating the change in urban runoff volume and peak flows based on data and relationships developed by the City of Austin, calculating the increases in runoff loads of various water quality parameters, and evaluating the effects of a range of best management practices. GBRA has presented the results to various stakeholder groups in the river basin. One aspect of the presentation is an introduction to Low Impact Development (LID). The theory behind LID practices is to maintain the natural hydrology of a proposed land development in order to effectively eliminate non-point source runoff impacts. Feedback has been positive and will function to support effective water quality management.

Another mechanism used to keep the public informed is the Internet. Both 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. It provides access to water quality data that have been collected by the two authorities over the years along with data collected by the TNRCC and the USGS. In addition to maintaining the web pages, the two river authorities have created data files available on the website with regularly updated data for the Guadalupe river basin. These files can be easily downloaded in either Excel or pdf format. These data are also provided to the TNRCC in computer database files.

Table 3 presents a summary of actions taken in the last year to protect basin water quality. It includes a summary of project administration, planning, monitoring and analysis efforts, water quality information clearinghouse details, actions taken on special studies, and coordination efforts with the public and advisory committees.

FUTURE ACTIONS

In the next biennium a number of new challenges face the program in the Guadalupe River basin. The GBRA has identified several topics of interest or special need that are described below. The final selection of new project initiatives will be made after input from the Basin Steering Committee and after budget information has been developed. There are several types of efforts including monitoring, both continued and new, and special studies.

Monitoring

Continued Monitoring

The CRP currently supports monitoring at 24 stations in the basin, some on a monthly basis and some quarterly. The data produced are used to verify that water quality conditions remain good and to help in the analysis of new problems or issues. We believe these should continue consistent with the recent Coordinated Monitoring Meeting.

New Monitoring

In advance of the establishment of a new permitted wastewater sludge land application site in Victoria County, a new monitoring site has been identified on Arenoso Creek (station No. 13295). The purpose is to establish background conditions and to assure that no adverse effects occur from this activity. In addition to conventional and field parameters, trace metals would be analyzed annually.

At the request of the Kendall County Judge and in light of recent enforcement action taken against a shooting range located on Joshua Creek, two new monitoring sites are planned. One will be on Joshua Creek and the other on the Guadalupe River below the confluence with the creek. The sites will be sampled quarterly for conventional and field parameters. In addition, dissolved metals will be monitored on Joshua Creek two times per year, and annually at the mainstem site.

In Caldwell County there is a history of oil and gas activities. Occasional spills occur in oil transportation and handling. To better document spill effects on water quality, monitoring on the San Marcos River above Luling and on Plum Creek near Lockhart, is planned. The monitoring would include the conventional parameters and also the major volatile and semivolatile parameters that are components of crude oil.

The Blanco River at FM 165 (station 12668) has exhibited unusually high sulfate concentrations during late 1999 and 2000. Additional monitoring is planned to try to understand or diagnose the cause of the high concentrations.

Special Studies

Two special studies are proposed for consideration in addition to the preparation of the Basin Summary Report, which will be a significant effort.

Nutrients

The US EPA has begun to develop nutrient criteria for all US waters. Draft criteria documents have been prepared for lakes and reservoirs, and streams and rivers, for a number of ecoregions throughout the country. The basic methodology developed is to assign criteria values at the 75th percentile of the data at all similar systems, or the 25th percentile of a select group of higher quality waters. While it is recognized that the ecological or scientific basis behind such methods is not robust, EPA has expressed the intent that criteria of some sort be adopted by the year 2003.

GBRA recognizes that the issue of nutrient criteria is very complex and variable. The approach proposed is to first apply EPA's proposed methods using existing data in the basin. Next, a more in-depth screening of selected segments would be conducted to assess the degree of use impairment that can be documented.

Use Attainability

A number of segments in the basin have been identified on the 303(d) list as not meeting their dissolved oxygen criteria. For example, Cypress Creek and Camp Meeting Creek, both unclassified waters, have been listed as not meeting aquatic life support uses based on criteria for the larger downstream river. However, these streams may not be capable of meeting the same aquatic life use designation (DO criterion) as the main stem of the river. To resolve this question in anticipation of TMDL action, a use attainability analysis can be performed for each stream. This could lead to the recommendation of specific standards for the two waterbodies.

TABLE 1 GBRA AND UGRA MONITORING STATIONS

Guadalupe River Basin Surface Water Quality Monitoring Program –2000-2001					
TNRCC Station Id.	Station Description	Latitude/ Longitude	County	Parameters/Frequency	Monitoring Types/By
12570	Dry Comal Creek at Seguin St., New Braunfels	29°42'16" 98°07'45"	Comal	C ¹ /Monthly F ² /Monthly M ³ /Annually AC ⁴ /Semi-ann. RN ⁵ /Semi-ann.	Fixed/GBRA
12578	Guadalupe River upstream of Lower Guadalupe Diversion Dam and Salt Water Barrier	28°30'24" 96°53'09"	Calhoun	C/Monthly M/Annually OW ⁶ /Bimonthly	Fixed/GBRA
12592	Guadalupe River at FM 766 Bridge near Cuero	29°08'49" 97°19'02"	DeWitt	C/Monthly F/Monthly M/Annually	Fixed/GBRA
12596	Lake Dunlap-Guadalupe River north bank at AC's Place at midpoint of Lone Star Drive	29°40'15" 98°04'48"	Guadalupe	C/Monthly F/Monthly M/Annually	Fixed/GBRA

¹ The C symbol represents the following parameters and their TNRCC codes: 00010, Temperature, Water (Centigrade); 00094 Conductivity, Field (µmhos/cm @ 25C); 00300 Oxygen, Dissolved (mg/L); 00400 pH (standard units); 00631 Nitrate/Nitrite-Nitrogen (mg/L as N); 00665 Total Phosphorus (mg/L as P); 31616 Fecal Coliform (#/100 mL); 00530 Solids, Total Suspended (mg/L); 82079 Turbidity (NTU); 00945 Sulfate (mg/L); 00940 Chloride (mg/L); 32211 Chlorophyll-a (µg/L); 00900 Total Hardness (mg/L); and 31648 E. coli (#/100 mL).

² The F symbol means that a flow measurement will be provided. When possible, this information will be derived from U.S. Geological stream gages; at some sites, the proximity of a hydroelectric generating facility allows the calculation of flow based upon power generated; at the remainder of the sites field measurements will be made by GBRA Regional Laboratory personnel or UGRA personnel.

³ The M symbol denotes metals. All M samples will be collected by the GBRA. The dissolved metals to be analyzed for are 01106 Aluminum (µg/L as Al); 01090 Zinc (µg/L as Zn); 01000 Arsenic (µg/L as As); 00915 Calcium (mg/L as Ca); 01025 Cadmium (µg/L as Cd); 00925 Magnesium (mg/L as Mg); 46570 Hardness, calc, (mg/L as CaCO₃); 01005 Barium (µg/L as Ba); 01030 Chromium (µg/L as Cr); 01040 Copper (µg/L as Cu); 01046 Iron (µg/L as Fe); 01049 Lead (µg/L as Pb); 01056 Manganese (µg/L as Mn); 01065 Nickel (µg/L as Ni); 01060 Molybdenum (µg/L as Mo); 01145 Selenium (µg/L as Se); 71890 Mercury, total (µg/L as Hg); and 01075 Silver (µg/L as Ag).

⁴ AC means Aquatic Commun-Habitat.

⁵ RN means Routine Nekton.

⁶ OW means Organics Water.

TABLE 1 GBRA AND UGRA MONITORING STATIONS (CONTINUED)

Guadalupe River Basin Surface Water Quality Monitoring Program –2000-2001 (cont.)					
TNRCC Station Id.	Station Description	Latitude/ Longitude	County	Parameters/Frequency	Monitoring Types/By
12598	Canyon Reservoir (Canyon Park Marina)	29°53'57" 98°13'24"	Comal	C/Monthly	Fixed/GBRA
12623	Coletto Creek Reservoir at Boat Launching Ramp	28°43'16" 97°10'15"	Goliad	C/Monthly F/Monthly M/Annually OW/Bimontly	Fixed/GBRA
12626	San Marcos River at Luling Water Treatment Plant	29°40'02" 97°39'14"	Caldwell	C/Monthly F/Monthly AC/Semi-ann. RNSemi-ann.	Fixed/GBRA
12640	Plum Creek at CR 135 SE of Luling	29°39'25" 97°36'00"	Caldwell		Fixed/GBRA
12653	Comal River at Hinman Island	29°42'29" 98°07'26"	Comal	C/Monthly F/Monthly	Fixed/GBRA
12658	Guadalupe River at River Road Second Crossing, upstream of New Braunfels	29°46'43" 98°09'37"	Comal	C/Monthly F/Monthly AC/ Semi-ann. RB ⁷ / Semi-ann.	Fixed/GBRA
12672	Upper San Marcos River upstream of IH 35	29°52'31" 97°55'54"	Hays	C/Quarterly F/Quarterly	Fixed/GBRA
12674	Cypress Creek at FM 12 at Wimberley	29°59'46" 98°05'48"	Hays	C/Quarterly F/Quarterly	Fixed/GBRA

⁷ RB means Routine Benthics.

TABLE 1 GBRA AND UGRA MONITORING STATIONS (CONTINUED)

Guadalupe River Basin Surface Water Quality Monitoring Program – 2000-2001 (cont.)					
TNRCC Station Id.	Station Description	Latitude/ Longitude	County	Parameters/Frequency	Monitoring Types/By
13700	Guadalupe River at RR 311, 1.9 mi SE of Spring Branch	29°53'00" 98°23'00"	Comal	C/Monthly F/Monthly	Fixed/GBRA
14932	Geronimo Creek at SH 123	29°40'12" 97°57'53"	Guadalupe	C/Monthly F/Monthly M/Annually AC/ Semi-ann. RB/ Semi-ann.	Fixed/GBRA
15110	Guadalupe River at H-5 Dam near Gonzales	29°28'08" 97°29'24"	Gonzales	C/Monthly F/Monthly	Fixed/GBRA
15148	Guadalupe River at US 183, Gonzales	29°29'49" 97°27'17"	Gonzales	FI ⁸ / Semi-ann. F/ Semi-ann. AC/ Semi-ann. RB/ Semi-ann.	Fixed/GBRA
15149	Lake McQueeney, 0.5 mile upstream of McQueeney dam on southeast bank	29°36'34" 98°02'10"	Guadalupe	C/Monthly F/Monthly BAC ⁹ / Semi-ann.	Fixed/GBRA

⁸ FI means Field parameters.

⁹ BAC means TSWQS Bacteria sampling.

TABLE 1 GBRA AND UGRA MONITORING STATIONS (CONTINUED)

Guadalupe River Basin Surface Water Quality Monitoring Program – 2000-2001(cont.)					
TNRCC Station Id.	Station Description	Latitude/ Longitude	County	Parameters/Frequency	Monitoring Types/By
12605	Guadalupe River at Co. Rd adjacent to Herman Sons Home, west of Comfort	29°56'56" 98°55'30"	Kerr	C/Quarterly F/Quarterly AC/ Semi-ann. RB/ Semi-ann. BAC	Fixed/UGRA
12608	Guadalupe River, Center Point Lake	29°56'46" 99°02'31"	Kerr	C/Quarterly F/Quarterly AC/ Semi-ann. RB/ Semi-ann. BAC	Fixed/UGRA
12678	Johnson Creek at SH 39 in Ingram	30°04'26" 99°14'49"	Kerr	C/Quarterly F/Quarterly AC/ Semi-ann. RB/ Semi-ann. BAC	Fixed/UGRA
12682	North Fork Guadalupe River at Gaging Station near Camp Waldemar	30°03'29" 99°27'00"	Kerr	C/Quarterly F/Quarterly AC/ Semi-ann. RB/ Semi-ann. BAC	Fixed/UGRA
12684	South Fork Guadalupe River, Hunts Lions Park	30°04'16" 99°19'59"	Kerr	C/Quarterly F/Quarterly AC/ Semi-ann. RB/ Semi-ann.	Fixed/UGRA

TABLE 1 GBRA AND UGRA MONITORING STATIONS

Guadalupe River Basin Surface Water Quality Monitoring Program –2000-2001					
TNRCC Station Id.	Station Description	Latitude/ Longitude	County	Parameters/Frequency	Monitoring Types/By
12570	Dry Comal Creek at Seguin St., New Braunfels	29°42'16" 98°07'45"	Comal	C ¹ /Monthly F ² /Monthly M ³ /Annually AC ⁴ /Semi-ann. RN ⁵ /Semi-ann.	Fixed/GBRA
12578	Guadalupe River upstream of Lower Guadalupe Diversion Dam and Salt Water Barrier	28°30'24" 96°53'09"	Calhoun	C/Monthly M/Annually OW ⁶ /Bimonthly	Fixed/GBRA
12592	Guadalupe River at FM 766 Bridge near Cuero	29°08'49" 97°19'02"	DeWitt	C/Monthly F/Monthly M/Annually	Fixed/GBRA
12596	Lake Dunlap-Guadalupe River north bank at AC's Place at midpoint of Lone Star Drive	29°40'15" 98°04'48"	Guadalupe	C/Monthly F/Monthly M/Annually	Fixed/GBRA

¹ The C symbol represents the following parameters and their TNRCC codes: 00010, Temperature, Water (Centigrade); 00094 Conductivity, Field (µmhos/cm @ 25C); 00300 Oxygen, Dissolved (mg/L); 00400 pH (standard units); 00631 Nitrate/Nitrite-Nitrogen (mg/L as N); 00665 Total Phosphorus (mg/L as P); 31616 Fecal Coliform (#/100 mL); 00530 Solids, Total Suspended (mg/L); 82079 Turbidity (NTU); 00945 Sulfate (mg/L); 00940 Chloride (mg/L); 32211 Chlorophyll-a (µg/L); 00900 Total Hardness (mg/L); and 31648 E. coli (#/100 mL).

² The F symbol means that a flow measurement will be provided. When possible, this information will be derived from U.S. Geological stream gages; at some sites, the proximity of a hydroelectric generating facility allows the calculation of flow based upon power generated; at the remainder of the sites field measurements will be made by GBRA Regional Laboratory personnel or UGRA personnel.

³ The M symbol denotes metals. All M samples will be collected by the GBRA. The dissolved metals to be analyzed for are 01106 Aluminum (µg/L as Al); 01090 Zinc (µg/L as Zn); 01000 Arsenic (µg/L as As); 00915 Calcium (mg/L as Ca); 01025 Cadmium (µg/L as Cd); 00925 Magnesium (mg/L as Mg); 46570 Hardness, calc, (mg/L as CaCO₃); 01005 Barium (µg/L as Ba); 01030 Chromium (µg/L as Cr); 01040 Copper (µg/L as Cu); 01046 Iron (µg/L as Fe); 01049 Lead (µg/L as Pb); 01056 Manganese (µg/L as Mn); 01065 Nickel (µg/L as Ni); 01060 Molybdenum (µg/L as Mo); 01145 Selenium (µg/L as Se); 71890 Mercury, total (µg/L as Hg); and 01075 Silver (µg/L as Ag).

⁴ AC means Aquatic Commun-Habitat.

⁵ RN means Routine Nekton.

⁶ OW means Organics Water.

TABLE 1 GBRA AND UGRA MONITORING STATIONS (CONTINUED)

Guadalupe River Basin Surface Water Quality Monitoring Program –2000-2001 (cont.)					
TNRCC Station Id.	Station Description	Latitude/ Longitude	County	Parameters/Frequency	Monitoring Types/By
12598	Canyon Reservoir (Canyon Park Marina)	29°53'57" 98°13'24"	Comal	C/Monthly	Fixed/GBRA
12623	Coleta Creek Reservoir at Boat Launching Ramp	28°43'16" 97°10'15"	Goliad	C/Monthly F/Monthly M/Annually OW/Bimontly	Fixed/GBRA
12626	San Marcos River at Luling Water Treatment Plant	29°40'02" 97°39'14"	Caldwell	C/Monthly F/Monthly AC/Semi-ann. RNSemi-ann.	Fixed/GBRA
12640	Plum Creek at CR 135 SE of Luling	29°39'25" 97°36'00"	Caldwell		Fixed/GBRA
12653	Comal River at Hinman Island	29°42'29" 98°07'26"	Comal	C/Monthly F/Monthly	Fixed/GBRA
12658	Guadalupe River at River Road Second Crossing, upstream of New Braunfels	29°46'43" 98°09'37"	Comal	C/Monthly F/Monthly AC/ Semi-ann. RB ⁷ / Semi-ann.	Fixed/GBRA
12672	Upper San Marcos River upstream of IH 35	29°52'31" 97°55'54"	Hays	C/Quarterly F/Quarterly	Fixed/GBRA
12674	Cypress Creek at FM 12 at Wimberley	29°59'46" 98°05'48"	Hays	C/Quarterly F/Quarterly	Fixed/GBRA

⁷ RB means Routine Benthics.

TABLE 1 GBRA AND UGRA MONITORING STATIONS (CONTINUED)

Guadalupe River Basin Surface Water Quality Monitoring Program – 2000-2001 (cont.)					
TNRCC Station Id.	Station Description	Latitude/ Longitude	County	Parameters/Frequency	Monitoring Types/By
13700	Guadalupe River at RR 311, 1.9 mi SE of Spring Branch	29°53'00" 98°23'00"	Comal	C/Monthly F/Monthly	Fixed/GBRA
14932	Geronimo Creek at SH 123	29°40'12" 97°57'53"	Guadalupe	C/Monthly F/Monthly M/Annually AC/ Semi-ann. RB/ Semi-ann.	Fixed/GBRA
15110	Guadalupe River at H-5 Dam near Gonzales	29°28'08" 97°29'24"	Gonzales	C/Monthly F/Monthly	Fixed/GBRA
15148	Guadalupe River at US 183, Gonzales	29°29'49" 97°27'17"	Gonzales	FI ⁸ / Semi-ann. F/ Semi-ann. AC/ Semi-ann. RB/ Semi-ann.	Fixed/GBRA
15149	Lake McQueeney, 0.5 mile upstream of McQueeney dam on southeast bank	29°36'34" 98°02'10"	Guadalupe	C/Monthly F/Monthly BAC ⁹ / Semi-ann.	Fixed/GBRA

⁸ FI means Field parameters.

⁹ BAC means TSWQS Bacteria sampling.

TABLE 1 GBRA AND UGRA MONITORING STATIONS (CONTINUED)

Guadalupe River Basin Surface Water Quality Monitoring Program – 2000-2001(cont.)					
TNRCC Station Id.	Station Description	Latitude/ Longitude	County	Parameters/Frequency	Monitoring Types/By
12605	Guadalupe River at Co. Rd adjacent to Herman Sons Home, west of Comfort	29°56'56" 98°55'30"	Kerr	C/Quarterly F/Quarterly AC/ Semi-ann. RB/ Semi-ann. BAC	Fixed/UGRA
12608	Guadalupe River, Center Point Lake	29°56'46" 99°02'31"	Kerr	C/Quarterly F/Quarterly AC/ Semi-ann. RB/ Semi-ann. BAC	Fixed/UGRA
12678	Johnson Creek at SH 39 in Ingram	30°04'26" 99°14'49"	Kerr	C/Quarterly F/Quarterly AC/ Semi-ann. RB/ Semi-ann. BAC	Fixed/UGRA
12682	North Fork Guadalupe River at Gaging Station near Camp Waldemar	30°03'29" 99°27'00"	Kerr	C/Quarterly F/Quarterly AC/ Semi-ann. RB/ Semi-ann. BAC	Fixed/UGRA
12684	South Fork Guadalupe River, Hunts Lions Park	30°04'16" 99°19'59"	Kerr	C/Quarterly F/Quarterly AC/ Semi-ann. RB/ Semi-ann.	Fixed/UGRA

TABLE 1 GBRA AND UGRA MONITORING STATIONS (CONTINUED)

Guadalupe River Basin Surface Water Quality Monitoring Program –2000-2001 (cont.)					
TNRCC Station Id.	Station Description	Latitude/ Longitude	County	Parameters/Frequency	Monitoring Types/By
15111	Guadalupe River at Riverview Rd., Ingram	30°04'10" 99°13'19"	Kerr	C/Quarterly F/Quarterly AC/ Semi-ann. RB/ Semi-ann.	Fixed/UGRA
15112	Guadalupe River at G St., Kerrville	30°02'06" 99°08'13"	Kerr	C/Quarterly F/Quarterly M/Annually AC/ Semi-ann. RB/ Semi-ann.	Fixed/UGRA
15113	Guadalupe River at Split Rock Rd., downstream of Flatrock Dam	29°58'52" 99°05'57"	Kerr	C/Quarterly F/Quarterly M/Annually AC/ Semi-ann. RB/ Semi-ann.	Fixed/UGRA
15998	Sandies Creek at FM 1116 7.4 km east of Smiley and approximately 3 km upstream of confluence with Elm Creek	29°15'37" 97°33'31"	Gonzales	C/Quarterly F/Quarterly AC/ Semi-ann. RB / Semi-ann. DO ¹⁰	N/A

¹⁰ DO means 24 hr DO sampling.

TABLE 1 GBRA AND UGRA MONITORING STATIONS (CONTINUED)

Guadalupe River Basin Surface Water Quality Monitoring Program –2000-2001 (cont.)					
TNRCC Station Id.	Station Description	Latitude/ Longitude	County	Parameters/Frequency	Monitoring Types/By
14937	Peach Creek at CR 353	29°30'28" 97°18'49"	Gonzales	C/Monthly F/Monthly M/Annually AC/ Semi-ann. RN/ Semi-ann.	Fixed/GBRA
16245	North Fork Guadalupe River Rock Bottom Rd	30°03'09" 99°29'04"	Kerr	BAC/5 times/yr.	Fixed/UGRA
12681	North Fork Guadalupe River at FM 1340	30°04'44" 99°20'38"	Kerr	BAC/5 times/yr.	Fixed/UGRA
12688	South Fork Guadalupe River adjacent to LynxHaven Lodge at SH 39	29°57'12" 99°28'57"	Kerr	BAC/5 times/yr.	Fixed/UGRA
12686	South Fork Guadalupe River adjacent to Camp Mystic	30°00'29" 99°22'08"	Kerr	BAC/5 times/yr.	Fixed/UGRA
16246	South Fork Guadalupe River Seago Rd Crossing	30°01'41" 99°21'42"	Kerr	BAC/5 times/yr.	Fixed/UGRA
12685	South Fork Guadalupe River adjacent to Camp Arrowhead	30°02'06" 99°21'28"	Kerr	BAC/5 times/yr.	Fixed/UGRA
12621	Guadalupe River at SH 39 near Hunt, 0.1 km below the North/South Fork Confluence	30°04'08" 99°19'23"	Kerr	BAC/5 times/yr.	Fixed/UGRA
16241	Guadalupe River Kelley Ck Rd off Hwy 39	30°04'02" 99°17'29"	Kerr	BAC/5 times/yr.	Fixed/UGRA
12620	Guadalupe River at Ingram Dam in Ingram	30°04'12" 99°14'31"	Kerr	BAC/5 times/yr.	Fixed/UGRA

TABLE 1 GBRA AND UGRA MONITORING STATIONS (CONTINUED)

Guadalupe River Basin Surface Water Quality Monitoring Program –2000-2001 (cont.)					
TNRCC Station Id.	Station Description	Latitude/ Longitude	County	Parameters/Frequency	Monitoring Types/By
12619	Guadalupe River at Bear Creek Road, 1 mi west of Kerrville	30°03'50" 99°11'34"	Kerr	BAC/5 times/yr.	Fixed/UGRA
12618	Guadalupe River at UGRA Lake Dam	30°03'50" 99°10'08"	Kerr	BAC/5 times/yr.	Fixed/UGRA
16244	Guadalupe River at Louise Hays Park Foot Bridge	30°02'47" 99°08'41"	Kerr	BAC/5 times/yr.	Fixed/UGRA
12617	Guadalupe River at SH 16 in Kerrville	30°02'42" 99°08'31"	Kerr	BAC/5 times/yr.	Fixed/UGRA
16243	Guadalupe River at Louise Hays Park Dam	30°02'41" 99°08'29"	Kerr	BAC/5 times/yr.	Fixed/UGRA
12615	Guadalupe River at Kerrville State Park, Segment km 174.4	30°00'40" 99°07'05"	Kerr	BAC/5 times/yr.	Fixed/UGRA
12610	Guadalupe River at Co.Rd., 0.1 mi above confluence of Turtle Creek at Segment km 166.2	29°57'12" 99°02'45"	Kerr	BAC/5 times/yr.	Fixed/UGRA
16242	Guadalupe River at Hwy 1350 Center Point Texas	29°56'22" 99°00'36"	Kerr	BAC/5 times/yr.	Fixed/UGRA
12603	Guadalupe River at IH 10 in Comfort	29°58'06" 98°53'32"	Kerr	BAC/5 times/yr.	Fixed/UGRA

TABLE 1 GBRA AND UGRA MONITORING STATIONS (CONTINUED)

Guadalupe River Basin Surface Water Quality Monitoring Program –2000-2001 (cont.)					
TNRCC Station Id.	Station Description	Latitude/ Longitude	County	Parameters/Frequency	Monitoring Types/By
12619	Guadalupe River at Bear Creek Road, 1 mi west of Kerrville	30°03'50" 99°11'34"	Kerr	BAC/5 times/yr.	Fixed/UGRA
12618	Guadalupe River at UGRA Lake Dam	30°03'50" 99°10'08"	Kerr	BAC/5 times/yr.	Fixed/UGRA
16244	Guadalupe River at Louise Hays Park Foot Bridge	30°02'47" 99°08'41"	Kerr	BAC/5 times/yr.	Fixed/UGRA
12617	Guadalupe River at SH 16 in Kerrville	30°02'42" 99°08'31"	Kerr	BAC/5 times/yr.	Fixed/UGRA
16243	Guadalupe River at Louise Hays Park Dam	30°02'41" 99°08'29"	Kerr	BAC/5 times/yr.	Fixed/UGRA
12615	Guadalupe River at Kerrville State Park, Segment km 174.4	30°00'40" 99°07'05"	Kerr	BAC/5 times/yr.	Fixed/UGRA
12610	Guadalupe River at Co.Rd., 0.1 mi above confluence of Turtle Creek at Segment km 166.2	29°57'12" 99°02'45"	Kerr	BAC/5 times/yr.	Fixed/UGRA
16242	Guadalupe River at Hwy 1350 Center Point Texas	29°56'22" 99°00'36"	Kerr	BAC/5 times/yr.	Fixed/UGRA
12603	Guadalupe River at IH 10 in Comfort	29°58'06" 98°53'32"	Kerr	BAC/5 times/yr.	Fixed/UGRA

TABLE 1 GBRA AND UGRA MONITORING STATIONS (CONTINUED)

Guadalupe River Basin Surface Water Quality Monitoring Program –2000-2001 (cont.)					
TNRCC Station Id.	Station Description	Latitude/ Longitude	County	Parameters/Frequency	Monitoring Types/By
12543	Verde Creek, 0.2 km upstream of confluence with Guadalupe River near center point	29°55'59" 99°00'29"	Kerr	C/Quarterly F/Quarterly AC/ Semi-ann. RB/ Semi-ann.	Fixed/UGRA
12546	Camp Meeting Creek, 0.1 above confluence with Guadalupe River in Kerrville	30°01'08" 99°07'30"	Kerr	C/Quarterly F/Quarterly AC/ Semi-ann. RB/ Semi-ann.	Fixed/UGRA
12590	Guadalupe River at fm 447, west of nursery and upstream of South Texas Electric	28°47'35" 97°00'47"	Victoria	C/Quarterly F/Quarterly	Fixed/GBRA
12790	San Antonio River FM 2506 east of Fannin	28°36'43" 97°12'50"	Goliad	C/Monthly F/Monthly	Fixed/GBRA
16578	San Marcos River at Hwy 90A near city of Gonzales, 7 km upstream of confluence with Guadalupe River	29°30'50" 97°29'38"	Gonzales	C/Quarterly F/Quarterly	Fixed/GBRA
16579	Guadalupe River at Dupont, 0.3 km, downstream of confluence with Blue Bayou, Victoria co.	28°39'29" 96°57'47"	Victoria	C/Quarterly F/Quarterly	Fixed/GBRA
13295	Arenosa Creek on CR 103, off of US 59, 3.5 mi north of Inez	28°56'56" 96°48'14"	Jackson	C/Monthly F/Monthly	Fixed/GBRA
12668	Blanco River at FM 165 Bridge Crossing near City of Blanco	30°05'27" 98°24'06"	Blanco	C/Monthly F/Monthly AC/ Semi-ann. RN/ Semi-ann.	Fixed/GBRA
13289	Garcitas Creek at SH 616, downstream confluence with Arenoso Creek	28°46'40" 96°41'56"	Victoria	N/A	GBRA
14935	Sandies Creek CR 953	29°08'54" 97°21'53"	Gonzales	N/A	GBRA
12645	Plum Creek at CR 197 Between Lockhart and Luling	29°49'16" 97°35'02"	Caldwell	N/A	GBRA

TABLE 2 TNRCC MONITORING STATIONS

Guadalupe River Basin Surface Water Quality Monitoring Program - 2000-2001

TNRCC Station Id.	Station Description	Latitude/ Longitude	County	Parameters/Frequency	Monitoring Types/By
12577	Guadalupe River tidal bridge at SH 35 NE of Tivoli	28°28'36" 96°51'48"	Calhoun	C/Quarterly BAC/Quarterly	Fixed/TNRCC
12595	Guadalupe River bridge at IH 10 west of Seguin	29°33'30" 98°01'54"	Guadalupe	C/Quarterly BAC/Quarterly F/Quarterly M/Semi-ann M-sed/Semi-ann	Fixed/TNRCC
12597	Canyon Lake at Canyon Dam	29°52'19" 98°12'11"	Comal	C/Quarterly BAC/Quarterly Org/Quarterly	Fixed/TNRCC
12600	Canyon Lake mid-lake south of Potters Creek Park at west end of park	29°53'45" 98°16'57"	Comal	C/Semi-ann. BAC/Semi-ann.	Fixed/TNRCC

TABLE 2 TNRCC MONITORING STATIONS

Guadalupe River Basin Surface Water Quality Monitoring Program - 2000-2001

12601	Canyon Lake headwaters above Cranes Mill Park	29°54'33" 98°19'54"	Comal	C/Quarterly BAC/Quarterly M-sed/Semi-ann	Fixed/TNRCC
12602	Guadalupe River at county rd in Waring	29°57'14" 98°48'04"	Kendall	C/Quarterly BAC/Quarterly F/Quarterly	Fixed/TNRCC
12622	Coleta Creek at US 77 south of Victoria	28°42'42" 97°02'03"	Victoria	C/Quarterly BAC/Quarterly F/Quarterly	Fixed/TNRCC
12628	Lower San Marcos River at county road immediately below Confluence of San Marcos and Blanco Rivers	29°51'25" 97°53'46"	Hays	C/Quarterly BAC/Quarterly	Fixed/TNRCC
12660	Blanco River at low water crossing at CR 174	29°59'02" 98°03'07"	Blanco	C/Quarterly F/Quarterly	Fixed/TNRCC

TABLE 2 TNRCC MONITORING STATIONS

Guadalupe River Basin Surface Water Quality Monitoring Program - 2000-2001

13383	Lavaca Bay at SH 35 Causeway	28°38'20" 96°36'32"	Calhoun	C/Quarterly BAC/Quarterly DO24/Semi-ann M-sed/Annually	Fixed/TNRCC
13384	Lavaca Bay 'Y' intersection of Port Lavaca and Matagorda Ship Channels at Marker 66	28°35'46" 96°33'43"	Calhoun	C/Quarterly BAC/Quarterly DO24/Semi-ann M-sed/Annually	Fixed/TNRCC
13511	Guadalupe River at Gruene Road crossing approx. 0.8 km SW of RR 306 in Gruene	29°44'17" 98°06'22"	Comal	C/Quarterly BAC/Quarterly F/Quarterly	Fixed/TNRCC
14726	Powderhorn Lake	28°30'22" 96°29'20"	Calhoun	C/Quarterly BAC/Quarterly	Fixed/TNRCC
14951	Espiritu Santo Bay at ICWW at Fulgrums Fishing Camp	28°21'54" 96°34'41"	Aransas	C/Quarterly BAC/Quarterly	Fixed/TNRCC

TABLE 2 TNRCC MONITORING STATIONS

Guadalupe River Basin Surface Water Quality Monitoring Program - 2000-2001

15273	Lake McQueeney in main pool south of Treasure Island, 1.2 km upstream of dam	29°35'56" 98°02'20"	Guadalupe	C/Semi-ann. BAC/Semi-ann. M/Semi-ann. M-sed/Semi-ann	Fixed/TNRCC
16703	Guadalupe River 200 yds upstream of bridge on FM 306, 0.5 mi downstream of Horseshoe Falls	29°51'47" 98°09'50"	Comal	C/Quarterly BAC/Quarterly F/Quarterly	Fixed/TNRCC
12647	Plum Creek at CR 202, SE of Lockhart	28°28'36" 96°51'48"	Caldwell	C/Quarterly BAC/Quarterly F/Quarterly	Fixed/TNRCC
17134	Guadalupe River at FM 1117 river crossing	29°32'24" 97°52'48"	Guadalupe	C/Quarterly BAC/Quarterly F/Quarterly	Fixed/TNRCC

TABLE 2 TNRCC MONITORING STATIONS

Guadalupe River Basin Surface Water Quality Monitoring Program - 2000-2001

13563	Lavaca Bay 152 meters SSW of CM22 in Red Bluff Channel	28°40'48" 96°34'48"	Calhoun	C/Quarterly BAC/Quarterly DO24/Semi-ann M/Semi-ann.	Fixed/TNRCC
13385	Lavaca Bay at Alcoa Ship Channel off loading dock	28°39'36" 96°34'48"	Calhoun	C/Quarterly BAC/Quarterly DO24/Semi-ann. M/Semi-ann.	Fixed/TNRCC

Table 3

Basin Action Summary - 2000-2001
Guadalupe River Basin

Segment No.	Segment Name	Impaired Use	Cause	Source	Actions Taken	Recommended Action	Rank	Funding Source(s)	Active Participants
Segments on 303d (August 2000):									
1801	Guadalupe River Tidal	Aquatic Life	Low Dissolved Oxygen	San Antonio River; Non-pt. Sources	Monitoring of San Antonio River at Fannin	Continued monitoring; Reinstall segment 1802; Transmittal of SA River data to TNRCC; refine stds. to consider DO deficit	L	GBRA; TNRCC	GBRA
1803A	Elm Creek (unclassified water body)	Aquatic Life & Contact Recreation	Low Dissolved Oxygen; Fecal Coliform	Non-point sources; Intermittent flow	None	Study to develop stds for unclassified stream sites with intermittent flow ; Apply new stds for contact recreation	H	TNRCC	GBRA
1803B	Sandies Creek (unclassified water body)	Aquatic Life	Low Dissolved Oxygen	Non-point sources; Intermittent flow	None	Study to develop stds for unclassified stream sites with intermittent flow	H	TNRCC	GBRA
1804B	Peach Creek (unclassified water body)	Contact Recreation	Fecal Coliform	Non-point sources; Intermittent flow	Monitoring-routine	Continued monitoring; Apply new stream stds for contact recreation	H	TNRCC	GBRA
1806A	Camp Meeting Creek (unclassified water body)	Aquatic Life	Low Dissolved Oxygen	Intermittent flow; Non-pt source(OSF)	Historical data review and trend analysis	Continued monitoring; Study to develop stds for unclassified stream sites with intermittent flow	H	TNRCC; UGRA	UGRA
1811A	Dry Comal (unclassified water body)	Contact Recreation	Fecal Coliform	Urban Runoff	Monitoring monthly	Continued monitoring; Apply new stream stds for contact recreation	H	TNRCC	GBRA
1814	Upper San Marcos River	General Water Quality	Sulfate Concentrations	Natural background concentrations	Quarterly monitoring; Review of historical data	Apply new stream stds for general water quality	L	TNRCC	GBRA
1815	Cypress Creek	Aquatic Life	Low Dissolved Oxygen	Urban runoff	Quarterly monitoring	Continued monitoring	H	TNRCC	GBRA

Segment No.	Segment Name	Impaired Use	Cause	Source	Actions Taken	Recommended Action	Rank	Funding Source(s)	Active Participants
Special studies/monitoring:									
1801	Guadalupe River Tidal (raw water source- City of Port Lavaca)	Water Supply	Vulnerable potable raw water source	Fuel spills, marine engines	Found no measurable MTBE in Feb., April-August '00	Notification of results to steering committee and potable water systems	---	TNRCC	GBRA
1803	Guadalupe River - Victoria area	Contact Recreation & Aquatic Life	Stormwater runoff	Urban Development	Completion of urbanization study; presentations to cities, drainage districts and interested parties	Implement stormwater management practices, low impact development techniques	---	TNRCC	GBRA
1804	Guadalupe River Lake Dunlap in main body near dam (raw water source- Canyon RWA WTP)	Water Supply	Vulnerable potable raw water source	Fuel spills, marine engines	Found no measurable MTBE in Feb., April-August '00	Notification of results to steering committee and potable water systems	---	TNRCC	GBRA
1804	Guadalupe River Lake Placid in main body near dam (raw water source- Springs Hill WTP)	Water Supply	Vulnerable potable raw water source	Fuel spills, marine engines	Found no measurable MTBE in Feb., April-August '00	Notification of results to steering committee and potable water systems	---	TNRCC	GBRA
1804	Guadalupe River Lake Wood in main body near dam (raw water source- Gonzales Co. WSC WTP)	Water Supply	Vulnerable potable raw water source	Fuel spills, marine engines	Found no measurable MTBE in Feb., April-August '00	Notification of results to steering committee and potable water systems	---	TNRCC	GBRA
1804	Guadalupe River - New Braunfels area	Contact Recreation & Aquatic Life	Stormwater runoff	Urban Development	Completion of urbanization study; presentations to cities, drainage districts and interested parties	Implement stormwater management practices, low impact development techniques	---	TNRCC	GBRA

Segment No.	Segment Name	Impaired Use	Cause	Source	Actions Taken	Recommended Action	Rank	Funding Source(s)	Active Participants
1804	Guadalupe River - Seguin area	Contact Recreation & Aquatic Life	Stormwater runoff	Urban Development	Completion of urbanization study; presentations to cities, drainage districts and interested parties	Implement stormwater management practices, low impact development techniques	----	TNRCC	GBRA
1808	San Marcos River - San Marcos area	Contact Recreation & Aquatic Life	Stormwater runoff	Urban Development	Completion of urbanization study; presentations to cities, drainage districts and interested parties	Implement stormwater management practices, low impact development techniques	----	TNRCC	GBRA
1808	San Marcos River at Luling WTP intake	Water Supply	Vulnerable potable raw water source	Fuel spills, marine engines	Sampling found no measurable MTBE in Feb., April-August '00	Notification of results to steering committee and potable water systems	----	TNRCC	GBRA
Events to protect water quality:									
1804	Guadalupe River - Hydroelectric lakes	-----	-----	-----	Established committee (Spring 2000) made up of lake users that will serve to give public feedback concerning any vegetation control activities	-----	----	GBRA	GBRA

Segment No.	Segment Name	Impaired Use	Cause	Source	Actions Taken	Recommended Action	Rank	Funding Source(s)	Active Participants
1804	Guadalupe River - Seguin area	Contact Recreation & Aquatic Life	Stormwater runoff	Urban Development	Completion of urbanization study; presentations to cities, drainage districts and interested parties	Implement stormwater management practices, low impact development techniques	----	TNRCC	GBRA
1808	San Marcos River - San Marcos area	Contact Recreation & Aquatic Life	Stormwater runoff	Urban Development	Completion of urbanization study; presentations to cities, drainage districts and interested parties	Implement stormwater management practices, low impact development techniques	----	TNRCC	GBRA
1808	San Marcos River at Luling WTP intake	Water Supply	Vulnerable potable raw water source	Fuel spills, marine engines	Sampling found no measurable MTBE in Feb., April-August '00	Notification of results to steering committee and potable water systems	----	TNRCC	GBRA
Events to protect water quality:									
1804	Guadalupe River - Hydroelectric lakes	-----	-----	-----	Established committee (Spring 2000) made up of lake users that will serve to give public feedback concerning any vegetation control activities	-----	----	GBRA	GBRA

Segment No.	Segment Name	Impaired Use	Cause	Source	Actions Taken	Recommended Action	Rank	Funding Source(s)	Active Participants
2453	Arenoso Creek	No impairment noted to date	Application submitted to TNRCC for a land application site for biosolids along Arenoso Creek, Victoria and Jackson Counties	sludge disposal site	GBRA responded to the request of the Jackson county judge to establish a monitoring site to collect background information prior to the granting of the disposal site permit	Maintain monitoring site as long as there is flow; monitoring to date has shown that Arenoso Creek is intermittent, with wide variations in flow	----	TNRCC	GBRA
1808	San Marcos River at City of San Marcos	No impairment noted to date	TNRCC has found a contaminated groundwater plume from an unknown source near the intersection of SH 123 and IH 35. The plume contains tetrachloroethylene (PCE). Groundwater emerges through springs that flow into Willow Springs which is a tributary of the San Marcos River. No concentrations were found in the San Marcos River.	unknown source	The site has been designated a state superfund site by TNRCC. TNRCC will be performing a remedial investigation to determine the source and extent of contamination. Samples of soil, groundwater, sediment, surface water and fish will be collected and analyzed for a wide range of contaminants.	GBRA maintain communications with the Texas Superfund program for updates and information.	----	TNRCC	TNRCC