

Appendix G to the United States Section, International Boundary and Water  
Commission (USIBWC)  
Clean Rivers Program FY 2010/2011 QAPP

Bacteria Characterization in Segment 2304 near Laredo, Texas

Prepared by the USIBWC

In Cooperation with the Texas Commission on Environmental Quality (TCEQ)

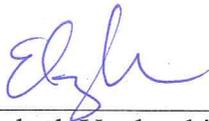
Effective March 28, 2011

Questions concerning this QAPP should be directed to:

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**S-A1a APPROVAL PAGE (page 1 of 5)**

The following signatures are required for the special study:



3/20/11

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3-21-11

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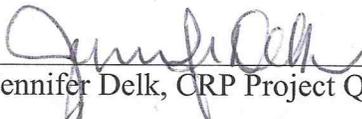
Date



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Julie McEntire, TCEQ CRP Project Manager

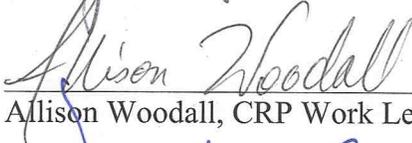
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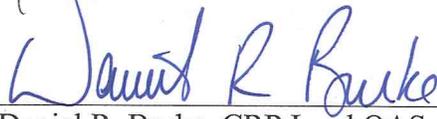
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Allison Woodall, CRP Work Leader

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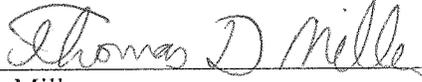
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Dr. Tom Vaughan  
Professor

Date

**S-A1a APPROVAL PAGE (page 3 of 5)**

**Laredo Community College**

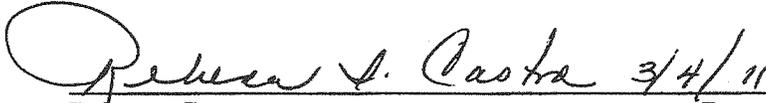


Tom Miller  
L.B.V.E.S.C. Director

Date

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**City of Laredo Health Department Laboratory**

 3/4/11

Rebecca Castro

Date

Technical Director/Quality Assurance Manager for the Environmental Division of the Laboratory

S-A1a APPROVAL PAGE (page 5 of 5)

TCEQ Region 16 Office

Elsa Hull

Elsa Hull

01/24/2011

Date

James D. Archer

James Archer

1-24-11

Date

The USIBWC will secure written documentation from each sub-tier project participant (e.g., subcontractors, other units of government, laboratories) stating the organization's awareness of and commitment to requirements contained in this quality assurance project plan appendix and any amendments of this plan. The USIBWC will maintain this documentation as part of the project's quality assurance records, and will ensure the documentation is available for review.

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## **LIST OF ACRONYMS**

As described in Section A2 of the basin-wide QAPP

## **SS-A3 DISTRIBUTION LIST**

As described in Section A3 of the basin-wide QAPP, and

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## **SS-A4 PROJECT/TASK ORGANIZATION**

### **TCEQ**

**Julie McEntire**  
**CRP Project Manager**

As described in the basin-wide QAPP, FY 2010, Section A4.

Other TCEQ staff as described in the basin-wide QAPP, FY 2010, Section A4.

### **USIBWC**

**Elizabeth Verdecchia**  
**USIBWC Program Manager**

As described in the basin-wide QAPP, FY 2010, Section A4, and will also coordinate this special study. Will also assist in preparing a written report based on the findings of this study.

**Leslie Grijalva**  
**USIBWC QA Officer**

As described in the basin-wide QAPP, FY 2010, Section A4, and will also review data to ensure it meets the requirements of this QAPP.

**Elizabeth Verdecchia**  
**Acting USIBWC Data Manager**

As described in the basin-wide QAPP, FY 2010, Section A4, and will manage data resulting from the study.

### **RIO GRANDE BASIN CRP PARTNERS**

**Dr. Tom Vaughan**  
**Rio Grande International Study Center (RGISC) and Texas A&M International University (TAMIU)**

As described in the basin-wide QAPP, FY 2010, Section A4, and will coordinate with CRP to ensure that sample collection follows TCEQ sampling procedures. Will also coordinate logistics of sampling, including boat launch and boat safety. TAMIU will also provide a boat for sampling.

**Tom Miller**  
**Laredo Community College, Lamar Bruni Vergara Environmental Science Center (L.B.V.E.S.C)**

Responsible for collecting samples and will also coordinate logistics of sampling, including boat launch and boat safety. Will coordinate with CRP to ensure samples are collected according to TCEQ sampling procedures.

**Rebecca Castro**  
**City of Laredo Health Department Laboratory**  
Responsible for analysis of samples and reporting of data to USIBWC-CRP.

**Rebecca Castro, Acting QAO, City of Laredo Health Department Laboratory**

Responsible for quality assurance of laboratory analysis and data submittals to USIBWC.

**Elsa Hull**

**TCEQ Region 16**

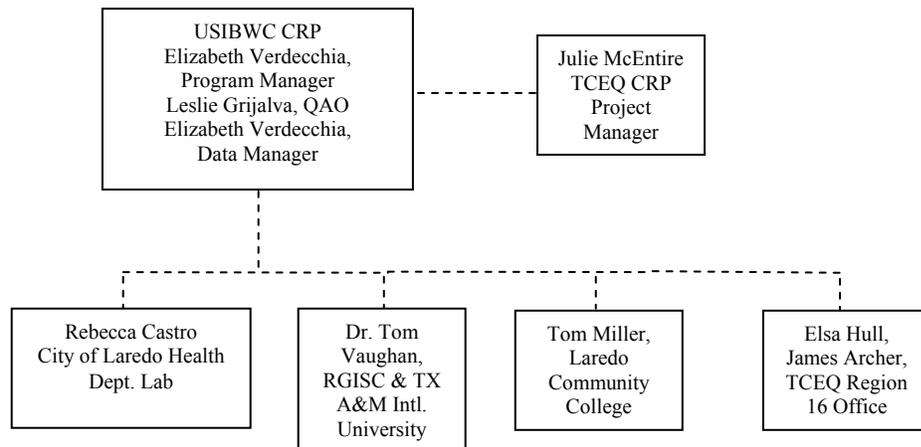
Responsible for sample collection. Will ensure samples are collected according to TCEQ sampling procedures.

**James Archer**

**TCEQ Region 16**

Responsible for sample collection. Will ensure samples are collected according to TCEQ sampling procedures.

**PROJECT ORGANIZATION CHART**



## SS-A5 PROBLEM DEFINITION

### Introduction

The Rio Grande in the Laredo/Nuevo Laredo area has been plagued by high levels of bacteria for decades. In 1989, the International Boundary and Water Commission (IBWC) signed IBWC Minute No. 279, a formal international agreement setting forth measures to improve the quality of waters of the Rio Grande at Laredo, Texas and Nuevo Laredo, Tamaulipas. The Minute led to the construction of the Nuevo Laredo International Wastewater Treatment Plant (NLIWTP), through funding from NADBank and cooperation with the Border Environmental Cooperative Commission. NLIWTP began operations in 1996 with remaining construction finalized within the next several years. Water quality data from the Rio Grande basin show that bacteria levels in water downstream of the plant drastically improved in the years following the operation of the plant. However, high levels of bacteria continue to persist in waters throughout the Laredo/Nuevo Laredo stretch.

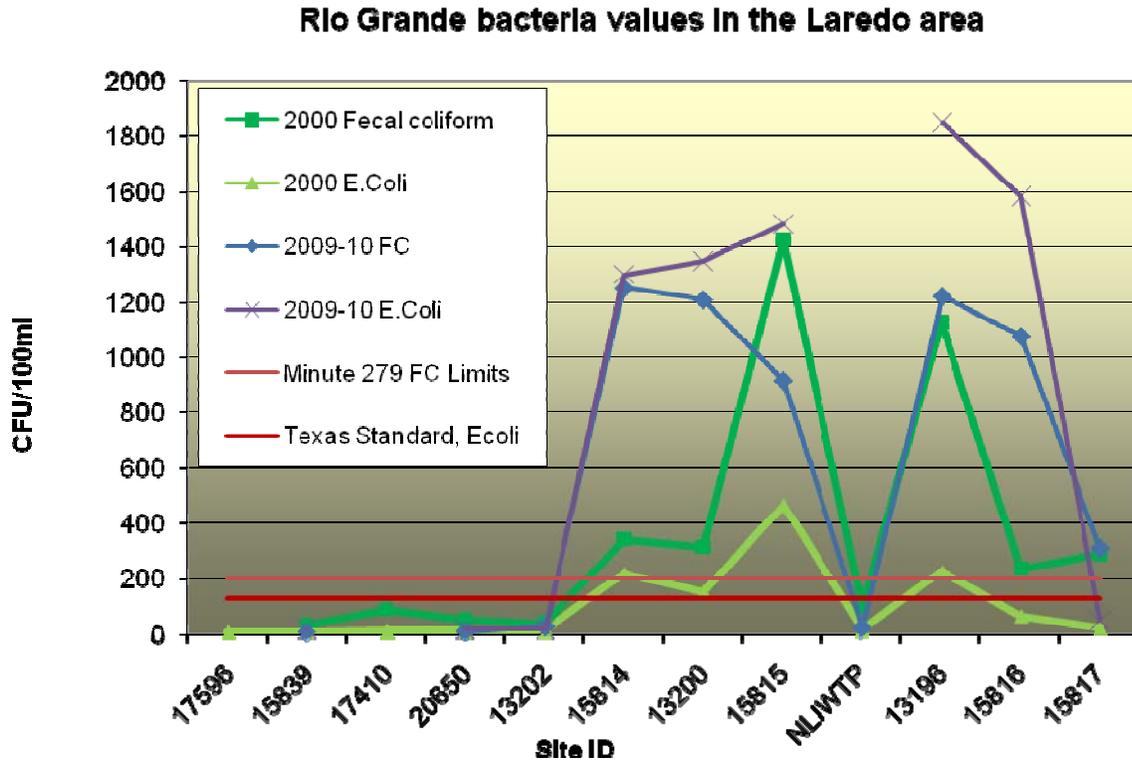
Data from 8.6 miles below Laredo from 1982 to 1989, as published in the IBWC Joint Report of Engineers that led to Minute 279, show that fecal coliform values typically ranged from 8,000 to 30,000 colonies/100ml, with a maximum of 102,000 measured in summer 1982. After the NLIWTP went online in 1996, bacteria values dropped significantly. At Station 13196 below the NLIWTP, for example, fecal bacteria values ranging from 10,000 to 76,000 colonies/100ml dropped to under 1,000, with some spikes at higher values. However, despite the improvement, bacteria levels in the urban areas remain above U.S. and Mexican standards.

The Texas Surface Water Quality Standards (TSWQS) for contact recreation are measured in *E. coli* bacteria. The standard for Rio Grande Segment 2304 from Falcon Dam to Amistad Reservoir is 126 colonies per 100 ml, using a geometric mean. Rio Grande Segment 2304 has been listed on the Clean Water Act Section 303(d) Impairment List by TCEQ since 1996. Specifically, in the Laredo/Nuevo Laredo area, 2010 Assessment Units 2304\_03 to 2304\_01 (from the City of Laredo water treatment plant intake downstream to the Arroyo Salado confluence) are impaired for bacteria, according to the *2010 Texas Draft Integrated Report*. However, due to the binational nature of the Rio Grande, implementing a Total Maximum Daily Load (TMDL) to address the impairment has not been possible.

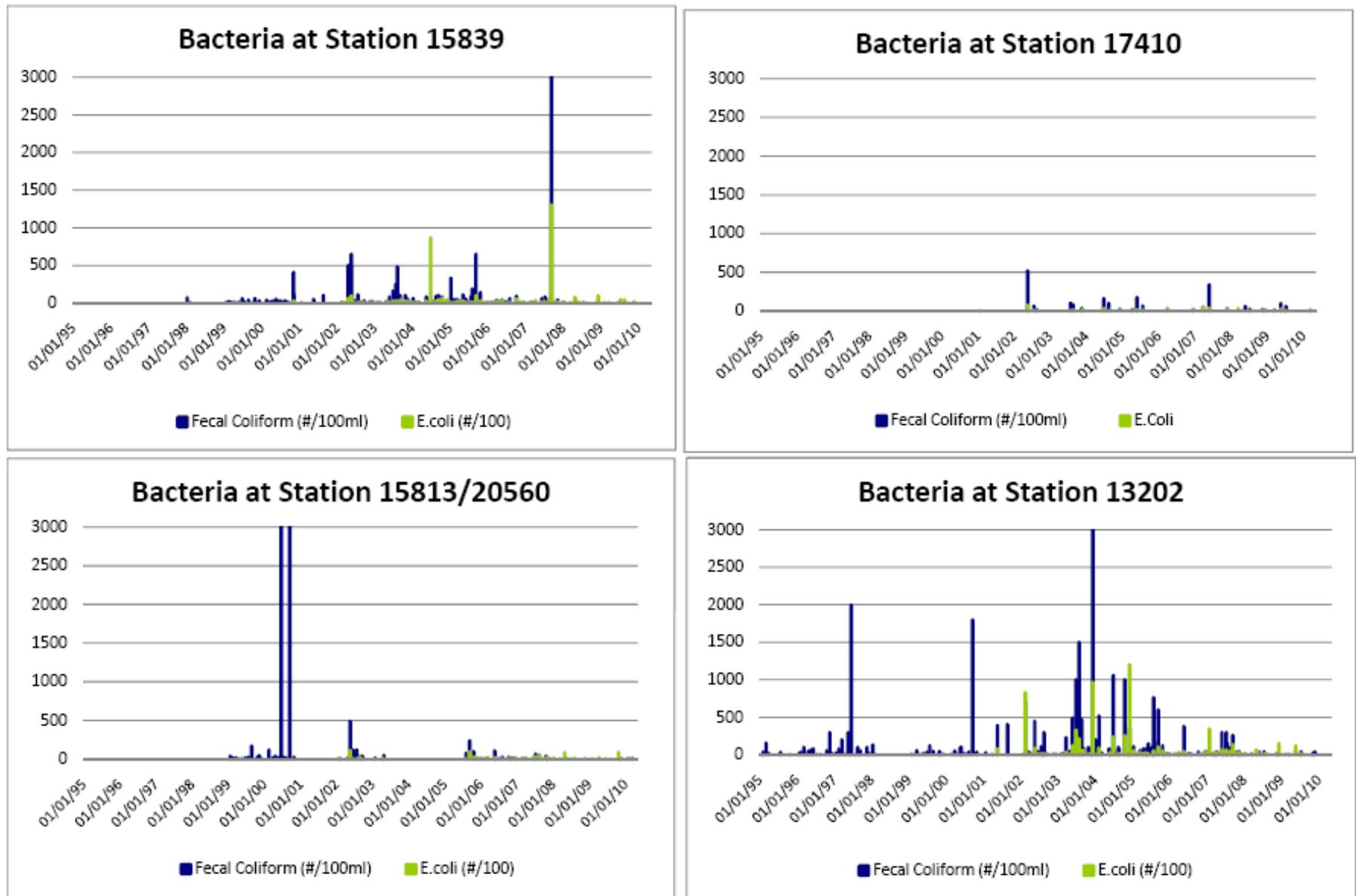
The USIBWC Texas Clean Rivers Program (UISBWC CRP) for the Rio Grande Basin currently collects both fecal coliform and *E. coli* at 10 stations, spanning 40 miles upstream of Laredo to 30 miles downstream of Laredo. Data from the Rio Grande in Segment 2304 show that values of bacteria upstream of Laredo/Nuevo Laredo are extremely low and have been for the past 30 years. Bacteria counts increase in the downtown section of Laredo and Nuevo Laredo, somewhere between the City of Laredo water treatment plant on Jefferson Street and International Bridge #2. Bacteria counts remain high through Nuevo Laredo and past the NLIWTP plant. Figure 1 shows that values exceed TSWQS at stations 13200, 15814, 15815, 13196 and 15816. Figure 1 also shows that bacteria values spike between Stations 13202 and 15814. Figures 2 through 4 are graphs depicting historical background data on the bacteria levels of certain sites.

Figure 1 A5.1 Graphs of Background Data

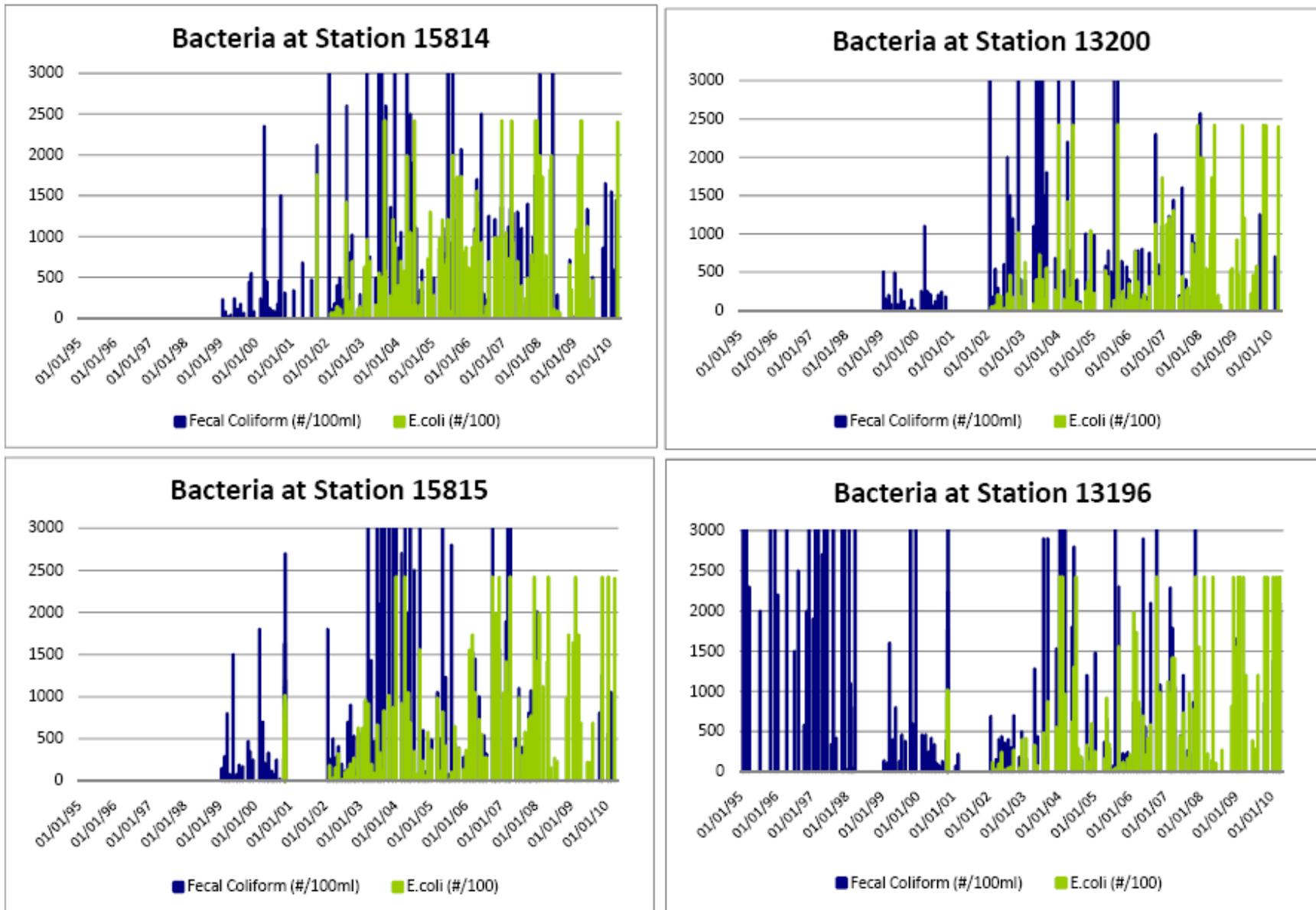
Rio Grande bacteria values in the Laredo area, from upstream to downstream



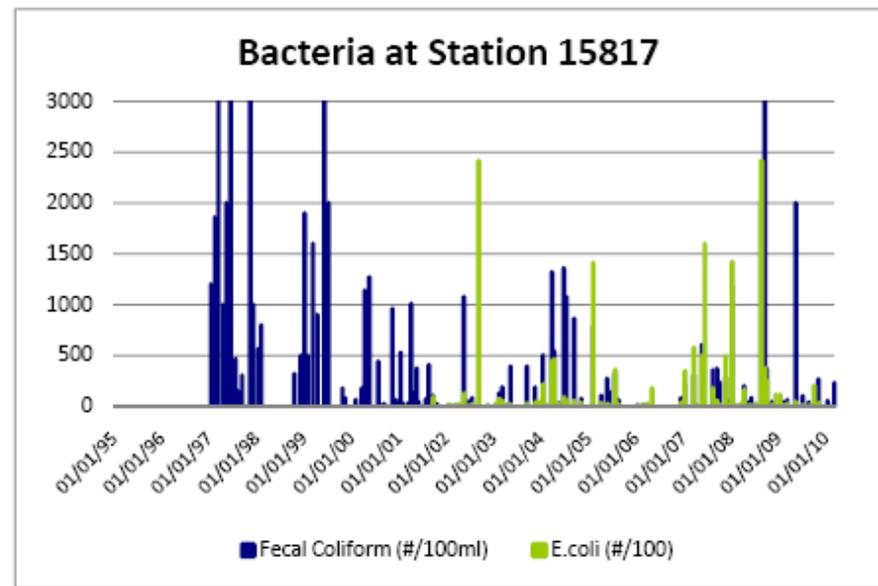
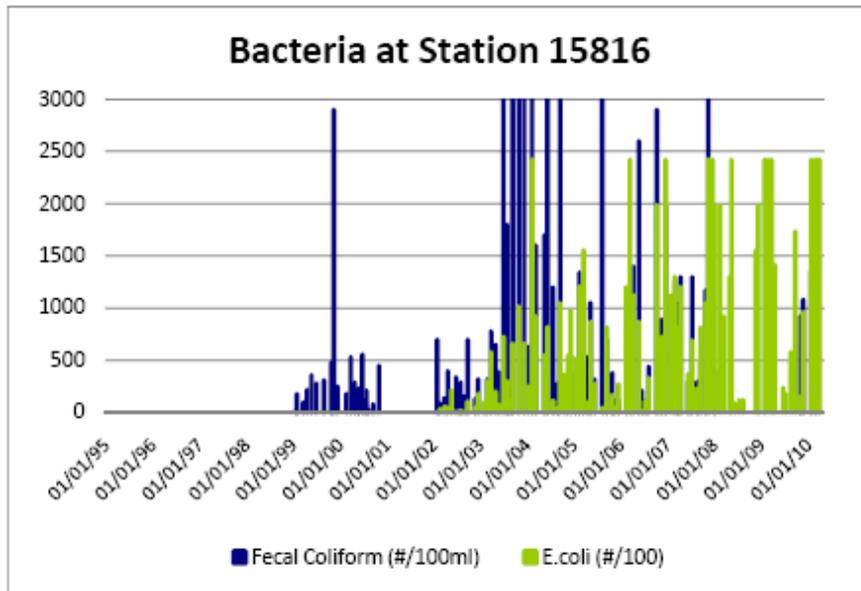
**Figure 2 A5.2 Graphs of Background data, Upstream of Laredo**



**Figure 3 A5.3 Graphs of Background data, in Laredo**



**Figure 4 A5.4 Graphs of Background data, downstream of Laredo**



## Study Objectives

The USIBWC-CRP, in conjunction with the Rio Grande International Study Center (RGISC), Texas A&M International University (TAMIU), the Laredo Community College (LCC), the Texas Commission on Environmental Quality (TCEQ) Region 16 office, and the Laredo Department of Health Laboratory, propose conducting a special study to address the bacteria impairment in the Laredo area of Segment 2304. This special study will accomplish two goals:

- a) evaluate and identify possible sources of bacteria contamination through a field survey via boat and spatial analysis of field survey results, and
- b) characterize the bacteria contamination through intensive bacteria monitoring.

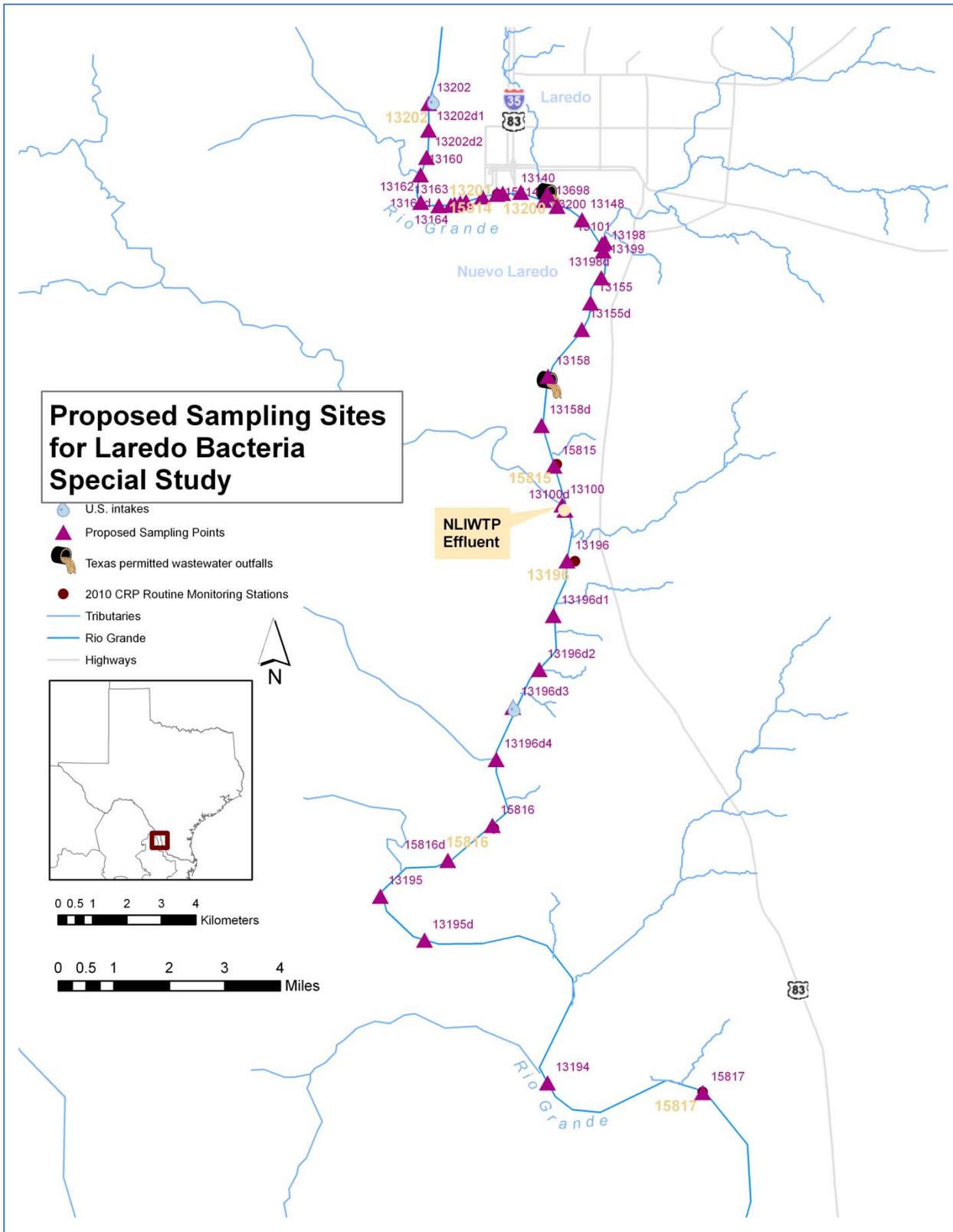
The information and data collected from the special study will provide the information necessary to begin steps to reduce pollutant loads and ultimately delist the impairment. This study is mimicked after the Brownsville Bacteria Special Study, documented in Appendix F of this QAPP.

## Study Area

According to the 2010 *Texas Water Quality Inventory Water Bodies Evaluated*, impaired Assessment Units 2304\_01 to 2304\_03 use Stations 13201, 15814, 15815, 13196, 15816, and 15817, six of the 10 routine stations in the Laredo area. Sampling will focus on these AUs as well as the upstream AU of 2304\_04. The study area encompasses the reach of the Rio Grande extending approximately 27 miles from TCEQ Station 13202 in AU 2304\_04 downstream to Station 15817 in AU 2304\_01. Figure 5 shows the stations and the extent of the proposed study area.

The “target area” will be the downtown area from the City of Laredo intake (13202) through the International Bridge #2 (15814) and downstream to the confluence of Zacate Creek (13200) where bacteria values initially spike, but the entire stretch down past the NLIWTP will be surveyed.

**Figure 5 Proposed Sampling Sites**



## SS-A6 PROJECT/TASK DESCRIPTION

### *Proposed Sampling*

40 sampling stations have been proposed for this study, as shown in Figure 5. The majority of the stations chosen were historical stations stored in the TCEQ Surface Water Quality Information System. Table 2 lists the stations and their corresponding information. “Target area” refers to the stretch from 13202 to downstream of downtown at Station 13200. In addition, Figures 6 and 7 include close-up maps for the proposed stations for a more detailed view of the area.

The sampling will begin at the intake (13202), and includes 22 stations at least every half mile in the 4 mile stretch downstream of the intake on the main stem of the Rio Grande and 2 in tributaries on the U.S. side (Zacate Creek and Chacon Creek). The remaining 23 miles down through the Webb/Zapata County line includes 18 stations, one roughly every mile or where there are existing stations. Sites in the target area may be spaced less than a half mile apart. This is due to several participating entities that have made observations in the past about discoloration in the water in these areas. Since there were existing stations in these areas, the special study sampling will maintain some of those sites. This study will be in addition to the USIBWC CRP routine monitoring of the 10 Laredo stations. Estimated flow will be collected at the 6 routine stations in the study area, with the exception of Station 15814 at Bridge 2, where instantaneous flow will be measured from an IBWC gage.

There will be two sampling events, where all 40 sampling stations will be collected over two consecutive days for each sampling event (four days of 20 samples each for a total of 80 samples. Both fecal coliform and *E. coli* will be collected at each station (Mexico uses fecal coliform as a bacteria indicator). These sampling trips should not be done within 48 hours of a major rain event. Sampling will take place from a boat. Entities that have available boats are TCEQ, IBWC (at Amistad), TAMIU, and possibly Border Patrol. Samples will be taken in batches to the laboratory to meet holding times. A team of “runners” will meet the boat at designated locations to pick up samples and deliver to the laboratory.

Boat logistics, including boat ramps and loading/unloading sites for samples, will be discussed with TCEQ, IBWC (at Amistad), TAMIU, and the Border Patrol so that the easiest access points are selected for boat and river access. Targeted dates for both sampling events are May and possibly July of 2011. These time periods were selected based on scheduling and personnel availability.

### *Survey of Structures*

The fact that the contamination consistently begins to appear between two routine sampling stations is a strong indicator that the contamination is probably resulting from one or more point discharges. This study will therefore include a survey of all structures that exist along both banks of the river. The survey will include description of the structures, GPS locations, pictures and video, and any other noteworthy information such as whether the structure is discharging at the time and whether there is any discoloration in the water nearby. After the field survey is complete, participants of the study will compare surveyed structures with permitted wastewater discharges, stormwater drains, and agricultural drains in both countries.

## Analysis of Bacteria

Both fecal coliform and *E. coli* bacteria samples will be analyzed by City of Laredo Health Laboratory for all 40 stations. USIBWC CRP will purchase all supplies needed for both fecal and *E. coli* analysis. The City of Laredo Health Laboratory is currently a USIBWC CRP partner and is also accredited by TCEQ in bacteria analysis of nonpotable water. Results will be sent to USIBWC CRP for quality assurance review and assessment.

## Results Assessment and Final Report

USIBWC CRP, in conjunction with the other participating entities, will assess data and collaborate on a final report. The data from the different sampling events and all stations will be compared to locations of structures and any other possible source of contamination. The final report will include a summary and interpretation of the results and possible recommendations for action.

## Revisions to the Special Study Appendix

Revisions to the Special Study Appendix may be necessary to address incorrectly documented information or to reflect changes in project organization, tasks, schedules, objectives, and methods. Requests for revisions will be directed from the USIBWC CRP Program Manager to the CRP Project Manager electronically. Revisions are effective immediately upon approval by the USIBWC CRP Program Manager, the USIBWC CRP QAO, the CRP Project Manager, the CRP Lead QA Specialist, and the CRP Project QA Specialist. They will be incorporated into the QAPP by way of attachment and distributed to personnel on the distribution list by the USIBWC CRP Program Manager.

## SS-A7 QUALITY OBJECTIVES AND CRITERIA

The objective of this project is to characterize bacteria contamination in Segment 2304. Data that will be collected includes field parameters and *E. coli* bacteria through an intensive monitoring that will identify the source of bacteria contamination and help to better understand the nature of the bacteria spikes that have historically been recorded in this segment.

The measurement performance specifications to support the project objectives are specified in Table SS-A7.1.

**Table 1 SS-A7.1 Measurement Performance Specifications**

Parameter	Units	Matrix	Method	PARAMETER CODE	AWRL	Limit of Quantitation (LOQ)	PRECISION (RPD of LCS/LCSD)	BIAS (%Rec. of LCS)	LOQ CHECK STANDARD %Rec	Lab
<b>Field Parameters (Water Column)</b>										
pH	pH units	water	EPA 150.1and TCEQ SOP	00400	1.0	NA	NA	NA	NA	Field
DO	mg/L	water	SM 4500-O G and TCEQ SOP, V1	00300	1.0	NA	NA	NA	NA	Field
Specific Conductance	µS/cm	water	EPA 120.1and TCEQ SOP	00094	1	NA	NA	NA	NA	Field
Water temperature	degrees centigrade	water	EPA 170.1 & TCEQ-SWQM SOP, V1	00010	NA*	NA	NA	NA	NA	Field

Flow estimate	cfs	water	TCEQ SOP	74069	NA	NA	NA	NA	NA	Field
Flow	cfs	Water	TCEQ-SWQM SOP, V1	00061	NA*	NA	NA	NA	NA	Field, Gage
Days since last significant rainfall	days	NA	TCEQ-SWQM SOP, V1	72053	NA*	NA	NA	NA	NA	Field
Flow method	1-gage 2-electric 3-mechanical 4-weir/flume 5-doppler	water	TCEQ-SWQM SOP, V1	89835	NA*	NA	NA	NA	NA	Field
Present Weather	1-clear 2- partly cloudy 3-cloudy 4-rain 5- other	water	TCEQ-SWQM SOP, V1	89966	NA*	NA	NA	NA	NA	Field
<b>Indicator Bacteria (Water)</b>										
<i>E. coli</i> , IDEXX Colilert	MPN/100 mL	water	SM 9223-B	31699	1	1	0.5***	NA	NA	Laredo Health Lab
Fecal Coliform	CFU/100 mL	water	SM9222D	31616	1	1	NA	NA	NA	Laredo Health Lab

\* Reporting to be consistent with SWQM guidance and based on measurement capability.

\*\*\*Based on a range statistic as described in Standard Methods, 20th Edition, Section 9020-B, A Quality Assurance/Quality Control - Intralaboratory Quality Control Guidelines. This criterion applies to bacteriological duplicates with concentrations >10 MPN/100mL or >10 organisms/100mL.

References:

United States Environmental Protection Agency (USEPA) "Methods for Chemical Analysis of Water and Wastes," Manual #EPA-600/4-79-020  
TCEQ SOP - Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2003.

## Ambient Water Reporting Limits (AWRLs)

As described in Section A7 of the basin-wide QAPP.

## Precision

As described in Section A7 of the basin-wide QAPP.

## Bias

As described in Section A7 of the basin-wide QAPP.

## Representativeness

Samples will be collected at half-mile intervals, beginning at Station 13202 down to Station 13200, and at one- mile intervals from Station 13200 to Station 15817. Because the objective is to identify possible sources, samples taken at half-mile intervals will narrow the spatial distance of a possible point source to within one mile.

## Comparability

As described in Section A7 of the basin-wide QAPP.

## **Completeness**

As described in Section A7 of the basin-wide QAPP.

## **SS-A8 SPECIAL TRAINING/CERTIFICATION**

As described in Section A8 of the basin-wide QAPP. Also, sampling will be conducted by personnel who are already trained and conduct the routine sampling at stations in the area. Training and partner audits are maintained by the USIBWC CRP staff.

## **SS-A9 DOCUMENTS AND RECORDS**

As described in Section A9 of the basin-wide QAPP. A report will be prepared by the USIBWC CRP staff documenting study findings.

## **SS-B1 SAMPLING PROCESS DESIGN**

The data collection design is summarized in Table SS-B1 (Sampling Sites and Monitoring Frequencies) and in Figure SS-B1 (Sample Site Map).

**Table 2 SS-B1. Proposed Sampling Sites and Monitoring Frequencies**

Segment/ AU	Region	Station Description	Station ID	Collecting Entity	Monitoring Type	Inst. Flow	Est. Flow	E. coli Bacteria	FC Bacteria	Field	Justification for Station	POINT_X	POINT_Y
2304_04	16	RIO GRANDE LAREDO WATER TREATMENT PLANT PUMP INTAKE	13202	IB	BS		2	2	2	2	Routine Station	-99.525107	27.523178
2304_03	16	0.5 mi downstream of 13202	13202d1	IB	BS			2	2	2	Target Area	-99.525143	27.51621
2304_03	16	1 mile downstream of 13202	13202d2	IB	BS			2	2	2	Target Area	-99.525648	27.509061
2304_03	16	UNNAMED MEXICAN TRIBUTARY TO RIO GRANDE APPROXIMATELY 2 RIVER KM UPSTREAM OF MISSOURI-PACIFIC RAILROAD BRIDGE IN LAREDO	13160	IB	BS			2	2	2	Existing station in Target Area	-99.527237	27.504512
2304_03	16	AVENIDA MONTERREY DRAIN 1 METER UPSTREAM OF CONFLUENCE WITH RIO GRANDE 1.1 KM UPSTREAM OF MISSOURI-PACIFIC RAILROAD BRIDGE IN LAREDO	13162	IB	BS			2	2	2	Existing station in Target Area	-99.52684	27.497399
2304_03	16	0.5 mile downstream of 13162	13162d	IB	BS			2	2	2	Target Area	-99.52245	27.496479
2304_03	16	NUEVO LAREDO WATER TREATMENT PLANT RETURN FLOW APPROXIMATELY 0.3 KM UPSTREAM OF MISSOURI-PACIFIC RAILROAD BRIDGE IN LAREDO	13163	IB	BS			2	2	2	Existing station in Target Area	-99.519257	27.49702
2304_03	16	AVENIDA AMERICA DRAIN 1 METER UPSTREAM OF CONFLUENCE WITH RIO GRANDE 0.2 KM UPSTREAM OF MISSOURI-PACIFIC RAILROAD BRIDGE IN LAREDO	13164	IB	BS			2	2	2	Existing station in Target Area	-99.518355	27.497472
2304_03	16	AVENIDA ABASOLO DRAIN 1 METER UPSTREAM OF CONFLUENCE WITH RIO GRANDE 0.06 KM UPSTREAM OF MISSOURI-PACIFIC RAILROAD BRIDGE IN LAREDO	13165	IB	BS			2	2	2	Existing station in Target Area	-99.516911	27.498013
2304_03	16	AVENIDA DONATO GUERRA DRAIN 1 METER FROM CONFLUENCE WITH RIO GRANDE 60 M DOWNSTREAM OF MISSOURI-PACIFIC RAILROAD BRIDGE IN LAREDO	13167	IB	BS			2	2	2	Existing station in Target Area	-99.51572	27.498447
2304_03	16	0.3 miles downstream of 13167	13167d	IB	BS			2	2	2	Target Area	-99.511026	27.49906
2304_03	16	RIO GRANDE AT INTERNATIONAL BRIDGE #2/EAST BRIDGE IN LAREDO	15814	IB	BS	2		2	2	2	Routine Station	-99.507343	27.499457

Segment/ AU	Region	Station Description	Station ID	Collecting Entity	Monitoring Type	Inst. Flow	Est. Flow	E. coli Bacteria	FC Bacteria	Field	Justification for Station	POINT_X	POINT_Y
2304_02	16	UNNAMED MEXICAN DRAIN 1 METER UPSTREAM OF CONFLUENCE WITH RIO GRANDE APPROXIMATELY 145 METERS DOWNSTREAM OF US 81 BRIDGE IN LAREDO	13142	IB	BS			2	2	2	Existing station in Target Area	-99.505791	27.499674
2304_02	16	UNNAMED MEXICAN DRAIN 1 METER UPSTREAM OF CONFLUENCE WITH RIO GRANDE APPROXIMATELY 140 METERS DOWNSTREAM OF SAN DARIO BRIDGE LAREDO	13144	IB	BS			2	2	2	Existing station in Target Area	-99.501061	27.499963
2304_02	16	ZACATE CREEK 70 METERS UPSTREAM OF CONFLUENCE WITH RIO GRANDE WHICH IS 1.4 KM DOWNSTREAM OF US 81 BRIDGE CONVENT AVE	13140	IB	BS			2	2	2	U.S. Tributary in Target Area	-99.494143	27.499548
2304_02	16	RIO GRANDE 50 YD UPSTREAM OF CONFLUENCE OF ZACATE CREEK AND RIO GRANDE	13200	IB	BS		2	2	2	2	Routine Station	-99.494598	27.498808
2304_02	16	RIO GRANDE 1.1 MI DOWNSTREAM FROM HIGHWAY BRIDGE BETWEEN LAREDO AND NUEVO LAREDO	13698	IB	BS			2	2	2	Existing station downstream of Target Area	-99.491592	27.495873
2304_02	16	UNNAMED MEXICAN DRAIN 1 METER UPSTREAM OF CONFLUENCE WITH RIO GRANDE APPROXIMATELY 2.0 KM DOWNSTREAM OF SAN DARIO BRIDGE IN LAREDO	13148	IB	BS			2	2	2	Existing station downstream of Target Area	-99.485261	27.492543
2304_02	16	RIO GRANDE 50 METERS UPSTREAM OF CONFLUENCE WITH CHACON CREEK	13199	IB	BS			2	2	2	Existing station downstream of Target Area	-99.479918	27.486442
2304_02	16	CHACON CREEK 100 METERS UPSTREAM OF THE CONFLUENCE WITH RIO GRANDE IN SOUTHEAST LAREDO	13101	IB	BS			2	2	2	U.S. Tributary	-99.479196	27.486875
2304_02	16	RIO GRANDE 150 YD DOWNSTREAM OF CONFLUENCE OF CHACON CREEK AND RIO GRANDE	13198	IB	BS			2	2	2	Existing station downstream of Target Area	-99.479557	27.484654
2304_02	16	0.5 mile downstream of 13198	13198d	IB	BS			2	2	2	Downstream of Target Area	-99.480062	27.477668
2304_02	16	UNNAMED MEXICAN DRAIN 1 METER UPSTREAM OF CONFLUENCE WITH RIO GRANDE 5.1 KM DOWNSTREAM OF US 81 BRIDGE IN LAREDO	13155	IB	BS			2	2	2	Existing station downstream of Target Area	-99.482915	27.471079

Segment/AU	Region	Station Description	Station ID	Collecting Entity	Monitoring Type	Inst. Flow	Est. Flow	E. coli Bacteria	FC Bacteria	Field	Justification for Station	POINT_X	POINT_Y
2304_02	16	0.5 mile downstream of 13155	13155d	IB	BS			2	2	2	Downstream of Target Area	-99.485153	27.464147
2304_02	16	UNNAMED MEXICAN DRAIN 1 METER UPSTREAM OF CONFLUENCE WITH RIO GRANDE 7.6 KM DOWNSTREAM OF US 81 BRIDGE IN LAREDO	13158	IB	BS			2	2	2	Existing station downstream of Target Area	-99.493999	27.451907
2304_02	16	0.7 MILES DOWNSTREAM OF LAREDO NPDES PERMIT 10681-003	13158d	IB	BS			2	2	2	Downstream of Target Area	-99.49566	27.439072
2304_02	16	RIO GRANDE AT MASTERSON RD IN LAREDO 9.9KM DWNSTR INTL BRIDGE #1/WEST BRIDGE DWNSTR SOUTHSIDE WWTP AND UPSTREAM NUEVO LAREDO WWTP	15815	IB	BS		2	2	2	2	Routine Station	-99.49241	27.428475
2304_02	16	ARROYO EL COYOTE MEXICAN TRIBUTARY TO THE RIO GRANDE SAMPLED 1 METER UPSTREAM OF ITS CONFLUENCE WITH RIO GRANDE	13100	IB	BS			2	2	2	Mexican tributary	-99.490316	27.418312
2304_02	16	NLIWTP effluent	13100d	IB	BS			2	2	2	NLIWTP effluent	-99.489558	27.416976
2304_01	16	RIO GRANDE AT PIPELINE CROSSING 8.7 MI DOWNSTREAM LAREDO	13196	IB	BS		2	2	2	2	Routine Station	-99.489016	27.403689
2304_01	16	1 mile downstream of 13196	13196d1	IB	BS			2	2	2	Downstream of Target Area	-99.492591	27.389446
2304_01	16	2 miles downstream of 13196	13196d2	IB	BS			2	2	2	Downstream of Target Area	-99.496273	27.375347
2304_01	16	WEBB COUNTY WATER UTILITIES Intake	13196d3	IB	BS			2	2	2	Downstream of Target Area	-99.503169	27.365508
2304_01	16	1 mile downstream of Webb Intake at Mexican Tributary	13196d4	IB	BS			2	2	2	U.S. intake	-99.507502	27.351896
2304_01	16	RIO GRANDE AT RIO BRAVO 0.5KM DWNSTR OF THE COMMUNITY OF EL CENIZO	15816	IB	BS		2	2	2	2	Routine Station	-99.508477	27.33462
2304_01	16	1 mile downstream of 15816	15816d	IB	BS			2	2	2	Downstream of Target Area	-99.520135	27.325492
2304_01	16	RIO GRANDE NEAR ISLA MESTENO AT IRRIGATION PUMP 350 METERS DOWNSTREAM OF ISLA MESTENO 22.4 KM SOUTH OF LAREDO	13195	IB	BS			2	2	2	Existing station downstream of Target Area	-99.537686	27.316189
2304_01	16	1 mile downstream of 13195	13195d	IB	BS			2	2	2	Existing station downstream of Target Area	-99.526197	27.304689

Segment/AU	Region	Station Description	Station ID	Collecting Entity	Monitoring Type	Inst. Flow	Est. Flow	E. coli Bacteria	FC Bacteria	Field	Justification for Station	POINT_X	POINT_Y
2304_01	16	RIO GRANDE AT THE SAN ISIDRO PUMP STATION	13194	IB	BS			2	2	2	Existing station downstream of Target Area	-99.494096	27.267425
2304_01	16	RIO GRANDE AT WEBB/ZAPATA COUNTY LINE	15817	IB	BS		2	2	2	2	Routine Station	-99.45354	27.264922

Data for the stations already in SWQMIS will be reported to TCEQ for data upload and assessment. These stations are 13202, 13160, 13162, 13163, 13164, 13165, 13167, 15814, 13142, 13144, 13140, 13200, 13698, 13148, 13199, 13101, 13198, 13155, 13158, 15815, 13100, 13196, 15816, 13195, 13194, and 15817. All other points are temporary stations being sampled only for informational purposes for this study.

Figure 6 SS-B1.1 Sampling Site Map

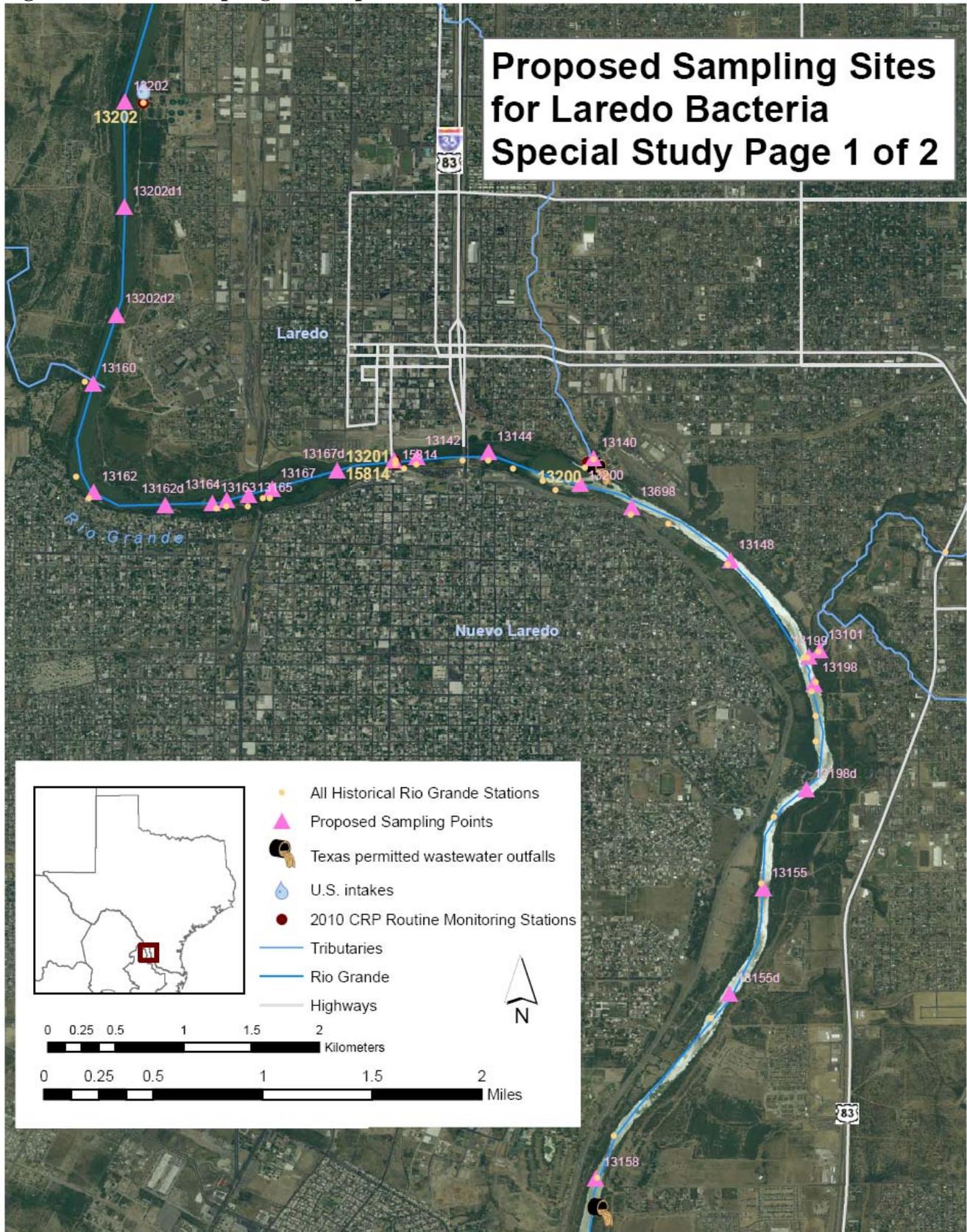
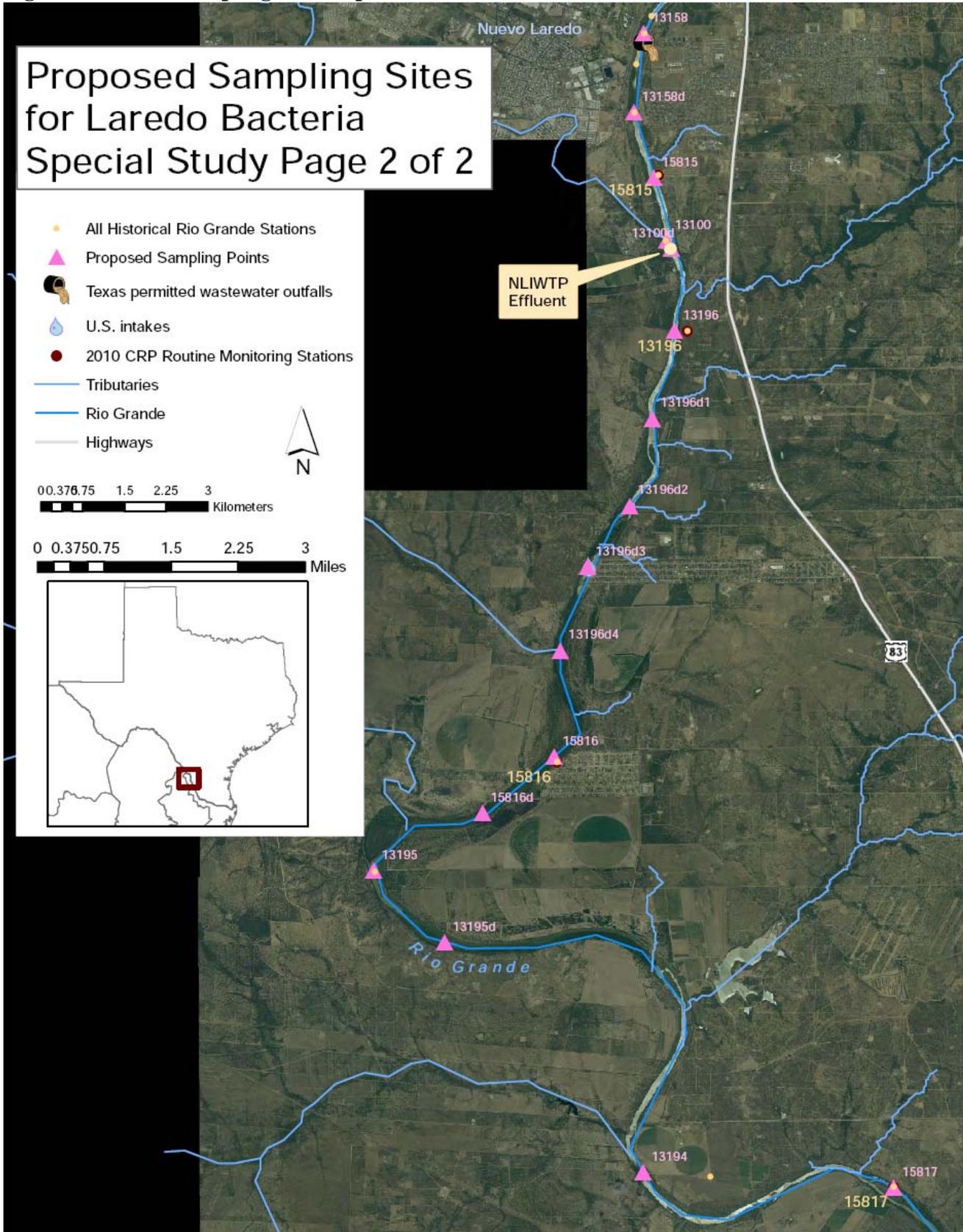


Figure 7 SS-B1.2 Sampling Site Map



## Sample Design Rationale and Site Selection Criteria

The sample design rationale is based on the intent of the study to characterize the spatial distribution of the bacteria impairment in Segment 2304 by sampling at half-mile intervals between stations that have historically picked up high bacterial counts. To this end, 40 sites have been selected based on distance from beginning station 13202, with the intent to assess the progressive impairment along the water body and the impact of anthropogenic sources (i.e., wastewater and agricultural discharges). In addition, the study will include a survey of all structures and discharges in the study area.

## SS-B2 SAMPLING METHODS

### Field Sampling Procedures.

As described in Section B2 of the basin-wide QAPP.

### Sample volume, container types, minimum sample volume, preservation requirements, and holding time requirements.

As described below in Table SS-B2.

**Table 3 SS-B2. Sample Storage, Preservation, and Handling Requirements**

Parameter	Matrix	Container	Preservation	Sample Volume	Holding Time
<i>E. coli</i> bacteria (31699)	Water	Polystyrene	Cool to 4 C Sodium thiosulfate	120 ml	6-8 hours
Fecal Coliform (31616)	Water	Polystyrene	Cool to 4 C Sodium Thiosulfate	120 ml	6-8 hours

### Sample Containers

Sample containers are delivered in coolers to Laredo by TAMIU staff or other study participant. Sterilized, shrink-banded 120 ml polystyrene vessels preserved with sodium thiosulfate.

### Processes to Prevent Contamination

As described in Section B2 of the basin-wide QAPP.

### Documentation of Field Sampling Activities

Field sampling activities are documented on the field data reporting forms shown on the next page. The following data will be recorded at each of the 34 stations:

1. Station ID and station description
2. GPS coordinates of special study station
3. Sampling Date and time
4. Sampling depth
5. Sample collector's name/signature
6. Values for field parameters shown in Table SS-A7.1
7. Detailed observational data such as water appearance, unusual odors, and more, as listed in the *TCEQ Surface Water Quality Monitoring Procedures Vol.1*

**Recording Data**

As described in Section B2 of the basin-wide QAPP.

**Sampling Method Requirements or Sampling Process Design Deficiencies, and Corrective Action**

As described in Section B2 of the basin- wide QAPP.

**UNITED STATES INTERNATIONAL BOUNDARY AND WATER COMMISSION  
TEXAS CLEAN RIVERS PROGRAM  
RIO GRANDE BASIN  
Special Study: Bacteria Characterization in Segment 2304**

***FIELD DATA REPORTING FORM***

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Station Description \_\_\_\_\_

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0	.	3	0																	
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00010		WATER TEMP (deg C only)
00400		pH (SU)
00300		D.O. (mg/L)
00094		SPECIFIC CONDUCTANCE (uS/cm)
72053		DAYS SINCE LAST SIGNIFICANT PRECIPITATION
00061		INSTANTANEOUS FLOW (cfs)
89835		FLOW MEASUREMENT METHOD 1-Gage      2-Electric 3-Mechanical      4-Weir/flume      5-Doppler
74069		ESTIMATED FLOW (cfs)
89966		PRESENT WEATHER 1-clear      2- partly cloudy 3-cloudy      4-rain      5- other

Measurement Comments and Field Observations:

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Signature of Collector: \_\_\_\_\_

Rev. 1/19/11

## **SS-B3 SAMPLING HANDLING AND CUSTODY**

### **Sample Tracking**

The Chain of Custody (COC) sheet for this study is shown on the following page. COC form will include date and time of collection, site identification, sample matrix, number of containers, preservative used, analyses required, name of collector, custody transfer signatures, and the shipping bill information. Additional information is provided in Section B3 of the basin-wide QAPP.

### **Sample Labeling**

Samples from the field are labeled on the container or container label with a permanent marker. Label information includes: site identification and the date and time of sampling.

### **Sample Handling**

As described in Section B3 of the basin-wide QAPP.

### **Sample Tracking Procedure Deficiencies and Corrective Action**

As described in Section B3 of the basin-wide QAPP.

**UNITED STATES INTERNATIONAL BOUNDARY AND WATER  
COMMISSION - TEXAS CLEAN RIVERS PROGRAM  
RIO GRANDE BASIN PARTNER  
WATER QUALITY CHAIN OF CUSTODY/REQUEST FOR ANALYSIS FORM  
Special Study: Bacteria Characterization in Segment 2304**

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TAG#

Laredo Health Dept. Lab LABORATORY
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COC/LAB #

**CHAIN OF CUSTODY**

**CLIENT INFORMATION**

Released by (printed): \_\_\_\_\_ Requested by: \_\_\_\_\_

Signature: \_\_\_\_\_ Collected by: \_\_\_\_\_

Date/Time: \_\_\_\_\_ Signature: \_\_\_\_\_

Received by (printed): \_\_\_\_\_ Segment/Sequence: 2304

Signature: \_\_\_\_\_ Matrix Type: water

Date/Time: \_\_\_\_\_ Preservative used: sodium thiosulfate

No. Of Containers: \_\_\_\_\_

Invoice Information: \_\_\_\_\_

Analysis Requested:

Conventionals			
Storet Code	Analyze if checked	Contract line no.	Parameter
31699	√		E. Coli bacteria
31619	√		Fecal coliform bacteria

Please submit report to: Texas Clean Rivers Program  
USIBWC  
4171 N. Mesa, Suite C-100  
El Paso, TX 79902

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## USIWBC - CRP CHAIN OF CUSTODY

Station ID	Site Description	Sample Collection Date	Sample Collection Time
13202	Rio Grande Laredo Water Treatment Plant Pump Intake		
13202d1	0.5 mi downstream of 13202		
13202d2	1 mile downstream of 13202		
13160	Unnamed Mexican Tributary to Rio Grande Approximately 2 River km Upstream of Missouri-Pacific Railroad Bridge in Laredo		
13162	Avenida Monterrey Drain 1 Meter Upstream of Confluence with Rio Grande 1.1 km Upstream of Missouri-Pacific Railroad Bridge in Laredo		
13162d	0.5 mile downstream of 13162		
13163	Nuevo Laredo Water Treatment Plant Return Flow Approximately 0.3 km Upstream of Missouri-Pacific Railroad Bridge in Laredo		
13164	Avenida America Drain 1 Meter Upstream of Confluence with Rio Grande 0.2 km Upstream of Missouri-Pacific Railroad Bridge in Laredo		
13165	Avenida Abasolo Drain 1 Meter Upstream of Confluence with Rio Grande 0.06 km Upstream of Missouri-Pacific Railroad Bridge in Laredo		
13167	Avenida Donato Guerra Drain 1 Meter From Confluence with Rio Grande 60 m Downstream of Missouri-Pacific Railroad Bridge in Laredo		
13167d	0.3 miles downstream of 13167		
15814	Rio Grande at International Bridge #2/East Bridge in Laredo		
13142	Unnamed Mexican Drain 1 meter Upstream of Confluence with Rio Grande Approximately 145 meters downstream of US 81 Bridge in Laredo		
13144	Unnamed Mexican Drain 1 meter Upstream of Confluence with Rio Grande Approximately 140 meters downstream of San Dario Bridge Laredo		
13140	Zacate Creek 70 meters Upstream of Confluence with Rio Grande Which is 1.4 km Downstream of US 81 Bridge Convent Ave.		
13200	Rio Grande 50 YD Upstream of Confluence of Zacate Creek and Rio Grande		
13698	Rio Grande 1.1 mile Downstream From Highway Bridge Between Laredo and Nuevo Laredo		
13148	Unnamed Mexican Drain 1 Meter Upstream of Confluence with Rio Grande Approximately 2.0 km Downstream of San Dario Bridge in Laredo		
13199	Rio Grande 50 Meters Upstream of Confluence with Chacon Creek		
13101	Chacon Creek 100 Meters Upstream of the Confluence with Rio Grande in Southeast Laredo		
13198	Rio Grande 150 YD Downstream of Confluence of Chacon Creek and Rio Grande		
13198d	0.5 mile downstream of 13198		
13155	Unnamed Mexican Drain 1 Meter Upstream of Confluence with Rio Grande 5.1 km Downstream of US 81 Bridge in Laredo		
13155d	0.5 mile downstream of 13155		
13158	Unnamed Mexican Drain 1 Meter Upstream of Confluence with Rio Grande 7.6 km Downstream of US 81 Bridge in Laredo		
13158d	0.7 Miles Downstream of Laredo NPDES Permit 10681-003		
15815	Rio Grande at Masterson Rd in Laredo 9.9 km Dwnstr of Intl Bridge #1/West Bridge Dwnstr Southside WWTP and Upstream Nuevo Laredo WWTP		

13100	Arroyo El Coyote Mexican Tributary to the Rio Grande Sampled 1 Meter Upstream of its Confluence with Rio Grande		
13100d	NLIWTP effluent		
13196	Rio Grande at Pipeline Crossing 8.7 mi Downstream Laredo		
13196d1	1 mile downstream of 13196		
13196d2	2 miles downstream of 13196		
13196d3	Webb County Water Utilities Intake		
13196d4	1 mile downstream of Webb Intake at Mexican Tributary		
15816	Rio Grande at Rio Bravo 0.5km Dwnstr of the Community of el Cenizo		
15816d	1 mile downstream of 15816		
13195	Rio Grande Near Isla Mesteno at Irrigation Pump 350 Meters Downstream of Isla Mesteno 22.4 km South of Laredo		
13195d	1 mile downstream of 13195		
13194	Rio Grande at the San Isidro Pump Station		
15817	Rio Grande at Webb/Zapata County Line		

Special Study: Bacteria Characterization in Segment 2304

COC page 3 of 3

## **SS-B4 ANALYTICAL METHODS**

The analytical methods, associated matrices, and performing laboratories are listed in Table SS-A7.1 of Section SS-A7. The authority for analysis methodologies under the Clean Rivers Program is derived from the TSWQS (§§307.1 - 307.10) in that data generally are generated for comparison to those standards and/or criteria. Laboratories collecting data under this QAPP are compliant with the NELAC standards. Copies of laboratory QMs and SOPs are available for review by the TCEQ.

### **Standards Traceability**

As described in Section B4 of the basin-wide QAPP.

### **Analytical Method Deficiencies and Corrective Actions**

As described in Section B4 of the basin-wide QAPP.

## **SS-B5 QUALITY CONTROL**

### **Sampling Quality Control Requirements and Acceptability Criteria**

As described in Section B5 of the basin-wide QAPP.

### **Laboratory Measurement Quality Control Requirements and Acceptability**

As described in Section B5 of the basin-wide QAPP.

### **Quality Control or Acceptability Requirements Deficiencies and Corrective Actions**

As described in Section B5 of the basin-wide QAPP.

## **SS-B6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION AND MAINTENANCE**

As described in Section B6 of the basin-wide QAPP.

## **SS-B7 INSTRUMENT CALIBRATION AND FREQUENCY**

As described in Section B7 of the basin-wide QAPP.

## **SS-B8 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES**

As described in Section B8 of the basin-wide QAPP.

## **SS-B9 NON-DIRECT MEASUREMENTS**

This QAPP does not include the use of data obtained from non-direct measurement sources.

## **SS-B10 DATA MANAGEMENT**

As described in Section B10 of the basin-wide QAPP.

## **SS-C1 ASSESSMENTS AND RESPONSE ACTIONS**

As described in Section C1 of the basin-wide QAPP.

### **Corrective Action**

As described in Section C1 of the basin-wide QAPP.

## **SS-C2 REPORTS TO MANAGEMENT**

### **Reports to USIBWC Project Management**

As described in Section C2 of the basin-wide QAPP.

### **Reports to TCEQ Project Management**

As described in Section C2 of the basin-wide QAPP. A Report of this special study will be finalized after Phase II.

### **Reports by TCEQ Project Management**

As described in Section C2 of the basin-wide QAPP.

## **SS-D1 DATA REVIEW, VERIFICATION, AND VALIDATION**

As described in Section D1 of the basin-wide QAPP.

## **SS-D2 VERIFICATION AND VALIDATION**

As described in Section D2 of the basin-wide QAPP.

## **SS-D3 RECONCILIATION WITH USER REQUIREMENTS**

As described in Section D3 of the basin-wide QAPP.