

Quality Assurance Project Plan Rio Grande Basin Monitoring Program USIBWC Clean Rivers Program

***4171 N. Mesa St., Ste. C-100
El Paso, Texas 79902***

Clean Rivers Program

Water Quality Planning Division

Texas Commission on Environmental Quality

P.O. Box 13087, MC 234

Austin, Texas 78711-3087

Effective Period: FY 2018 to FY 2019

Questions concerning this QAPP should be directed to:

**Leslie Grijalva
USIBWC El Paso Headquarters Program Manager
4171 N. Mesa St., Ste. C-100
El Paso, TX 79902
(915) 832-4770
Leslie.Grijalva@ibwc.gov**

A1 Approval Page

Texas Commission on Environmental Quality

Water Quality Planning Division



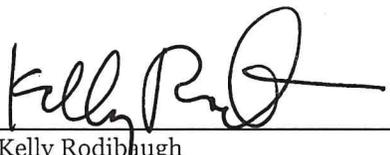
Kyle Girtten, Manager
Water Quality Monitoring and Assessment
Section

8/30/17
Date



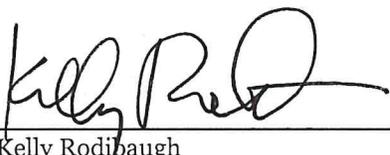
Sarah Eagle, Work Leader
Clean Rivers Program

8/30/17
Date



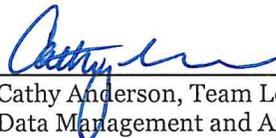
Kelly Rodibaugh
Project Quality Assurance Specialist
Clean Rivers Program

8/30/2017
Date



Kelly Rodibaugh
Project Manager
Clean Rivers Program

8/30/2017
Date



Cathy Anderson, Team Leader
Data Management and Analysis

8/30/2017
Date

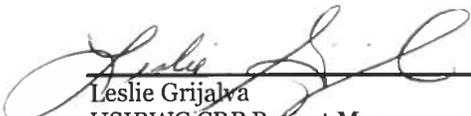
Monitoring Division



Sharon Coleman
TCEQ QA Manager and Acting Lead CRP QA Specialist

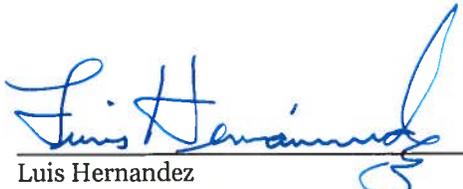
8/30/2017
Date

**United States Section, International Boundary and Water
Commission (USIBWC), Environmental Management Division**



Leslie Grijalva Date 8-28-17
USIBWC CRP Project Manager and
Acting USIBWC CRP Quality Assurance Officer

**United States Section, International Boundary and Water
Commission (USIBWC), Operations and Maintenance Division**

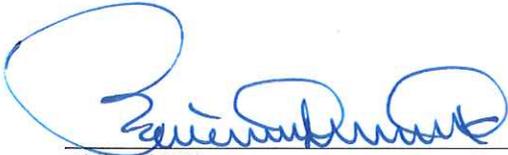


Luis Hernandez Date 8/28/2017
USIBWC Operations and Maintenance Division Chief

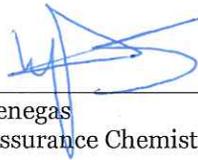
City of Laredo Health Department Laboratory

 8/23/2017
Rebeca Castro Date
Technical Director/Quality Assurance Manager
For the Environmental Division of the Laboratory

El Paso Water Public Service Board, International Water Quality Laboratory


Richard Wilcox
Laboratory Manager

8-23-17
Date


Miguel Venegas
Quality Assurance Chemist

8-28-17
Date

Brownsville Public Utilities Board (BPUB) Laboratory



Lee Roy Atkinson
Laboratory Manager

8/22/2017
Date



Gabriel Coronado
Quality Assurance Specialist

8/22/2017
Date



Julian Alvarado
Quality Assurance Specialist

8/22/2017
Date

The USIBWC CRP will secure written documentation from each sub-tier project participant (e.g., subcontractors, subparticipants, or other units of government) stating the organization's awareness of and commitment to requirements contained in this quality assurance project plan and any amendments or added appendices of this plan. Alternatively, additional signature blocks for sub-tier participants may be added to section A1. Signatures in section A1 will eliminate the need for adherence letter maintenance. The USIBWC CRP will maintain this documentation as part of the project's quality assurance records, and will ensure the documentation is available for review.

A2 Table of Contents

A1	Approval Page.....	2
A2	Table of Contents.....	8
	List of Acronyms	9
A3	Distribution List	10
A4	Project/Task Organization.....	10
	Figure A4.1. Organization Chart - Lines of Communication.....	16
A5	Problem Definition/Background.....	17
A6	Project/Task Description	20
A7	Quality Objectives and Criteria.....	23
A8	Special Training/Certification	25
A9	Documents and Records	25
	Table A9.1 Project Documents and Records	25
B1	Sampling Process Design.....	27
B2	Sampling Methods	27
	Table B2.1 Sample Storage, Preservation and Handling Requirements.....	27
B3	Sample Handling and Custody.....	32
B4	Analytical Methods	34
B5	Quality Control.....	35
B6	Instrument/Equipment Testing, Inspection, and Maintenance	39
B7	Instrument Calibration and Frequency	39
B8	Inspection/Acceptance of Supplies and Consumables	40
B9	Acquired Data.....	40
B10	Data Management	40
C1	Assessments and Response Actions.....	45
	Table C1.1 Assessments and Response Requirements.....	45
	Figure C1.1 Corrective Action Process for Deficiencies.....	47
C2	Reports to Management	48
	Table C2.1 QA Management Reports.....	48
D1	Data Review, Verification, and Validation.....	50
D2	Verification and Validation Methods	50
	Table D2.1: Data Review Tasks	51
D3	Reconciliation with User Requirements	53
	Appendix A: Measurement Performance Specifications (Table A7.1)	54
	Appendix B: Task 3 Work Plan & Sampling Process Design and Monitoring Schedule (Plan)	56
	Appendix C: Station Location Maps	80
	Appendix D: Field Data Sheets.....	82
	Appendix E: Chain of Custody Forms.....	88
	Appendix F: Data Review Checklist and Summary.....	98
	Attachment 1- Example Letter to Document Adherence to this QAPP.....	123

List of Acronyms

AWRL	Ambient Water Reporting Limit
BBNP	Big Bend National Park
BBRSP	Big Bend Ranch State Park
BMP	Best Management Practices
BPUB	Brownsville Public Utilities Board
CAP	Corrective Action Plan
CE	Collecting Entity
COC	Chain of Custody
CRP	Clean Rivers Program
DMRG	Data Management Reference Guide, December 2016, or most recent version
DM&A	Data Management and Analysis
EPCC	El Paso Community College
EPW	El Paso Water Utilities
EPA	United States Environmental Protection Agency
FY	Fiscal Year
GIS	Geographical Information System
GPS	Global Positioning System
IWQL	El Paso Water Utilities International Water Quality Laboratory
LAN	Local Area Network
LCS	Laboratory Control Sample
LCS D	Laboratory Control Sample Duplicate
LIMS	Laboratory Information Management System
LOD	Limit of Detection
LOQ	Limit of Quantitation
MC	Midland College
MT	Monitoring Type
NELAP	National Environmental Lab Accreditation Program
PM	Project Manager
QA	Quality Assurance
QAM	Quality Assurance Manual
QM	Quality Manual
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QAS	Quality Assurance Specialist
QC	Quality Control
QMP	Quality Management Plan
RGBMP	Rio Grande Basin Monitoring Program
RT	Routine Monitoring
SE	Submitting Entity
SLOC	Station Location
SOP	Standard Operating Procedure
SWQM	Surface Water Quality Monitoring
SWQMIS	Surface Water Quality Monitoring Information System
TAMU	Texas A&M International University
TMDL	Total Maximum Daily Load
TPWD	Texas Parks and Wildlife Department
TCEQ	Texas Commission on Environmental Quality
TNI	The NELAC Institute
TSWQS	Texas Surface Water Quality Standards
VOA	Volatile Organic Analytes
USIBWC	U.S. International Boundary and Water Commission
UTEP	University of Texas at El Paso
UTRGV	University of Texas Rio Grande Valley

A3 Distribution List

**Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087**

Kelly Rodibaugh, Project Manager
Clean Rivers Program
MC-234
(512) 239-1739

Sharon Coleman
TCEQ Quality QA Manager and Acting Lead CRP
Quality Assurance Specialist
MC-165
(512) 239-6340

Cathy Anderson
Team Leader, Data Management and Analysis
MC-234
(512) 239-1805

**United States Section, International Boundary and Water Commission (USIBWC)
4171 N. Mesa St., Ste. C-100
El Paso, Texas 79902**

Leslie Grijalva, USIBWC El Paso Headquarters
Program Manager and Acting Quality Assurance Officer
(915) 832-4770

USIBWC Field Office- American Dam/Carlos Marin Field Office
2616 W. Paisano Drive
El Paso, TX 79922-1629

Attention: Area Project Manager
(915) 351-1030

USIBWC Field Office- Amistad Dam Field Office
670 Texas Spur 349
Del Rio, TX 78840-0425

Attention: Area Project Manager
(830) 775-2437

USIBWC Field Office- Falcon Dam Field Office
PO Box 1
FM 2098, Reservoir Road
Falcon Heights, TX 78545-0001

Attention: Area Project Manager
(956) 848-5211

USIBWC Field Office- Mercedes Field Office
325 Golf Course Road
Mercedes, TX 78570-9677

Attention: Area Project Manager
(956) 565-3150

USIBWC Field Office- Presidio Field Office
PO Box 848
110 South Dod Avenue
Presidio, TX 79485-0848

Attention: Area Project Manager
(432) 229-3751

USIBWC Field Office- Laredo Field Office
1 West End Washington St.
Building P27
Laredo, TX 78040-4343

Attention: Area Project Manager
(956) 726- 2963

A&B Environmental Services, Inc.
10100 East Freeway, Ste. 100
Houston, Texas 77029

Yuhui Zhang, Laboratory Manager
(713) 453-6060

Mark Johnston, Quality Assurance Officer
(713) 453-6060

Brownsville Public Utilities Board- Analytical Laboratory
1425 Robinhood Drive, P.O. Box 3270
Brownsville, TX 78523-3270

LeeRoy Atkinson, Laboratory Manager
(956) 983-6357

Gabriel Corondado, Quality Assurance Specialist
(956) 983-6253

Julian Alvarado, Quality Assurance Specialist
(956) 983- 6100

El Paso Water
International Water Quality Laboratory
4100 Delta Drive, P.O. Box 511
El Paso, TX 79961

Richard Wilcox, Laboratory Manager
(915) 594-5444

Miguel Venegas, Quality Assurance Chemist
(915) 594-5421

City of Laredo Health Department Laboratory
2600 Cedar- P.O. Box 2337
Laredo, TX 78044-2337

Rebeca Castro, Technical Director and Quality Assurance Manager
(956) 795- 4908 ext. 4693

City of Laredo Health Department
2600 Cedar, P.O. Box 2337
Laredo, TX 78044-2337

Samuel Gonzalez
(956) 740-3964

Daniel Maldonado, Sanitation Inspector
(956) 795- 4904 ext. 4626

Lupe Luna, Sanitation Inspector
(956) 795- 4904 ext. 4624

USIBWC FY18-19 QAPP
Last revised on August 30, 2017

**City of Laredo Environmental Services Department
619 Reynolds St.
Laredo, TX 78040**

John Porter, Director
(956) 794-1650

Lucky Roncinske, Environmental Technician II
(956) 794-1650

**Texas Parks and Wildlife Department
State Parks Region 1 Director
P.O. Box 1079
Fort Davis, Texas 79734**

Nicolas Havlik
(432) 426-3533 ext. 239

**Barton Warnock Education Center
HC 70 Box 375
Terlingua, Texas 79852**

Tim Gibbs
(432) 424-3327

**Big Bend National Park
Science & Resource Management
266 Tecolote Drive
Big Bend National Park, TX 79834**

Jeff Bennett, Physical Scientist
(432) 477-1141 or (432) 837-9964

**University of Texas Rio Grande Valley- Edinburg
Department of Civil Engineering
1201 West University Drive
Edinburg, TX 78539-2999**

Dr. Jungseok Ho, Assistant Professor
(956) 665-3104

**Sul Ross State University, Rio Grande Research Center
Box 64
Sul Ross State University
Alpine, TX 79832**

Dr. Kevin Urbanczyk, Ph.D.
Director, Rio Grande Research Center
Professor, BGPS
(432) 837-8110

**El Paso Community College
P.O. Box 20500
El Paso, TX 79998**

USIBWC FY18-19 QAPP
Last revised on August 30, 2017

Dr. Maria E. Alvarez, Professor of Biology, Biology District-Wide Coordinator,
and MBRS-RISE and MSEIP Program Director
(915) 831-5074

Department of Biological Sciences
University of Texas at El Paso
500 W University Ave.
El Paso, Texas 79968-0519

Dr. Elizabeth Walsh, Professor
(915) 747-5421

The USIBWC CRP will provide copies of this project plan and any amendments or appendices of this plan to each person on this list and to each sub-tier project participant, e.g., subcontractors, sub-participant, or other units of government. The USIBWC Headquarters will document distribution of the plan and any amendments and appendices, maintain this documentation as part of the project's quality assurance records, and will ensure the documentation is available for review.

A4 PROJECT/TASK ORGANIZATION

Description of Responsibilities

TCEQ

Sarah Eagle

CRP Work Leader

Responsible for Texas Commission on Environmental Quality (TCEQ) activities supporting the development and implementation of the Texas Clean Rivers Program (CRP). Responsible for verifying that the TCEQ Quality Management Plan (QMP) is followed by CRP staff. Supervises TCEQ CRP staff. Participates in the development, approval, implementation, and maintenance of written QA standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Reviews and responds to any deficiencies, corrective actions, or findings related to the area of responsibility. Oversees the development of Quality Assurance (QA) guidance for the CRP. Reviews and/or approves all QA audits, corrective actions, evaluations, reports, work plans, contracts, QAPPs, and TCEQ Quality Management Plan. Enforces corrective action, as required, where QA protocols are not met. Ensures CRP personnel are fully trained.

Sharon Coleman

Acting CRP Lead Quality Assurance Specialist

Participates in the development, approval, implementation, and maintenance of written QA standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Assists program and project manager in developing and implementing quality system. Serves on planning team for CRP special projects. Coordinates the review and approval of CRP QAPPs. Prepares and distributes annual audit plans. Conducts monitoring systems audits of Planning Agencies. Concurs with and monitors implementation of corrective actions. Conveys QA problems to appropriate management. Recommends that work be stopped in order to safeguard programmatic objectives, worker safety, public health, or environmental protection. Ensures maintenance of QAPPs and audit records for the CRP.

Kelly Rodibaugh

CRP Project Manager

Responsible for the development, implementation, and maintenance of CRP contracts. Tracks, reviews, and approves deliverables. Participates in the development, approval, implementation, and maintenance of written QA standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Assists CRP Lead QA Specialist in conducting Basin Planning Agency audits. Verifies QAPPs are being followed by Basin Planning Agency and that projects are producing data of known quality. Coordinates project planning with the Basin Planning Agency Project Manager. Reviews and approves data and reports produced by the Basin Planning Agency. Notifies QA Specialists of circumstances which may adversely affect the quality of data derived from the collection and analysis of samples. Develops, enforces, and monitors corrective action measures to ensure the Basin Planning Agency meets deadlines and scheduled commitments.

Cathy Anderson

Team Leader, Data Management and Analysis (DM&A) Team

Participates in the development, approval, implementation, and maintenance of written QA standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Develops and maintains data management-related SOPs for CRP data management. Ensures DM&A staff perform data management-related tasks.

Peter Bohls

CRP Data Manager, DM&A Team

Responsible for coordination and tracking of CRP data sets from CRP Project Manager review through approval. Ensures that data are reported following instructions in the DMRG. Runs automated data validation checks in SWQMIS and coordinates data verification and error correction with CRP Project Managers. Generates SWQMIS summary reports to assist CRP Project Managers' data review. Identifies data anomalies and inconsistencies. Provides training and guidance to CRP and Planning Agencies on technical data issues to ensure that data are submitted according to documented procedures. Reviews QAPPs for valid stream monitoring stations. Checks validity of parameter codes, submitting entity code(s), collecting entity code(s), and monitoring type code(s). Develops and maintains data management-related SOPs for CRP data management. Coordinates and processes USIBWC FY18-19 QAPP

data correction requests. Participates in the development, implementation, and maintenance of written QA standards (e.g., Program Guidance, SOPs, QAPPs, QMP).

Kelly Rodibaugh

CRP Project Quality Assurance Specialist

Serves as liaison between CRP management and TCEQ QA management. Participates in the development, approval, implementation, and maintenance of written QA standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Serves on planning team for CRP special projects and reviews QAPPs in coordination with other CRP staff. Coordinates documentation and implementation of corrective action for the CRP.

United States Section, International Boundary and Water Commission (USIBWC)

Gilbert Anaya

USIBWC Environmental Management Division Chief

Responsible for oversight of the USIBWC El Paso Headquarters Program and Clean Rivers Program at the USIBWC. Performs evaluations of USIBWC El Paso Headquarters personnel. Cost Center Manager for the USIBWC El Paso Headquarters budget.

Luis Hernandez

USIBWC Operations and Maintenance Division Chief

Responsible for oversight of the USIBWC field offices that are considered Rio Grande Basin Clean Rivers Program partners.

Leslie Grijalva

USIBWC El Paso Headquarters Program Manager

Responsible for implementing and monitoring CRP requirements in contracts, QAPPs, and QAPP amendments and appendices. Coordinates basin planning activities and work of basin partners. Ensures monitoring systems audits are conducted to ensure QAPPs are followed by USIBWC participants and that projects are producing data of known quality. Ensures that sub participants are qualified to perform contracted work. Ensures CRP project managers and/or QA Specialists are notified of deficiencies and corrective actions, and that issues are resolved. Responsible for validating that data collected are acceptable for reporting to the TCEQ. Responsible for validating that data collected are acceptable for reporting to the TCEQ. Responsible for ensuring that field data are properly reviewed and verified. Responsible for the transfer of basin quality-assured water quality data to the TCEQ in a format compatible with the instructions in the SWQM Data Management Reference Guide (DMRG), December 2016 or most recent. Maintain quality-assured data on USIBWC internal sites.

Leslie Grijalva

Acting USIBWC El Paso Headquarters Quality Assurance Officer

Responsible for coordinating the implementation of the QA program. Responsible for writing and maintaining this QAPP and monitoring its implementation. Responsible for maintaining records of QAPP distribution, including appendices and amendments. Responsible for maintaining written records of sub-tier commitment to requirements specified in this QAPP. Responsible for identifying, receiving, and maintaining project QA records. Responsible for coordinating with the TCEQ QAS to resolve QA-related issues. Notifies the USIBWC El Paso Headquarters Program Manager of particular circumstances which may adversely affect the quality of data. Coordinates and monitors deficiencies and corrective action. Coordinates and maintains records of data verification and validation. Coordinates the research and review of technical QA material and data related to water quality monitoring system design and analytical techniques. Conducts monitoring systems audits on project participants to determine compliance with project and program specifications, issues written reports, and follows through on findings. Ensures that field staff is properly trained and that training records are maintained. Responsible for ensuring that field data are properly reviewed and verified. Responsible for the transfer of basin quality-assured water quality data to the TCEQ in the TCEQ required format. Maintain quality-assured data on USIBWC internet sites.

Leslie Grijalva**USIBWC Data Manager**

Responsible for ensuring that field data are properly reviewed and verified. Responsible for the transfer of basin quality-assured water quality data to the TCEQ in a format compatible with SWQMIS. Maintains quality-assured data on USIBWC internet sites.

A&B Environmental Services, Inc.**Yuhui Zhang****A&B Environmental Services, Inc., Laboratory Manager**

Responsible for implementing and monitoring CRP requirements in contracts, QAPPs, and QAPP amendments and appendices. Responsible for project coordination at A&B, providing support to IBWC at each program stage: QAPP development, sampling, sample receipt and login, analyses, and data reporting. Responsible for quality assurance of reported analyses performed by A&B and may perform validation and verification of data before the laboratory report is sent to USIBWC. Notifies the USIBWC El Paso Headquarters Program Manager of particular circumstance which may adversely affect the quality of data. Responsible for coordinating with A&B and USIBWC El Paso Headquarters Program Manager to resolve QA-related issues. Implements and ensures implementation of corrective action needed to resolve nonconformance noted during assessments.

Mark Johnston**A&B Environmental Services, Inc., Quality Assurance Officer**

Responsible for the overall quality control and quality assurance of analyses performed by A&B. Monitors implementation of the QAM/QAPP within the laboratory to ensure complete compliance with QA data quality objectives, as defined by the contract and in this QAPP. Conducts in-house audits to ensure compliance with written SOPs and to identify potential problems. Responsible for supervising and verifying all aspects of QA/QC in the laboratory.

RIO GRANDE BASIN CRP PARTNERS

The Program Manager, QAO, and Data Manager for all of the below listed partners are the same as listed above for USIBWC, unless otherwise noted.

US International Boundary and Water Commission, Field Offices

Manages data collection activities and generates the work orders for water quality monitoring at five field offices along the Texas portion of the Rio Grande. The area operations managers direct activities on the local level as follows: American Dam Field Office, Amistad Dam Field Office, Falcon Dam Field Office, Mercedes Field Office, Laredo Field Office and the Presidio Field Office. Samples collected by the Amistad Dam, Falcon Dam, Mercedes Laredo and Presidio field offices are shipped to A&B Lab Services, Inc. for analysis. American Dam submits their samples to the El Paso Water Laboratory for analysis.

Lee Roy Atkinson, Laboratory Manager**Brownsville Public Utilities Board (BPUB) Laboratory**

Responsible for implementing and monitoring CRP requirements in contracts, QAPPs, and QAPP amendments and appendices. Responsible for water quality monitoring, analysis, and data review of Station 20449 in Brownsville, TX. Samples are collected and analyzed by the BPUB laboratory as part of their regular permit monitoring and provided to the USIBWC CRP.

Gabriel Coronado and Julian Alvarado, Quality Assurance Specialists**Brownsville Public Utilities Board (BPUB) Laboratory**

Responsible for the review of laboratory data and laboratory techniques performed at the BPUB laboratory. Responsible for the overall quality control and quality assurance of analyses performed by the BPUB laboratory.

Monitors implementation of the QM/QAPP within the laboratory to ensure complete compliance with QA data quality objectives, as defined by this QAPP. Conducts internal annual audits to ensure compliance with written SOPs, identify potential problems and initiate Corrective Action Reports and files. Responsible for supervising and verifying all aspects of QA/QC in the laboratory.

Richard Wilcox, Laboratory Manager

El Paso Water International Water Quality Laboratory (EPW)

Responsible for implementing and monitoring CRP requirements in contracts, QAPPs, and QAPP amendments and appendices. Responsible for water quality laboratory analysis and data review for samples collected by USIBWC American Dam Field Office. Responsible for sending data monthly to the USIBWC CRP.

Miguel Venegas, Quality Assurance Chemist

El Paso Water International Water Quality Laboratory (EPW)

Responsible for the review of laboratory data and laboratory techniques performed at the EPW laboratory. Responsible for the overall quality control and quality assurance of analyses performed by the EPW laboratory. Monitors implementation of this QM/QAPP within the laboratory to ensure complete compliance with QA data quality objectives, as defined by this QAPP. Conducts internal annual audits to ensure compliance with written SOPs, identify potential problems and initiate Corrective Action Reports and files. Responsible for supervising and verifying all aspects of QA/QC in the laboratory.

Rebeca Castro, Technical Director/ Quality Assurance Officer

City of Laredo Health Department Laboratory

Responsible for the review of laboratory data and laboratory techniques performed at the City of Laredo Health Department laboratory. Responsible for the overall quality control and quality assurance of analyses performed by the City of Laredo Health Department laboratory. Monitors implementation of this QM/QAPP within the laboratory to ensure complete compliance with QA data quality objectives, as defined by this QAPP. Conducts internal annual audits to ensure compliance with written SOPs, identify potential problems and initiate Corrective Action Reports and files. Responsible for supervising and verifying all aspects of QA/QC in the laboratory.

Samuel Gonzalez, Chief of Environmental Health Services

City of Laredo Health Department

Responsible for supervising water quality monitoring staff at the City of Laredo Health Department.

Daniel Maldonado and Lupe Luna, Sanitation Inspectors

City of Laredo Health Department

Responsible for water quality monitoring for samples collected in the Laredo area of the Rio Grande. Samples collected are submitted to the City of Laredo Health Department Laboratory for analysis. Ensures that samples are collected according to methods specified in this QAPP and the latest version of the SWQM Procedures.

John Porter, Director

City of Laredo Environmental Services Department

Responsible for supervising water quality monitoring staff at the City of Laredo Environmental Services Department.

Lucky Roncinske

City of Laredo Environmental Services Department

Responsible for water quality monitoring samples collected on Manadas Creek in the Laredo area. Samples collected are submitted to A&B Environmental Services, Inc. for analysis. Ensures that samples are collected according to methods specified in this QAPP and the latest version of the SWQM Procedures.

Nicolas Havlik

Texas Parks and Wildlife Department, Natural Resources Program

Responsible for water quality monitoring at stations in Big Bend Ranch State Park. Water samples collected are submitted to A&B Environmental Services, Inc. for analysis.

Tim Gibbs

Texas Parks and Wildlife Department, Barton Warnock Education Center

Responsible for water quality monitoring at stations in Big Bend Ranch State Park. Water samples collected are submitted to A&B Environmental Services, Inc. for analysis. Ensures that samples are collected according to methods specified in this QAPP and the latest version of the SWQM Procedures.

Jeff Bennett

Big Bend National Park

Responsible for water quality monitoring in the Big Bend National Park and Rio Grande Wild and Scenic River. Samples collected are submitted to A&B Environmental Services, Inc. for analysis. Ensures that samples are collected according to methods specified in this QAPP and the latest version of the SWQM Procedures.

Dr. Jungseok Ho

University of Texas Rio Grande Valley- Edinburg

Responsible for water quality monitoring samples collected at Arroyo Los Olmos, a tributary to the Rio Grande, and one site on the Rio Grande. Samples collected are submitted to A&B Environmental Services, Inc. for analysis. Ensures that samples are collected according to methods specified in this QAPP and the latest version of the SWQM Procedures.

Dr. Kevin Urbanczyk

Sul Ross State University, Rio Grande Research Center

Responsible for water quality monitoring at Kokernot Springs in Alpine, TX. Samples collected are submitted to A&B Environmental Services, Inc. for analysis. Ensures that samples are collected according to methods specified in this QAPP and the latest version of the SWQM Procedures.

Dr. Maria E. Alvarez, Professor of Biology, Biology District-Wide Coordinator, and MBRS-RISE and MSEIP Program Director

El Paso Community College

Responsible for water quality monitoring at several stations in the El Paso area. Water samples collected are submitted to A&B Environmental Services, Inc. for analysis. Ensures that samples are collected according to methods specified in this QAPP and the latest version of the SWQM Procedures.

Dr. Elizabeth Walsh

University of Texas at El Paso

Responsible for water quality monitoring in the El Paso area of the Rio Grande. Samples collected are submitted to A&B Environmental Services, Inc. for analysis. Ensures that samples are collected according to methods specified in this QAPP and the latest version of the SWQM Procedures.

Terms of Agreement

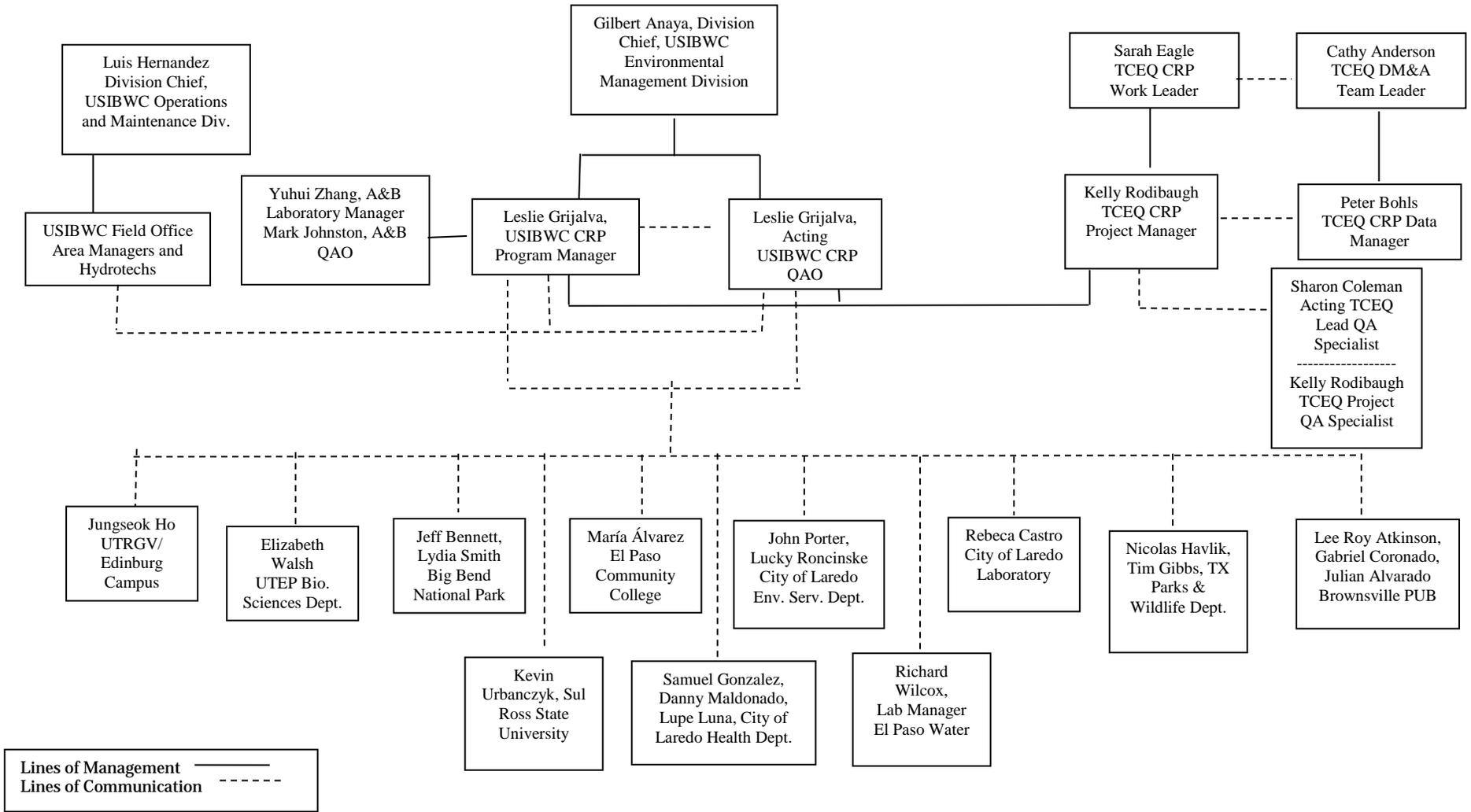
The USIBWC Clean Rivers Program Sampling Partners agree to the long-term collection of water quality samples and environmental data at designated monitoring stations on a prescribed schedule. The types of samples and data collected by each partner may vary in time, commitment, and geography. A Sampling Partner's signature on the Section A1 Approval Page of the Rio Grande Basin Monitoring Program Quality Assurance Project Plan or on a Letter of Adherence (see Attachment 1) indicates acknowledgment that the Sampling Partner does not expect to be paid for his/her work, compensation for expenses associated with said in-kind work, and will abide by the Texas Commission on Environmental Quality procedures.

In Addition, USIBWC non-federal entity Sampling Partners release, waive, discharge and covenant not to sue the USIBWC, including its officers and employees, with respect to any and all liability, claims or causes of action whatsoever related to any damages or injury that they may sustain, whether caused by the negligence of the

USIBWC or otherwise, while performing tasks under this QAPP. USIBWC Sampling Partners are aware and fully responsible for guarding against any risks involved with such activity, and choose to participate voluntarily and at their own risk. They voluntarily assume full responsibility for any property damage or personal injury that they may sustain while participating in, or related to the above activity.

Project Organization Chart

Figure 1: A4.1. Organization Chart - Lines of Communication



City of Laredo Health Dept. uses the City of Laredo Health Dept. lab, BPUB analyzes their own data and the *enterococcus* samples for the Brownville area, and American Dam uses the El Paso Waterlab. All other partners use A&B.

A5 Problem Definition/Background

In 1991, the Texas Legislature passed the Texas Clean River Act (Senate Bill 818) in response to growing concerns that water resource issues were not being pursued in an integrated, systematic manner. The act requires that ongoing water quality assessments be conducted for each river basin in Texas, an approach that integrates water quality issues within the watershed. The CRP legislation mandates that each river authority (or local governing entity) shall submit quality-assured data collected in the river basin to the commission. Quality-assured data in the context of the legislation means data that comply with TCEQ rules for surface water quality monitoring (SWQM) programs, including rules governing the methods under which water samples are collected and analyzed and data from those samples are assessed and maintained. This QAPP addresses the program developed between the USIBWC CRP and the TCEQ to carry out the activities mandated by the legislation. This QAPP was developed and will be implemented in accordance with provisions of the TCEQ Quality Management Plan, January 2017 or most recent version (QMP).

The purpose of this QAPP is to clearly delineate USIBWC CRP QA policy, management structure, and procedures which will be used to implement the QA requirements necessary to verify and validate the surface water quality data collected. This QAPP is reviewed by the TCEQ to help ensure that data generated for the purposes described above are scientifically valid and legally defensible. This process will ensure that data collected under this QAPP and submitted to SWQMIS have been collected and managed in a way that guarantees its reliability and therefore can be used in water quality assessments, total maximum daily load (TMDL) development, establishing water quality standards, making permit decisions and used by other programs deemed appropriate by the TCEQ. Project results will be used to support the achievement of CRP objectives, as contained in the *Clean Rivers Program Guidance and Reference Guide FY 2018 -2019*.

The international reach of the Rio Grande (hereinafter Rio Grande Basin) encompasses an immense area from the arid Chihuahuan Desert region around El Paso, Texas, downstream to the subtropical coastal region near Brownsville, Texas. Therefore, for the purpose of coordination and planning, the Rio Grande has been divided into four sub-basins; the Upper Rio Grande Basin extending from the New Mexico/Texas State line downstream to the International Amistad Dam (including the Devils River); the Pecos River sub-basin that extends from the Red Bluff Reservoir at the New Mexico/Texas State line to the confluence with the Rio Grande; the Middle Rio Grande Basin that extends downstream of International Amistad Dam to International Falcon Dam; and the Lower Rio Grande Basin extending from downstream of International Falcon Dam to the Rio Grande Tidal area. The Rio Grande Basin, its tributaries, and associated bays are further partitioned into 14 stream segments: six segments in the Upper Rio Grande Basin, three segments in the Pecos River sub-basin, three segments in the Middle Rio Grande Basin, and two segments in the Lower Rio Grande Basin.

Figure 2 shows a map of the CRP portion of the Rio Grande Basin and identifies the Upper, Middle, and Lower Rio Grande and the Pecos River. The Upper Basin includes the main stem of the Rio Grande from the Texas-New Mexico state line in El Paso County downstream to the International Amistad Reservoir in Val Verde County to include the Devils River. The Upper Basin encompasses 8 west Texas counties. Texas Surface Water Quality Standards (TSWQS) identify and designate uses for six segments in the Upper Basin. The TCEQ Surface Water Quality Standards (2014) recommended the following use categories for each of these segments in the Rio Grande: Contact Recreation, High Aquatic Life, and Public Water Supply (Table 1 A5.1). However, the 2014 Standards recommended that the Rio Grande below International Dam (Segment 2308) be designated as Non-Contact Recreation and Limited Aquatic Life. These designations are still under review by the US Environmental Protection Agency (EPA).

The Pecos River begins in the Sangre de Cristo Mountains of north-central New Mexico, travels through eastern New Mexico, crosses into Texas at the Red Bluff Reservoir, winds through west Texas, and then empties into the Rio Grande in Val Verde County above the International Amistad Dam. Segment 2312- Red Bluff Reservoir, is designated for Contact Recreation and High Aquatic Use. Segment 2311- Upper Pecos River and Segment 2310- Lower Pecos River are designated for Contact Recreation and High Aquatic Use with Segment 2310 also being designated as a Public Water Supply.

The Middle Rio Grande Basin includes the main stem of the Rio Grande from International Amistad Dam in Val Verde County (Segment 2304), International Falcon Dam (Segment 2303), and San Felipe Creek (Segment 2313). This portion of the basin includes parts of Val Verde, Edwards, Kinney, Maverick, Dimmit, Webb, Zapata, Jim

Hogg, and Starr Counties in Texas. The designated uses for each of these segments are Contact Recreation, High Aquatic Life, and Public Water Supply.

The study area in the Lower Rio Grande Basin includes the main stem of the Rio Grande from International Falcon Dam in Starr County to the Gulf of Mexico in Cameron County (Segments 2301 and 2302). This portion of the basin includes parts of Starr, Hidalgo, and Cameron Counties in Texas. Designated uses for Segment 2302, Rio Grande below International Falcon Reservoir, include Contact Recreation, High Aquatic Life, and Public Water Supply, while Segment 2301 is a tidal flat designated as Exceptional Aquatic Life and Contact Recreation.

Figure 2: A5.1. Map of Rio Grande Basin

(Detailed station location information can be found on the maps in Appendix B and at <http://cms.lcra.org>)

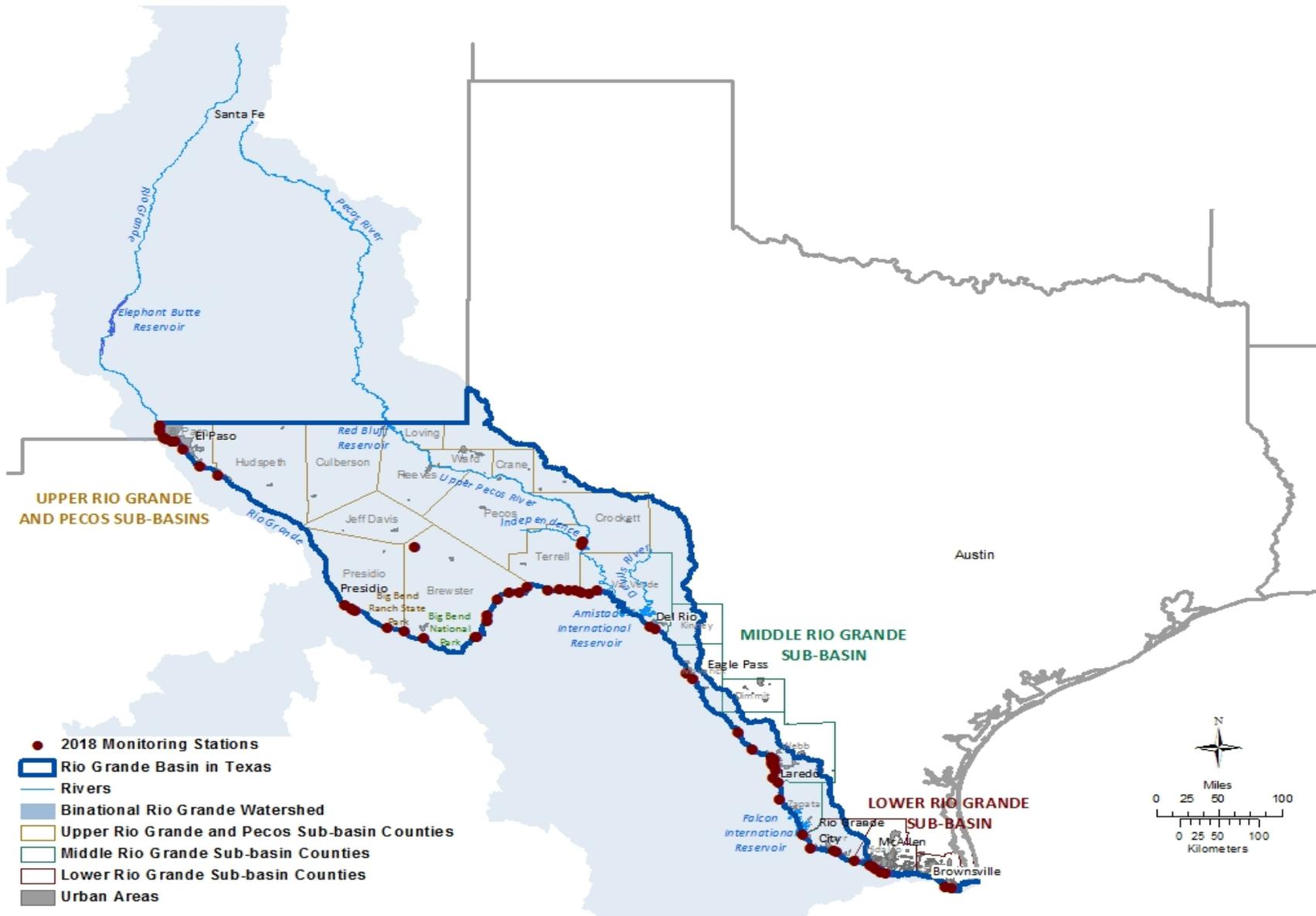


Table 1: *A5.1 Designated Uses and Criteria for segments in the Rio Grande Basin

Rio Grande Basin Designated Uses and Numeric Criteria

Segment No.	Rio Grande Basin Segment Names	Recreation Use	Aquatic Life Use	Domestic Water Supply Use	Other Uses	Cl ⁻¹ (mg/L)	SO ₄ ⁻² (mg/L)	TDS (mg/L)	Dissolved Oxygen (mg/L)	pH Range (SU)	Indicator Bacteria ¹ #/100 mL	Temperature (degrees F)
2301	Rio Grande Tidal	PCR1	E						5.0	6.5-9.0	35	95
2302	Rio Grande Below Falcon Reservoir	PCR1	H	PS		270	350	880	5.0	6.5-9.0	126	90
2303	International Falcon Reservoir	PCR1	H	PS		200	300	1,000	5.0	6.5-9.0	126	93
2304	Rio Grande Below Amistad Reservoir	PCR1	H	PS		200	300	1,000	5.0	6.5-9.0	126	95
2305	International Amistad Reservoir	PCR1	H	PS		150	270	800	5.0	6.5-9.0	126	88
2306	Rio Grande Above Amistad Reservoir	PCR1	H	PS		200	450	1,400	5.0	6.5-9.0	126	93
2307	Rio Grande Below Riverside Diversion Dam	PCR1	H	PS		300	550	1,500	5.0 ²	6.5-9.0	126	93
2308	Rio Grande Below International Dam	NCR	L			250	450	1,400	3.0	6.5-9.0	605	95
2309	Devils River ³	PCR1	E	PS		50	50	300	6.0	6.5-9.0	126	90
2310	Lower Pecos River	PCR1	H	PS		1,700	1,000	4,000	5.0	6.5-9.0	126	92
2311	Upper Pecos River	PCR1	L			7,000	3,500	15,000	5.0 ⁴	6.5-9.0	33	92
2312	Red Bluff Reservoir	PCR1	H			3,200	2,200	9,400	5.0	6.5-9.0	33	90
2313	San Felipe Creek ³	PCR1	H	PS		50	50	400	5.0	6.5-9.0	126	90
2314	Rio Grande Above International Dam	PCR1	H	PS		340	600	1,800	5.0	6.5-9.0	126	92
2315	Rio Grande Below Rio Conchos	PCR1	H			450	750	2,100	5.0	6.5-9.0	126	93

- 1 The indicator bacteria for freshwater is *E. coli* and for saltwater is Enterococci. The indicator bacteria for Segments 2311 and 2312 is Enterococci.
- 2 The dissolved oxygen criterion in the upper reach of Segment 2307 (Riverside Diversion Dam to the end of the rectified channel below Fort Quitman) is 3.0 mg/L when headwater flow over the Riverside Diversion Dam is less than 35 cfs.
- 3 The critical low-flow for Segments 2309 and 2313 is calculated in accordance with §307.8(a)(2)(A) of this title.
- 4 A 24-hour minimum dissolved oxygen criterion of 1.0 mg/L applies to Segment 2311.

From TCEQ's Texas Surface Water Quality Standards, Title 30 Chapter 307 of the Texas Administrative Code effective March 6, 2014.

*Note: New Recreation Use categories currently awaiting EPA approval.

A6 Project/Task Description

See Appendix B for the project-related work plan tasks and schedule of deliverables for a description of work defined in this QAPP.

See Appendix B for sampling design and monitoring pertaining to this QAPP.

The USIBWC CRP in the Rio Grande basin coordinates monitoring efforts among a large number of partners to routinely collect surface water quality data from more than 67 sites throughout the basin. Partners in the Rio Grande basin include universities, municipalities, non-profit organizations, and other agencies which monitor water quality in the Rio Grande basin for their own purposes and also at the request of the Clean Rivers Program. The program was established to collect, store, and make available water quality data, which the participating partners require to carry out their assigned functions. The USIBWC CRP collects this data and uses it for assessments of water quality under the Clean Rivers Program. The data are also widely used by state water quality managers, cities, counties, consultants, students and the general public and is used to monitor water quality for use in assessment for the attainment of uses and numerical criteria. Smaller non-classified water bodies are also monitored in response to perceived risk for pollution and/or to define water quality. The USIBWC's Quality Assurance Project Plan is the mechanism for bringing this data into the statewide water quality database, the Surface Water Quality Monitoring Information System, or SWQMIS. A map showing the locations of all fixed monitoring locations are included in Appendix C. (For a complete monitoring schedule of the Rio Grande Basin, see <http://cms.lcra.org>.)

Basin-wide monitoring efforts include sites sampled by USIBWC El Paso Headquarters staff, partners as listed in A4, and TCEQ field office staff throughout the basin. Monitoring sites are evaluated for location, frequency of collection, and parameters annually at coordinated monitoring meetings held at four locations in the basin. For FY2018-2019, routine monitoring is defined as field, flow, conventionals, and bacteriological samples. Organics in sediment will only be analyzed at sites where organics have been detected in the previous two years. Metals and certain organics in water and sediment will still be collected at sites where they have historically shown levels of concern and where stakeholders request continued collection. (For a more detailed description of the monitoring plan and how it is designed, please see Appendix B.)

The USIBWC CRP has leveraged a broad network of in-kind partners to collect samples throughout the Rio Grande Basin. The CRP monitoring partners in the Rio Grande basin are: USIBWC CRP, USIBWC field offices (American Dam, Amistad Dam, Falcon Dam, Laredo, Presidio, Mercedes), El Paso Community College, El Paso Water, University of Texas at El Paso, Big Bend National Park, Big Bend Ranch State Park, City of Laredo Health Department, City of Laredo Environmental Services, Midland College, University of Texas Rio Grande Valley (Edinburg campus), Sul Ross State University and the Brownsville Public Utilities Board. All CRP partners in the Rio Grande basin monitoring program are required to be trained by the USIBWC CRP staff, and they must agree to follow this QAPP by signing this document or an adherence letter. Various partners collect limited field and/or laboratory parameters due to issues such as remoteness of the site, shipping problems, accreditation, or to a standing Memorandum of Agreement/Understanding between the entity and the USIBWC. Only data meeting the specifications detailed in this QAPP are reported to TCEQ. For any partner reporting five parameters or less, the USIBWC El Paso Headquarters considers this as "limited conventionals analysis".

Amendments to the QAPP

Revisions to this QAPP may be necessary to address incorrectly documented information or to reflect changes in project organization, tasks, schedules, objectives, and methods. Requests for amendments will be directed from the USIBWC CRP Project Manager to the CRP Project Manager electronically. The USIBWC CRP will submit a completed QAPP Amendment document, including a justification of the amendment, a table of changes, and all pages, sections or attachments affected by the amendment. Amendments are effective immediately upon approval by the USIBWC CRP Project Manager, the USIBWC CRP QAO, the CRP Project Manager, the CRP Lead QA Specialist, the CRP Project QA Specialist, the TCEQ QA Manager or designee, and additional parties affected by the amendment. Amendments are not retroactive. No work shall be implemented without an approved QAPP or amendment prior to the start of work. Any activities under this contract that commence prior to the approval of the governing QA document constitute a deficiency and are subject to corrective action as described in section C1

of this QAPP. Any deviation or deficiency from this QAPP which occurs after the execution of this QAPP should be addressed through a Corrective Action Plan (CAP). An Amendment may be a component of a CAP to prevent future recurrence of a deviation. Amendments will be incorporated into this QAPP by way of attachment and distributed to personnel on the distribution list by the USIBWC CRP Project Manager. The USIBWC CRP will secure an adherence letter from each sub-tier project participant (e.g., subcontractors, sub-participant, or other units of government) affected by the amendment stating the organization's awareness of and commitment to requirements contained in each amendment to this QAPP. The USIBWC CRP will maintain this documentation as part of the project's QA records, and ensure that the documentation is available for review.

Special Project Appendices

Projects requiring QAPP appendices will be planned in consultation with the USIBWC CRP and the TCEQ Project Manager and TCEQ technical staff. Appendices will be written in an abbreviated format and will reference the Basin QAPP where appropriate. Appendices will be approved by the USIBWC CRP Project Manager, the USIBWC CRP QAO, the Laboratory (as applicable), and the CRP Project Manager, the CRP Project QA Specialist, the CRP Lead QA Specialist and other TCEQ personnel, and additional parties affected by the Appendix, as appropriate. Copies of approved QAPP appendices will be distributed by the USIBWC CRP to project participants before data collection activities commence. The USIBWC El Paso Headquarters will secure written documentation from each sub-tier project participant (e.g., subcontractors, subparticipants, other units of government) stating the organization's awareness of and commitment to requirements contained in each special project appendix to this QAPP. The USIBWC El Paso Headquarters will maintain this documentation as part of the project's QA records, and ensure that the documentation is available for review.

A7 Quality Objectives and Criteria

The purpose of routine water quality monitoring is to collect surface water quality data that can be used to characterize water quality conditions, identify significant long-term water quality trends, support water quality standards development, support the permitting process, and conduct water quality assessments in accordance with TCEQ's [Guidance for Assessing and Reporting Surface Water Quality in Texas, June 2015](https://www.tceq.texas.gov/assets/public/waterquality/swqm/assess/14txir/2014_guidance.pdf) or most recent version (https://www.tceq.texas.gov/assets/public/waterquality/swqm/assess/14txir/2014_guidance.pdf). These water quality data, and data collected by other organizations (e.g., USGS, TCEQ, etc.), will be subsequently reconciled for use and assessed by the TCEQ.

The measurement performance specifications to support the project purpose for a minimum data set are specified in Appendix A: Table A7.1 and in the text following.

Ambient Water Reporting Limits (AWRLs)

The AWRL establishes the reporting specification at or below which data for a parameter must be reported to be compared with freshwater screening criteria. The AWRLs specified in Appendix A, Table A7.1 are the program-defined reporting specifications for each analyte and yield data acceptable for the TCEQ's water quality assessment. A full listing of AWRLs can be found at <https://www.tceq.texas.gov/assets/public/waterquality/crp/QA/awrlmaster.pdf>.

The limit of quantitation (LOQ) is the minimum level, concentration, or quantity of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence by the laboratory analyzing the sample. Analytical results shall be reported down to the laboratory's LOQ (i.e., the laboratory's LOQ for a given parameter is its reporting limit).

The following requirements must be met in order to report results to the CRP:

- The laboratory's LOQ for each analyte must be at or below the AWRL as a matter of routine practice
- The laboratory must demonstrate its ability to quantitate at its LOQ for each analyte by running an LOQ check sample for each analytical batch of CRP samples analyzed
- Control limits for LOQ check samples are found in Appendix A.

Laboratory Measurement Quality Control Requirements and Acceptability Criteria are provided in Section B5.

Precision

Precision is the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. It is a measure of agreement among replicate measurements of the same property, under prescribed similar conditions, and is an indication of random error.

Laboratory precision is assessed by comparing replicate analyses of laboratory control samples (LCS) in the sample matrix (e.g. deionized water, sand, commercially available tissue) or sample/duplicate pairs in the case of bacterial analysis. Precision results are compared against measurement performance specifications and used during evaluation of analytical performance. Program-defined measurement performance specifications for precision are defined in Appendix A.

Bias

Bias is a statistical measurement of correctness and includes multiple components of systematic error. A measurement is considered unbiased when the value reported does not differ from the true value. Bias is determined through the analysis of LCS and LOQ Check Samples prepared with verified and known amounts of all target analytes in the sample matrix (e.g. deionized water, sand, commercially available tissue) and by calculating percent recovery. Results are compared against measurement performance specifications and used during evaluation of analytical performance. Program-defined measurement performance specifications for bias are specified in Appendix A.

Representativeness

Site selection, the appropriate sampling regime, the sampling of all pertinent media according to TCEQ SOPs, and use of only approved analytical methods will assure that the measurement data represents the conditions at the site. Routine data collected under CRP for water quality assessment are considered to be spatially and temporally representative of routine water quality conditions. Water Quality data are collected on a routine frequency and are separated by approximately even time intervals. At a minimum, samples are collected over at least two seasons (to include inter-seasonal variation) and over two years (to include inter-year variation) and include some data collected during an index period (March 15- October 15). Although data may be collected during varying regimes of weather and flow, the data sets will not be biased toward unusual conditions of flow, runoff, or season. The goal for meeting total representation of the water body will be tempered by the potential funding for complete representativeness.

Comparability

Confidence in the comparability of routine data sets for this project and for water quality assessments is based on the commitment of project staff to use only approved sampling and analysis methods and QA/QC protocols in accordance with quality system requirements and as described in this QAPP and in TCEQ SOPs. Comparability is also guaranteed by reporting data in standard units, by using accepted rules for rounding figures, and by reporting data in a standard format as specified in the Data Management Plan Section B10.

Completeness

The completeness of the data is basically a relationship of how much of the data are available for use compared to the total potential data. Ideally, 100% of the data should be available. However, the possibility of unavailable data due to accidents, insufficient sample volume, broken or lost samples, etc. is to be expected. Therefore, it will be a general goal of the project(s) that 90% data completion is achieved.

A8 Special Training/Certification

Before new field personnel independently conduct field work, the USIBWC CRP Program Manager or USIBWC CRP QAO trains him/her in proper instrument calibration, field sampling techniques, and field analysis procedures. The QA officer (or Program Manager if QAO is not available) will document the successful field demonstration. The QA Officer (or Program Manager if QAO is not available) will retain documentation of training and the successful field demonstration in the employee's personnel file (the documentation will be available during monitoring systems audits). Field personnel may request refresher training sessions, or additional training if new personnel is acquired, and the USIBWC El Paso Headquarters will accommodate their request.

The requirements for Global Positioning System (GPS) certification are located in Section B10, Data Management.

Contractors and subcontractors must ensure that laboratories analyzing samples under this QAPP meet the requirements contained in TNI Standard (2009) Volume 1, Module 2, Section 4.5.5 (concerning Subcontracting of Environmental Tests).

A9 Documents and Records

The documents and records that describe, specify, report, or certify activities are listed. The list below is limited to documents and records that may be requested for review during a monitoring systems audit.

Table 2: A9.1 Project Documents and Records

Document/Record	Location	Retention (yrs)	Format
QAPPs, amendments and appendices	USIBWC CRP	7 yrs	paper, and electronic
Field SOPs	USIBWC CRP	7 yrs	paper, and electronic
Laboratory Quality Manuals	USIBWC CRP	7 yrs	paper
Laboratory SOPs	USIBWC CRP	7 yrs	paper
QAPP distribution documentation	USIBWC CRP	7 yrs	paper, and electronic
Field staff training records	USIBWC CRP	7 yrs	paper, and electronic
Field equipment calibration/maintenance logs	USIBWC CRP	7 yrs	paper
Field instrument printouts	USIBWC CRP	7 yrs	paper
Field notebooks or data sheets	USIBWC CRP	7 yrs	paper, and electronic
Chain of custody records	USIBWC CRP	7 yrs	paper, and electronic
Laboratory calibration records	USIBWC CRP	7 yrs	Paper, and electronic
Laboratory instrument printouts*	A&B Environmental Services, Inc. Brownsville Public Utilities Board- Analytical Laboratory El Paso Water Utilities Public Service Board International Water Quality Laboratory City of Laredo Health Department Laboratory	7 yrs	paper
Laboratory data reports/results	USIBWC CRP	7 yrs	paper, and electronic
Laboratory equipment maintenance logs*	A&B Environmental Services, Inc. Brownsville Public Utilities Board- Analytical Laboratory El Paso Water Utilities Public Service Board International Water Quality Laboratory	7 yrs	paper

Document/Record	Location	Retention (yrs)	Format
	City of Laredo Health Department Laboratory		
Corrective Action Documentation	USIBWC CRP	7 yrs	paper, and electronic

* Documentation available to USIBWC CRP upon request.

Laboratory Test Reports

Test/data reports from the laboratory must document the test results clearly and accurately. Routine data reports should be consistent with the TNI Standard (2009), Volume 1, Module 2, Section 5.10 and include the information necessary for the interpretation and validation of data. The requirements for reporting data and the procedures are provided. The laboratory manager or technical director at each respective laboratory validates the analytical data by comparing the various quality control measurements and by recalculating a random selection of the results produced by each analyst submitting data. The TNI Standard provides for some flexibility in regard to the elements required in a test report. From the Clean Rivers Program perspective, it is important that data are reported unambiguously, are accurate, and that the necessary information for the review, verification, validation, and interpretation of data is included. At a minimum, test reports (regardless of whether they are hard copy or electronic) should include the following:

Parameter Code

Parameter Name

Sample results

Sample Depth

Units of measurement

Sample matrix

Dry weight or wet weight (as applicable)

Station information

Collecting Entity

Date and time of collection

Dilution Factor

Date Analyzed

Holding time for E.coli

LOQ and LOD (formerly referred to as the reporting limit and the method detection limit, respectively), and qualification of results outside the working range (if applicable)

Certification of NELAP compliance

Lab Method

Prep Date/Time

Electronic Data

Data will be submitted electronically to the TCEQ in the Event/Result file format described in the most current version of the [DMRG](#), which can be found at (https://www.tceq.texas.gov/waterquality/data-management/dmrg_index.html). A completed Data Review Checklist and Data Summary (see Appendix F) will be submitted with each data submittal.

B1 Sampling Process Design

See Appendix B for sampling process design information and monitoring tables associated with data collected under this QAPP.

B2 Sampling Methods

Field Sampling Procedures

Field sampling will be conducted in accordance with the latest versions of the TCEQ Surface Water Quality

Monitoring Procedures Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2012. (RG-415) and Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416), collectively referred to as “SWQM Procedures”. Updates to SWQM Procedures are posted to the Surface Water Quality Monitoring Procedures website (https://www.tceq.texas.gov/waterquality/monitoring/swqm_guides.html), and shall be incorporated into the USIBWC CRP’s procedures, QAPP, SOPs, etc., within 60 days of any final published update. Additional aspects outlined in Section B below reflect specific requirements for sampling under CRP and/or provide additional clarification.

Table 3: B2.1 Sample Storage, Preservation and Handling Requirements, A&B Environmental Services, Inc.

Routine Conventionals-in-Water Samples (8 containers: 3 unpreserved, 1 preserved with HNO₃, 2 preserved with H₂SO₄, 2 preserved with Na₂S₂O₃.)				
Parameters	Containers	Sample Volume (ml)	Preservation	Maximum Holding Time
CONTAINER 1				
TSS(00530)/VSS (00535)		200	Cool to <6 C but not frozen	7 days
Chloride (Cl) (00940)		50	Cool to <6 C but not frozen	28 days
Sulfate (SO ₄) (00945)		50	Cool to <6 C but not frozen	28 days
Fluoride (00951)		50	Cool to <6 C but not frozen	28 days
TDS(70300)		50	Cool to <6 C but not frozen	7 days
Bromide (71870)		50	Cool to <6 C but not frozen	28 days
Alkalinity (00410)		50	Cool to <6 C but not frozen	14 days
CONTAINER 2				
Calcium (00916)		50	1-2 ml conc.HNO ₃ to pH <2 and cool to <6 C but not frozen	6 months
Magnesium (00927)		50	1-2 ml conc.HNO ₃ to pH <2 and cool to <6 C but not frozen	6 months
Sodium (00929)		50	1-2 ml conc.HNO ₃ to pH <2 and cool to <6 C but not frozen	6 months
Potassium (00937)		50	1-2 ml conc.HNO ₃ to pH <2 and cool to <6 C but not frozen	6 months
Hardness (00900)		50	1-2 ml conc.HNO ₃ to pH <2 and cool to <6 C but not frozen	6 months
CONTAINER 3				
Ammonia (NH ₃) (00610)		50	1-2 ml conc.H ₂ SO ₄ to pH <2 and Cool <6 C but not frozen	28 days
Total Phosphorus (PO ₄) (00665)		50	1-2 ml conc.H ₂ SO ₄ to pH <2 and Cool <6 C but not frozen	28 days
Nitrate + Nitrite (00630) (NO ₃ + NO ₂)		50	1-2 ml conc.H ₂ SO ₄ to pH <2 and Cool <6 C but not frozen	28 days
CONTAINER 4				
Chlorophyll a (32211)	glass amber	500	Cool to <6 C but not frozen, dark	Filter within 48 hours. Filters may be stored frozen up to 28 days
Pheophytin-a (32218)	glass amber	500	Cool to <6 C but not frozen, dark	Filter within 48 hours. Filters may be stored frozen up to 28 days
CONTAINER 5 and 6				

E. coli bacteria (31699)	Sterilized plastic container	100	Cool <6 C but not frozen Sodium thiosulfate	*8 hours
E. coli bacteria (31699)	Sterilized plastic container	290	Cool <6 C but not frozen Sodium thiosulfate	*8 hours
CONTAINER 7				
Biological Oxygen Demand (BOD) (00310)	HDPE	1000	Cool <6 C but not frozen	48 hours
CONTAINER 8				
Total Organic Carbon (TOC) (00680)	H2SO4, cleaned plastic bottle	120	1.0 ml conc H2SO4 to pH <2 and Cool <6 C but not frozen	28 days
Metals -In-Water				
Parameters	Containers	Sample Volume (ml)	Preservation	Maximum Holding Time
CONTAINER 1				
Total Metals Suite	HNO3 cleaned plastic bottle	500	Pre-acidified container with 5 ml ultra-pure HNO3 to pH<2	180 days
CONTAINER 2 and 3				
Total Mercury	2- 40-mL VOA vials	80	pre-cleaned, HCl-preserved	28 days
Metals in Sediment				
CONTAINER 1				
	1 pint glass jar with Teflon- lined lid	1000 grams		
Metals		500 grams	Cool <6 C but not frozen	180 days
CONTAINER 1				
Total Mercury		500 grams	Dark and Cool <6 C but not frozen	28 days

*E. coli samples should always be processed as soon as possible and within 8 hours. When transport conditions necessitate delays in delivery longer than 8 hours, the holding time may be extended and samples must be processed as soon as possible and within 30 hours.

Collecting entities that use this lab: USIBWC Headquarters, Amistad Dam FO, Falcon Dam FO, Laredo FO, Presidio FO, Mercedes FO, BBNP, TPWD, City of Laredo Env. Services, UTRGV-Edinburg, Midland College, UTEP, EPCC, Sul Ross.

Table 4: B2.2 Sample Storage, Preservation and Handling Requirements, City of Laredo Health Department Laboratory

E. Coli and Fecal Coliform Analysis- City of Laredo Health Department Laboratory (2 containers Preserved with Sodium Thiosulfate)				
Parameters	Containers	Sample Volume (ml)	Preservation	Maximum Holding Time
CONTAINER 1				
E. coli, Colilert, IDEXX Method (31699)	Polystyrene	290	Cool <6 C but not frozen Sodium Thiosulfate	8 hrs
CONTAINER 2				
Fecal Coliform (31616)	Polystyrene	120	Cool <6 C but not frozen Sodium Thiosulfate	8 hrs

Collecting entity that uses this lab: City of Laredo Health Department

Table 5: B2.3 Sample Storage, Preservation and Handling Requirements, EPW International Water Quality Laboratory

Routine Conventionals-in-Water Samples				
Parameters	Containers	Sample Volume (ml)	Preservation	Maximum Holding Time
CONTAINER 1				
Turbidity (82079)	HDPE	100	Cool <6 C but not frozen	48 hours
CONTAINER 2				
BOD (00310)	HDPE	1000	Cool <6 C but not frozen	48 hours
CONTAINER 3				
E. coli bacteria (31699)	Sterilized plastic container	2X250	Cool <6 C but not frozen Sodium thiosulfate	8 hours
CONTAINER 4				
Chlorophyll a (32211)	Sterilized plastic container	1X500	Cool to <6 C but not frozen, dark	Filter within 48 hours. Filters may be stored frozen up to 24 days

Collecting entity that uses this lab: USIBWC American Dam Field Office

Table 6: B2.4 Sample Storage, Preservation and Handling Requirements, Brownsville PUB Laboratory

Routine Conventionals-in-Water Samples				
Parameters	Containers	Sample Volume (ml)	Preservation	Maximum Holding Time
CONTAINER 1				
TSS (00530)	HDPE	2000	Cool <6 C but not frozen	48 hours
TDS (70300)	HDPE	250	Cool <6 C but not frozen	48 hours
CONTAINER 2				
Ammonia (NH ₃) (00610)	HDPE	500	1-2 ml conc. H ₂ SO ₄ to pH <2 and Cool <6 C but not frozen	28 days
CONTAINER 3				
BOD (00310)	HDPE	2000	Cool <6 C but not frozen	48 hours
CONTAINER 4				
E. coli bacteria (31699)	Sterilized plastic container	290	Cool <6 C but not frozen Sodium thiosulfate	8 hours
CONTAINER 5				
Enterococcus (31701)	Sterilized plastic container	290	Cool <6 C but not frozen Sodium thiosulfate	8 hours

Collecting entity that uses this lab: BPUB

Sample Containers

Certificates from sample container manufacturers are maintained by the laboratory.

The analyzing laboratory adds the appropriate preservative to the proper sample containers and provides them to the partners. A&B Environmental Services, Inc. provides sample containers for all CRP partners, with the exception of the City of Laredo Health Department Lab, IWQL, and the BPUB, which supply their own sample containers for their sampling.

USIBWC FY18-19 QAPP

Last revised on August 30, 2017

A&B laboratories uses 1L, 500 mL and 250 mL HDPE containers, 1L glass amber bottles, 100 mL and 290 mL sterilized plastic containers with 1% sodium thiosulfate tablets added, and 120 mL cleaned plastic bottles. For metals-in water, A&B uses 500 mL pre-acidified plastic bottles and 40 mL VOA vials. For metals in sediment, a 1 pint glass jar with a Teflon-lined lid is used. For organics in water, pre-acidified VOA vials and pre-rinsed glass bottles with Teflon-lined lids are used. For organics in sediment, 1 pint glass jars with Teflon-lined lids are used.

The City of Laredo Health Department laboratory uses sterile, 120 mL polystyrene IDEXX bottles with 1% sodium thiosulfate tablets for their bacteria samples.

The IWQL laboratory uses 1L and 100 mL HDPE containers for BOD and Turbidity, and sterilized, 250 mL plastic containers with 1% sodium thiosulfate for the bacteria samples.

The BPUB laboratory uses 1L HDPE containers for TSS and BOD, 250 mL HDPE containers for TDS, 500 mL HDPE containers preserved with H₂SO₄ for Ammonia, and 120 mL IDEXX bottles with 1% sodium thiosulfate bottles for the bacteria analysis.

Processes to Prevent Contamination

Procedures outlined in SWQM Procedures outline the necessary steps to prevent contamination of samples. These include: direct collection into sample containers, when possible; use of certified containers for organics; and clean sampling techniques for metals. Field QC samples (identified in Section B5) are collected to verify that contamination has not occurred.

Documentation of Field Sampling Activities

Field sampling activities are documented on field data sheets as presented in Appendix D. Flow worksheets, aquatic life use monitoring checklists, habitat assessment forms, field biological assessment forms, and records of bacteriological analyses (if applicable) are part of the field data record. Parameters which are preferred by the SWQM and Water Quality Standards Programs are highlighted in the shell A7 document. The following will be recorded for all visits:

Station ID
Sampling Date
Location
Sampling Depth
Sampling Time
Sample Collector's name and signature
Values for all field parameters collected

Notes containing detailed observational data not captured by field parameters, including:

Water appearance
Weather
Biological activity
Recreational activity
Unusual odors
Pertinent observations related to water quality or stream uses
Watershed or instream activities
Specific sample information
Missing parameters

Recording Data

For the purposes of this section and subsequent sections, all field and laboratory personnel follow the basic rules for recording information as documented below:

- Write legibly, in indelible ink

- Changes are made by crossing out original entries with a single line strike-out, entering the changes, and initialing and dating the corrections.
- Close-out incomplete pages with an initialed and dated diagonal line.

Sampling Method Requirements or Sampling Process Design Deficiencies and Corrective Action

Examples of sampling method requirements or sample design deficiencies include but are not limited to such things as inadequate sample volume due to spillage or container leaks, failure to preserve samples appropriately, contamination of a sample bottle during collection, storage temperature and holding time exceedance, sampling at the wrong site, etc. Any deviations from this QAPP, SWQM Procedures, or appropriate sampling procedures may invalidate data, and require documented corrective action. Corrective action may include for samples to be discarded and re-collected. It is the responsibility of the USIBWC CRP Project Manager, in consultation with the USIBWC CRP QAO, to ensure that the actions and resolutions to the problems are documented and that records are maintained in accordance with this QAPP. In addition, these actions and resolutions will be conveyed to the CRP Project Manager both verbally and in writing in the project progress reports and by completion of a CAP.

The definition of and process for handling deficiencies and corrective action are defined in Section C1.

B3 Sample Handling and Custody

Sample Tracking

Proper sample handling and custody procedures ensure the custody and integrity of samples beginning at the time of sampling and continuing through transport, sample receipt, preparation, and analysis.

A sample is in custody if it is in actual physical possession or in a secured area that is restricted to authorized personnel. The Chain of Custody (COC) form is a record that documents the possession of the samples from the time of collection to receipt in the laboratory. The following information concerning the sample is recorded on the COC form (See Appendix E). The following list of items matches the COC form in Appendix E.

Date and time of collection
 Site identification
 Sample matrix
 Number of containers
 Preservative used
 Was the sample filtered
 Analyses required
 Name of collector
 Custody transfer signatures and dates and time of transfer
 Bill of lading, if applicable

Sample Labeling

Samples from the field are labeled on the container, or on a label; with an indelible marker. Label information includes:

Site identification
 Date and time of collection
 Preservative added, if applicable
 Indication of field-filtration for metals, as applicable
 Sample type (i.e., analyses) to be performed

Sample Handling

Handling procedures for water, sediment and biological samples are discussed in detail in the TCEQ SWQM Procedures. Proper sample handling is a joint effort of the sampling crew, the sample transporter, and laboratory

staff. Sample integrity must be protected by preventing sample contamination after the sample is placed in a container. USIBWC, Midland College, University of Texas Rio Grande Valley at Edinburg, Big Bend National Park, City of Laredo Environmental, El Paso Community College, Texas Parks and Wildlife Department, Sul Ross State University and the University of Texas at El Paso samples will be shipped to A&B Environmental Services, Inc. Please refer to the Chain of Custody section below for more details.

Field Data Reporting Forms (See Appendix D) are required for reporting field data. The first form, "Field Data Reporting Form", is used when collecting grab samples. This form includes DO, temperature, pH, Specific conductance, Secchi disk, flow, flow severity, flow measurement method, stream width, stream depth, and days since significant precipitation. A second form, "Field Data Reporting Form Sediment Samples", is used for composite sampling of sediment samples. For all water or sediment samples collected, the COC Form(s) are submitted to the laboratory with the sample(s). A third field form, "Drought Field Data Reporting Form," is used during a prolonged drought periods where the water bodies are extremely low, pooled, or dry.

Chain of Custody forms are submitted with all water and/or sediment chemistry samples, as well as with all bacteria samples. If both water and sediment samples are collected, separate COC for the water samples and sediment samples will be submitted. Routine water chemistry and metals in water analyses are requested on the same form.

The receiving laboratory sample custodian will examine all arriving samples for proper documentation and preservation. Internal sample handling, custody, and storage procedures for laboratories are described in the laboratory quality assurance manual. It is assumed that samples in tape-sealed ice chests are secure whether being transported by staff vehicle, by common carrier, or by commercial package delivery.

Samples will be put in the ice chest with enough ice to fill to the top, and enough ice in the chest to keep the samples cold until they reach the laboratory. This is especially important in the warm months of the year. COC will be placed in an envelope and taped to the top of the ice chest or they may be sealed in a plastic bag and taped to the inside of the ice chest lid. Ice chests will then be sealed with tape before shipping.

Sample Tracking Procedure Deficiencies and Corrective Action

All deficiencies associated with COC procedures, as described in this QAPP, are immediately reported to the USIBWC CRP Project Manager. These include such items as delays in transfer resulting in holding time violations; violations of sample preservation requirements; incomplete documentation, including signatures; possible tampering of samples; broken or spilled samples, etc. The USIBWC CRP Project Manager in consultation with the USIBWC CRP QAO will determine if the procedural violation may have compromised the validity of the resulting data. Any failures that have reasonable potential to compromise data validity will invalidate data and the sampling event should be repeated. The resolution of the situation will be reported to the TCEQ CRP Project Manager in the project progress report. CAPs will be prepared by the USIBWC CRP QAO and submitted to TCEQ CRP Project Manager along with project progress report.

The definition of and process for handling deficiencies and corrective action are defined in Section C1.

B4 Analytical Methods

The analytical methods, associated matrices, and performing laboratories are listed in Appendix A. The authority for analysis methodologies under CRP is derived from the 30 Tex. Admin. Code ch. 307, in that data generally are generated for comparison to those standards and/or criteria. The Texas Surface Water Quality Standards state "Procedures for laboratory analysis must be in accordance with the most recently published edition of the book entitled Standard Methods for the Examination of Water and Wastewater, the TCEQ Surface Water Quality Monitoring Procedures as amended, 40 CFR 136, or other reliable procedures acceptable to the TCEQ, and in accordance with chapter 25 of this title."

Laboratories collecting data under this QAPP must be NELAP-accredited in accordance with 30 TAC Chapter 25. Copies of laboratory QMs and SOPs are available for review by the TCEQ.

Standards Traceability

All standards used in the field and laboratory are traceable to certified reference materials. Standards preparation is fully documented and maintained in a standards log book. Each documentation includes information concerning the standard identification, starting materials, including concentration, amount used and lot number; date prepared, expiration date and preparer's initials/signature. The reagent bottle is labeled in a way that will trace the reagent back to preparation.

Analytical Method Deficiencies and Corrective Actions

Deficiencies in field and laboratory measurement systems involve, but are not limited to such things as instrument malfunctions, failures in calibration, blank contamination, quality control samples outside QAPP defined limits, etc. In many cases, the field technician or lab analyst will be able to correct the problem. If the problem is resolvable by the field technician or lab analyst, then they will document the problem on the field data sheet or laboratory record and complete the analysis. If the problem is not resolvable, then it is conveyed to the USIBWC CRP Laboratory Supervisor, who will make the determination and notify the USIBWC CRP QAO. If the analytical system failure may compromise the sample results, the resulting data will not be reported to the TCEQ. The nature and disposition of the problem is reported on the data report which is sent to the USIBWC CRP Manager. The Lead Organization Project Manager will include this information in the CAP and submit with the Progress Report which is sent to the TCEQ CRP Project Manager.

The definition of and process for handling deficiencies and corrective action are defined in Section C1.

The TCEQ has determined that analyses associated with the qualifier codes (e.g., "holding time exceedance", "sample received unpreserved", "estimated value") may have unacceptable measurement uncertainty associated with them. This will immediately disqualify analyses from submittal to SWQMIS. Therefore, data with these types of problems should not be reported to the TCEQ. Additionally, any data collected or analyzed by means other than those stated in this QAPP, or data suspect for any reason should not be submitted for loading and storage in SWQMIS. However, when data is lost, its absence will be described in the data summary report submitted with the corresponding data set, and a corrective action plan (as described in section C1) may be necessary.

B5 Quality Control

Sampling Quality Control Requirements and Acceptability Criteria

The minimum field QC requirements, and program-specific laboratory QC requirements, are outlined in SWQM Procedures. Specific requirements are outlined below. Field QC sample results are submitted with the laboratory data report (see Section A9.).

Field blank

Field blanks are required for total metals-in-water samples when collected without sample equipment (i.e., as grab samples). For other types of samples, they are optional. A field blank is prepared in the field by filling a clean container with pure deionized water and appropriate preservative, if any, for the specific sampling activity being undertaken. Field blanks are used to assess contamination from field sources, such as airborne materials, containers, or preservatives. The frequency requirement for field blanks for total metals-in-water samples is specified in the SWQM Procedures.

The analysis of field blanks should yield values lower than the LOQ. When target analyte concentrations are high, blank values should be lower than 5% of the lowest value of the batch.

Field blanks are associated with batches of field samples. In the event of a field blank failure for one or more target analytes, all applicable data associated with the field batch may need to be qualified as not meeting project QC requirements, and these qualified data will not be reported to the TCEQ. These data include all samples collected on that day during that sample run and should not be confused with the laboratory analytical batch.

Field equipment blank

Field equipment blanks are required for metals-in-water samples when collected using sampling equipment. Field

equipment blank is a sample of analyte-free media which has been used to rinse common sampling equipment to check the effectiveness of decontamination procedures. It is collected in the same type of container as the environmental sample, preserved in the same manner and analyzed for the same parameter.

The analysis of field equipment blanks should yield values lower than the LOQ, or, when target analyte concentrations are very high, blank values must be less than 5% of the lowest value of the batch, or corrective action will be implemented.

Field equipment blanks are associated with batches of field samples. In the event of a field equipment blank failure for one or more target analytes, all applicable data associated with the field batch may need to be qualified as not meeting project QC requirements, and these qualified data will not be reported to the TCEQ. These data include all samples collected on that day during that sample run and should not be confused with the laboratory analytical batch.

Laboratory Measurement Quality Control Requirements and Acceptability Criteria

Batch

A batch is defined as environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A preparation batch is composed of one to 20 environmental samples of the same NELAP-defined matrix, meeting the above mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 25 hours. An analytical batch is composed of prepared environmental samples (extract, digestates, or concentrates) which are analyzed together as a group. An analytical batch can include prepared samples originating from various environmental matrices and can exceed 20 samples.

Method Specific QC requirements

QC samples, other than those specified later in this section, are run (e.g., sample duplicates, surrogates, internal standards, continuing calibration samples, interference check samples, positive control, negative control, and media blank) as specified in the methods and in SWQM Procedures. The requirements for these samples, their acceptance criteria or instructions for establishing criteria, and corrective actions are method-specific.

Detailed laboratory QC requirements and corrective action procedures are contained within the individual laboratory quality manuals (QMs). The minimum requirements that all participants abide by are stated below.

Comparison Counting

For routine bacteriological samples, repeat counts on one or more positive samples are required, at least monthly. If possible, compare counts with an analyst who also performs the analysis. Replicate counts by the same analyst should agree within 5 percent, and those between analysts should agree within 10 percent. Record the results.

Limit of Quantitation (LOQ)

The laboratory will analyze a calibration standard (if applicable) at the LOQ published in Appendix A, Table A7, on each day calibrations are performed. In addition, an LOQ check sample will be analyzed with each analytical batch. Calibrations including the standard at the LOQ listed in Appendix A, 7.1 will meet the calibration requirements of the analytical method or corrective action will be implemented.

LOQ Sediment and Tissue Samples – When considering LOQs for solid samples and how they apply to results, two aspects of the analysis are considered: (1) the LOQ of the sample, based on the real-world in which moisture content and interferences affect the result and (2) the LOQ in this QAPP which is a value less than or equal to the AWRL based on an idealized sample with zero % moisture.

The LOQ for a solid sample is based on the lowest non-zero calibration standard (as are those for water samples), the moisture content of the solid sample, and any sample concentration or dilution factors resulting from sample preparation or clean-up.

To establish solid-phase LOQs to be listed in Appendix A, Table A7.1 of this QAPP, the laboratory will adjust the

concentration of the lowest non-zero calibration standard for the amount of sample extracted, the final extract volume, and moisture content (assumed to be zero % moisture). Each calculated LOQ will be less than or equal to the AWRL on the dry-weight basis to satisfy the AWRL requirement for sediment and tissue analyses. When data are reviewed for consistency with this QAPP, they are evaluated based on this requirement. Results may not appear to meet the AWRL requirement due to high moisture content, high concentrations of non-target analytes necessitating sample dilution, etc. These sample results will be submitted to the TCEQ with an explanation on the data summary as to why results do not appear to meet the AWRL requirement.

LOQ Check Sample

An LOQ check sample consists of a sample matrix (e.g., deionized water, sand, commercially available tissue) free from the analytes of interest spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. It is used to establish intra-laboratory bias to assess the performance of the measurement system at the lower limits of analysis. The LOQ check sample is spiked into the sample matrix at a level less than or equal to the LOQ published in Appendix A, Table A7, for each analyte for each analytical batch of CRP samples run. If it is determined that samples have exceeded the high range of the calibration curve, samples should be diluted or run on another curve. For diluted or high concentration samples run on batches with calibration curves that do not include the LOQ published in Appendix A, Table A7, a check sample will be run at the low end of the calibration curve.

The LOQ check sample is carried through the complete preparation and analytical process. LOQ Check Samples are run at a rate of one per analytical batch.

The percent recovery of the LOQ check sample is calculated using the following equation in which %R is percent recovery, S_R is the sample result, and S_A is the reference concentration for the check sample:

$$\%R = S_R / S_A \times 100$$

Measurement performance specifications are used to determine the acceptability of LOQ Check Sample analyses as specified in Appendix A Table A7.1.

Laboratory Control Sample (LCS)

An LCS consists of a sample matrix (e.g., deionized water, sand, commercially available tissue) free from the analytes of interest spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. It is used to establish intra-laboratory bias to assess the performance of the measurement system. The LCS is spiked into the sample matrix at a level less than or near the midpoint of the calibration for each analyte. In cases of test methods with very long lists of analytes, LCSs are prepared with all the target analytes and not just a representative number, except in cases of organic analytes with multiplex responses.

The LCS is carried through the complete preparation and analytical process. LCSs are run at a rate of one per preparation batch.

Results of LCSs are calculated by percent recovery (%R), which is defined as 100 times the measured concentration, divided by the true concentration of the spiked sample.

The following formula is used to calculate percent recovery, where %R is percent recovery; S_R is the measured result; and S_A is the true result:

$$\%R = S_R / S_A \times 100$$

Measurement performance specifications are used to determine the acceptability of LCS analyses as specified in Appendix A Table A7.1.

Laboratory Duplicates

A laboratory duplicate is an aliquot taken from the same container as an original sample under laboratory conditions and processed and analyzed independently. A laboratory duplicate is prepared in the laboratory by splitting aliquots of a sample, LCS, or matrix spike. Both samples are carried through the entire preparation and

analytical process. Laboratory duplicates are used to assess precision and are performed at a rate of one per preparation batch.

For most parameters except bacteria, precision is evaluated using the relative percent difference (RPD) between duplicate LCS results as defined by 100 times the difference (range) of each duplicate set, divided by the average value (mean) of the set. For duplicate results, X_1 and X_2 , the RPD is calculated from the following equation: (If other formulas apply, adjust appropriately.)

$$RPD = \frac{|X_1 - X_2|}{\left(\frac{X_1 + X_2}{2}\right)} \times 100$$

For bacteriological parameters, precision is evaluated using the results from laboratory duplicates. Bacteriological duplicates are analyzed on a 10% frequency (or once per preparation batch, whichever is more frequent). Sufficient volume should be collected to analyze laboratory duplicates from the same sample container.

The base-10 logarithms of the results from the original sample and its duplicate are calculated. The absolute value of the difference between the two base-10 logarithms is calculated and compared to the precision criterion in Appendix A, Table A7.1.

If the precision criterion is exceeded, the data are not acceptable for use under this project and are not reported to TCEQ. Results from all samples associated with that failed duplicate (usually a maximum of 10 samples) are considered to have excessive analytical variability and are qualified as not meeting project QC requirements.

The precision criterion in Appendix A, Table A7.1 for bacteriological duplicates applies only to samples with concentrations > 10 MPN.

Laboratory equipment blank

Laboratory equipment blanks are prepared at the laboratory where collection materials for metals sampling equipment are cleaned between uses. These blanks document that the materials provided by the laboratory are free of contamination. The QC check is performed before the metals sampling equipment is sent to the field. The analysis of laboratory equipment blanks should yield values less than the LOQ. If the result is not less than the LOQ, the equipment should not be used.

Matrix spike (MS) – Matrix spikes are prepared by adding a known quantity of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.

Matrix spikes indicate the effect of the sample on the precision and accuracy of the results generated using the selected method. Matrix-specific QC samples indicate the effect of the sample matrix on the precision and accuracy of the results generated using the selected method. The information from these controls is sample/matrix specific and would not normally be used to determine the validity of the entire batch. The frequency of matrix spikes is specified by the analytical method, or a minimum of one per preparation batch, whichever is greater. To the extent possible, matrix spikes prepared and analyzed over the course of the project should be performed on samples from different sites.

The components to be spiked shall be as specified by the mandated analytical method. The results from matrix spikes are primarily designed to assess the validity of analytical results in a given matrix, and are expressed as percent recovery (%R).

The percent recovery of the matrix spike is calculated using the following equation, where %R is percent recovery, S_{SR} is the concentration measured in the matrix spike, S_R is the concentration in the parent sample, and S_A is the concentration of analyte that was added:

$$\%R = \frac{S_{SR} - S_R}{S_A} \times 100$$

Matrix spike recoveries are compared to the acceptance criteria published in the mandated test method. If the matrix spike results are outside established criteria, the data for the analyte that failed in the parent sample is not

acceptable for use under this project and will not be reported to TCEQ. The result from the parent sample associated with that failed matrix spike will be considered to have excessive analytical variability and will be qualified by the laboratory as not meeting project QC requirements. Depending on the similarities in composition of the samples in the batch, the USIBWC El Paso Headquarters may consider excluding all of the results in the batch related to the analyte that failed recovery.

Matrix spike recoveries are compared to the same acceptance criteria established for the associated LCS recoveries, rather than the matrix spike recoveries published in the mandated test method. The EPA 1993 methods (i.e. ammonia-nitrogen, ion chromatography, TKN) that establish matrix spike recovery acceptance criteria are based on recoveries from drinking water that has very low interferences and variability and do not represent the matrices sampled in the CRP. If the matrix spike results are outside laboratory-established criteria, there will be a review of all other associated quality control data in that batch. If all of quality control data in the associated batch passes, it will be the decision of the laboratory QAO or USIBWC CRP Project Manager to report the data for the analyte that failed in the parent sample to TCEQ or to determine that the result from the parent sample associated with that failed matrix spike is considered to have excessive analytical variability and does not meet project QC requirements. Depending on the similarities in composition of the samples in the batch, the USIBWC CRP may consider excluding all of the results in the batch related to the analyte that failed recovery.

Method blank

A method blank is a sample of matrix similar to the batch of associated samples (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as the samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses. The method blanks are performed at a rate of once per preparation batch. The method blank is used to document contamination from the analytical process. The analysis of method blanks should yield values less than the LOQ. For very high-level analyses, the blank value should be less than 5% of the lowest value of the batch, or corrective action will be implemented. Samples associated with a contaminated blank shall be evaluated as to the best corrective action for the samples (e.g. reprocessing, data qualifying codes). In all cases the corrective action must be documented.

The method blank shall be analyzed at a minimum of one per preparation batch. In those instances for which no separate preparation method is used (e.g., VOA) the batch shall be defined as environmental samples that are analyzed together with the same method and personnel, using the same lots of reagents, not to exceed the analysis of 20 environmental samples.

Quality Control or Acceptability Requirements Deficiencies and Corrective Actions

Sampling QC excursions are evaluated by the USIBWC CRP Project Manager, in consultation with the USIBWC CRP QAO. In that differences in sample results are used to assess the entire sampling process, including environmental variability, the arbitrary rejection of results based on pre-determined limits is not practical. Therefore, the professional judgment of the USIBWC CRP Project Manager and QAO will be relied upon in evaluating results. Rejecting sample results based on wide variability is a possibility. Field blanks for trace elements and trace organics are scrutinized very closely. Field blank values exceeding the acceptability criteria will automatically invalidate the sample. Notations of blank contamination are noted in the quarterly report and the final QC Report. Equipment blanks for metals analysis are also scrutinized very closely.

Laboratory measurement quality control failures are evaluated by the laboratory staff. The disposition of such failures and the nature and disposition of the problem is reported to the USIBWC CRP Laboratory QAO. The Laboratory QAO will discuss with the USIBWC CRP Project Manager. If applicable, the USIBWC CRP Project Manager will include this information in the CAP and submit with the Progress Report which is sent to the TCEQ CRP Project Manager.

The definition of and process for handling deficiencies and corrective action are defined in Section C1.

B6 Instrument/Equipment Testing, Inspection, and Maintenance

All sampling equipment testing and maintenance requirements are detailed in the SWQM Procedures. Sampling equipment is inspected and tested upon receipt and is assured appropriate for use. Equipment records are kept on all field equipment and a supply of critical spare parts is maintained.

All laboratory tools, gauges, instrument, and equipment testing and maintenance requirements are contained within laboratory QM(s).

B7 Instrument Calibration and Frequency

Field equipment calibration requirements are contained in the SWQM Procedures. Post-calibration error limits and the disposition resulting from error are adhered to. Data collected from field instruments that do not meet the post-calibration error limits specified in the SWQM Procedures will not be submitted for inclusion into SWQMIS. The post-error limits can be seen at Table 7 B7.1.

Table 7: B7.1 Post- Calibration Check Error Limits

Parameter	Value
Dissolved oxygen	± 0.5 mg/L, ± 6 % saturation
pH	± 0.5 standard units
Specific conductance	± 5 %
Temperature	± 0.2 °C

Detailed laboratory calibrations are contained within the QM(s).

B8 Inspection/Acceptance of Supplies and Consumables

No special requirements for acceptance are specified for field sampling supplies and consumables. Reference to the laboratory QM may be appropriate for laboratory-related supplies and consumables.

B9 Acquired Data

Non-directly measured data, secondary data, or acquired data involves the use of data collected under another project, and collected with a different intended use than this project. The acquired data still meets the quality requirements of this project, and is defined below. The following data source(s) will be used for this project:

USIBWC and USGS gage station data will be used throughout this project to aid in determining gage height and flow. Rigorous QA checks are completed on gage data by the USIBWC and USGS and the data are approved by the USIBWC and USGS and permanently stored with these agencies. This data will be submitted to the TCEQ under parameter code 00061 Flow, Instantaneous or parameter code 74069 Flow Estimate depending on the proximity of the monitoring station to the USIBWC and USGS gage station.

Reservoir stage data are collected every day from the United States Geological Survey (USGS), International Boundary and Water Commission (IBWC), and the United States Army Corps of Engineers (USACE) websites. These data are preliminary and subject to revision. The Texas Water Development Board (TWDB) derives reservoir storage (in acre-feet) from these stage data (elevation in feet above mean sea level), by using the latest rating curve datasets available. These data are published at the TWDB website at <http://waterdatafortexas.org/reservoirs/statewide>. The web application uses real time gaged observations 7 AM reading each day (or closest reading available) from 119 major reservoirs to approximate daily storage for each reservoir, as well as daily total storage for water planning regions, river basins and the state of Texas. These instantaneous data are updated to mean daily data for all previous days. These data will be submitted to the TCEQ under parameter code 00052 Reservoir Stage and parameter code 00053 Reservoir Percent Full.

Insert additional sources of non-direct measurements as needed.

B10 Data Management

Data Management Process

Data will be managed in accordance with the DMRG and applicable USIBWC information resource management policies.

Quantitative measurements are taken in the field by personnel using multi-parameter instruments. Qualitative measurements, which include observational data (i.e. weather conditions), are also taken in the field. Samples for laboratory analysis are also collected. The field investigator has prime responsibility to assure that all pertinent information is recorded, is recorded correctly, and is recorded in the proper units. Rio Grande Basin Monitoring Program Partners (all collecting entities, and USIBWC personnel) will check all COC forms prior to shipping the sample to the laboratory to verify that all the pertinent required information has been included. All laboratories will ensure that the COC forms are properly filled out, and that all samples received are acceptable. All hand-entered data must be recorded legibly and with special care to maintain the decimal in its proper location.

Field measurements and sample collection are performed according to procedures recorded or referenced in Sections B2 and B3. Field data will be reported on the required data forms and submitted to the USIBWC CRP by the RGBMP partners, and laboratory results and chain of custody forms will be reported to the USIBWC CRP by the laboratories. The data from the forms is reviewed and checked for outliers by the USIBWC CRP Project Manager and QAO. This includes verifying the data against historical data for the site, as well as using the minimum and maximum limits for parameters set up in the Access software database that the USIBWC CRP uses. The data is entered into the database by the USIBWC CRP Project Manager and QAO using Access software. The Access software database, which was designed specifically for the USIBWC CRP, is then used to query the data for outliers and incorrect data format. The database will contain only data outlined in Table A7 collected or acquired by USIBWC and partners participating under this QAPP. Data is verified using the TCEQ SWQMIS data loader. Water quality monitoring data files are then submitted to the TCEQ CRP Project Manager. Both the TCEQ Project Manager and TCEQ Data Manager perform quality control checks on the data. The TCEQ Project Manager then approves the data and the TCEQ Data Manager loads the data into the SWQMIS database.

RGBMP water quality monitoring data added to the USIBWC CRP database undergoes the following quality control checks:

1. Each set of data forms received by USIBWC CRP are reviewed for the following:
 - a. valid and complete station number, date, time, and other applicable metadata;
 - b. comparison of station number to station description to ensure they both represent the same sampling point; and
 - c. that each value is represented by a valid parameter code.
2. The Data Review Checklist will be utilized to ensure that potential areas for error are addressed and reviewed prior to submission of data.

Even when accepted protocols are followed in collecting and analyzing environmental samples, a potential for loss of data quality arises in the manipulation and reporting of the data. Procedures that may lower the chance for number-handling errors are discussed in a subsequent section. Data exchange and management among USIBWC and RGBMP partners follow the lines of communication established in the organizational chart in Figure 1.

Data Dictionary

Terminology and field descriptions are included in the 2016 DMRG, or most recent version. A table outlining the entities that will be used when submitting data under this QAPP is included below for the purpose of verifying which entity codes are included in this QAPP.

Table 8: B10.1 Submitting and Collecting Entity Codes

Name of Monitoring Entity	Tag Prefix	Submitting Entity	Collecting Entity
USIBWC American Dam Field Office	BD	IB	IB
USIBWC Amistad Dam Field Office	BA	IB	IB
USIBWC Falcon Dam Field Office	BF	IB	IB
USIBWC Laredo Field Office	BL	IB	IB
USIBWC Presidio Office	BP	IB	IB
USIBWC Mercedes Field Office	BM	IB	IB
USIBWC El Paso Headquarters	BH	IB	IB
Univ. of TX RGV – Edinburg (UTRGV)	B	IB	PT
Big Bend National Park (BBNP)	B	IB	BB
City of Laredo Health Depart.	B	IB	LA
City of Laredo Env. Services	B	IB	LE
Univ. of TX at El Paso (UTEP)	B	IB	UE
Brownsville PUB (BPUB)	B	IB	BO
El Paso Community College (EPCC)	B	IB	EP
TX Parks and Wildlife Dept. (TPWD)	B	IB	PW
Midland College	B	IB	MC
Sul Ross State University	B	IB	SL

Data Errors and Loss

When the USIBWC CRP receives laboratory data, the data is checked by the USIBWC CRP Project Manager to ensure all contract requirements were met by the laboratory for the analysis. Upon receipt of field and laboratory data, the USIBWC CRP QAO ensures that no outliers or errors in the data are present. If any are observed, the USIBWC CRP QAO either corrects the error if possible or verifies the error with the source. The data is then given to the USIBWC CRP QAO who also checks the data for any errors. If any errors are present, the USIBWC CRP QAO corrects the error if possible or verifies the error with the source. The data is then entered into the Access database. Prior to exporting the data from Access for submittal to TCEQ, the database is queried for any errors by comparing the data with another database containing known Monitoring Station ID codes, approved Parameter codes, the LOQ's established in Table A7 of this QAPP, and normal minimum and maximum values for each analysis. Any data errors confirmed, or data deemed incorrect or of questionable quality, is not submitted to TCEQ. Any errors discovered by the database are corrected and the data is exported from Access into pipe delimited file formats as described in the Surface Water Quality Monitoring Data Management Reference Guide, 2016 or most recent version.

Record Keeping and Data Storage

All field data sheets and laboratory data received by the USIBWC CRP are entered into a logbook by the USIBWC CRP QAO. Complete data sets are assigned a tag ID and logged into a spreadsheet by the USIBWC CRP QAO.

Complete original data sets are archived in hard copy form and retained on-site by USIBWC CRP for a minimum of seven years. USIBWC CRP staff back up all electronic logs and datasets on external hard drives on at least a monthly basis. Additionally, IT personnel backup all network drives weekly at a separate location from the CRP. Data is submitted as required by the CRP guidance and all data that meets project performance specifications is stored in the SWQMIS database. All laboratories have separate data security measures as addressed by their procedures.

Data Handling, Hardware, and Software Requirements

The USIBWC CRP computer system is attached to a Novell Netware 6.5 Local Area Network (LAN) consisting of multiple servers and backup servers on a 10-BaseT backbone. The Netware 6.5 LAN is comprised of workstation nodes plus networked and individual printers. All components communicate with each other through switches (10/100) and routers. The switches give the user their Internet access through USIBWC's connection with a federally contracted communications provider via a T3 line. Details of hardware and software directly used to meet the requirements of this document are listed in the tables below:

Table 9: B10.2 Personal Computer and Software Configuration

Configuration	Current		Anticipated	
Type	Hardware/Software	Date	Hardware/Software	Date
PC Workstation Hardware	Dell configured as follows: Intel Core 2 Quad CPU Q9550 2.83 GHz; 3.25 GB RAM; 18" LCD Color Monitor 64MB 4x AGP Graphics Accelerator; 150GB Hard Drive; CD-RW drives; DVD-ROM drive; 3COM PCI 10/100 Twisted Pair Ethernet w/WOL Network Card; 104+ Keyboard; and MS IntelliMouse; Printer.	Three systems currently installed. As of 5/2015	System upgrades	As Determined by the USIBWC IT Dept.
PC Software	MS Windows XP 2002 Professional; Novell Netware 8 Groupwise; MS Office 2007 and 2010	As of 9/23/2013	Software upgrades	As Determined by the USIBWC IT Dept.
Portable PC Hardware	Portable PC: Dell Precision M2400; Intel Core 2Duo CPU P8600 2.4 GHz, 3.48 GB RAM; 300 GB Hard Drive, CD and DVD-RW drive; Lithium Ion battery with battery gauge and AC pack; Full size 88 key keyboard; and EZ Pad Plus Pointing device	As of 5/2015	Hardware upgrades	As Determined by the USIBWC IT Dept.
II Portable PC Software	Adobe Creative Suite 4 Master MS Office 2007 and 2010	As of 5/2015	Software upgrades	As Determined by the USIBWC IT Dept.
Data Backup System	Each workstation contains a 16x rewritable drive.	As of 5/2015		As Determined by the USIBWC IT Dept.

Table 10: B10.3 GIS Workstation Hardware and Software Configuration

Configuration	Current		Anticipated	
	Type	Hardware/Software	Date	Hardware/Software
PC Workstation Hardware	Dell configured as follows: Intel Core 2 Quad CPU Q9550 2.83 GHz; 3.25 GB RAM; 18" LCD Color Monitor 64MB 4x AGP Graphics Accelerator; 150GB Hard Drive; CD-RW drives; DVD-ROM drive; 3COM PCI 10/100 Twisted Pair Ethernet w/WOL Network Card; 104+ Keyboard; and MS IntelliMouse; Printer.	Three systems currently installed. As of 5/2015	System upgrades	As Determined by the USIBWC IT Dept.
PC Software	MS Windows XP 2002 Professional; Novell Netware 8 Groupwise; MS Office 2007 and 2010	As of 9/23/2013	Software upgrades	As Determined by the USIBWC IT Dept.
Portable PC Hardware	Portable PC: Dell Precision M2400; Intel Core 2Duo CPU P8600 2.4 GHz, 3.48 GB RAM; 300 GB Hard Drive, CD and DVD-RW drive; Lithium Ion battery with battery gauge and AC pack; Full size 88 key keyboard; and EZ Pad Plus Pointing device	As of 5/2015	Hardware upgrades	As Determined by the USIBWC IT Dept.
IPortable PC Software	Adobe Creative Suite 4 Master MS Office 2007 and 2010	As of 5/2015	Software upgrades	As Determined by the USIBWC IT Dept.
Data Backup System	Each workstation contains a 16x rewritable drive.	As of 5/2015		As Determined by the USIBWC IT Dept.

Information Resource Management Requirements

Data will be managed in accordance with the TCEQ DMRG, and applicable USIBWC CRP information resource management policies.

GPS equipment may be used as a component of the information required by the Station Location (SLOC) request process for creating the certified positional data that will ultimately be entered into SWQMIS database. Positional data obtained by CRP grantees using a GPS will follow the TCEQ's OPP 8.11 and 8.12 policy regarding the collection and management of positional data. All positional data entered into SWQMIS will be collected by a GPS certified individual with an agency approved GPS device to ensure that the agency receives reliable and accurate positional data. Certification can be obtained in any of three ways: completing a TCEQ training class, completing a suitable training class offered by an outside vendor, or by providing documentation of sufficient GPS expertise and experience. Contractors must agree to adhere to relevant TCEQ policies when entering GPS-collected data.

In lieu of entering certified GPS coordinates, positional data may be acquired with a GPS and verified with photo interpolation using a certified source, such as Google Earth or Google Maps. The verified coordinates and map interface can then be used to develop a new SLOC.

C1 Assessments and Response Actions

The following table presents the types of assessments and response actions for data collection activities applicable to this QAPP.

Table 11: C1.1 Assessments and Response Requirements

Assessment Activity	Approximate Schedule	Responsible Party	Scope	Response Requirements
Status Monitoring Oversight, etc.	Continuous	USIBWC CRP	Monitoring of the project status and records to ensure requirements are being fulfilled	Report to TCEQ in Quarterly Report
Monitoring Systems Audit of USIBWC CRP	Dates to be determined by TCEQ	TCEQ	Field sampling, handling and measurement; facility review; and data management as they relate to CRP	30 days to respond in writing to the TCEQ to provide corrective actions
Monitoring Systems Audit of Program Subparticipants	Dates to be determined by the USIBWC CRP (at least 4 in-person audits per year)*	USIBWC CRP	Field sampling, handling and measurement; facility review; and data management as they relate to CRP	30 days to respond in writing to the USIBWC El Paso Headquarters. PM will report problems to TCEQ in Progress Report.
Laboratory Assessment	Dates to be determined by TCEQ	TCEQ Laboratory Assessor	Analytical and quality control procedures employed at the laboratory and the contract laboratory	30 days to respond in writing to the TCEQ to provide corrective actions
Desk Audit/Data Traceability Review	Dates to be determined by the USIBWC (every biennium an on-site visit is not conducted)*	USIBWC CRP	Review of all calibration documentation, field sheet and chain of custody records. Data will be checked by selecting a date range and checking the data against USIBWC El Paso Headquarters records.	30 days to respond in writing to the USIBWC. PA will report problems to TCEQ in Progress Report.
<p>*The USIBWC CRP and the TCEQ Project Manager discussed adjusting the audits for the next contract period due to budgetary constraints. The new contract allows for this QAPP to specify that the USIBWC CRP will conduct a minimum of 4 in-person, on-site monitoring systems audits of 4 partners each contract year, excluding the laboratories. Must be 4 different partners for each fiscal year. When an on-site monitoring systems audit is not conducted during a given biennium, a desk audit or data traceability review may be conducted, for a total of 7 desk audits during each fiscal year of the contract. Readiness reviews will be conducted with all new partners, and all partners with new personnel.</p>				

Corrective Action Process for Deficiencies

Deficiencies are any deviation from this QAPP, *SWQM Procedures*, SOPs, or the DMRG. Deficiencies may invalidate resulting data and require corrective action. Repeated deficiencies should initiate a CAP. Corrective action for deficiencies may include for samples to be discarded and re-collected. Deficiencies are documented in logbooks, field data sheets, etc. by field or laboratory staff, are communicated to USIBWC CRP Project Manager (or other appropriate staff), and should be subject to periodic review so their responses can be uniform, and their frequency tracked. It is the responsibility of the USIBWC CRP Project Manager, in consultation with the USIBWC CRP QAO, to ensure that the actions and resolutions to the problems are documented and that records are maintained in accordance with this QAPP. In addition, these actions and resolutions will be conveyed to the CRP Project Manager both verbally and in writing in the project progress reports and by completion of a CAP.

The USIBWC CRP staff has developed an Excel spreadsheet to track any problems encountered by/with partners during the sampling process. This makes the process of tracking deficiencies with such a large number of partners much easier. When the USIBWC CRP Project Manager or QAO encounter an issue with a sampling event, such as late coolers, failure to meet temperature, calibration problems, etc., the event is logged into the spreadsheet. The information logged includes the partner, the stations affected, the sampling date, and what the problem was. The USIBWC CRP QAO works with the partner to correct the deficiency every time an entry is made into the spreadsheet. Once a partner accumulates three entries on the spreadsheet for the same deficiency, the USIBWC CRP QAO issues a CAP and the partner is required to correct the deficiency and respond. This process allows the USIBWC CRP staff to quickly correct things such as YSI probe malfunctions, but also allows the PM and QAO to see bigger problems that may require more training or other means of intervention.

Corrective Action

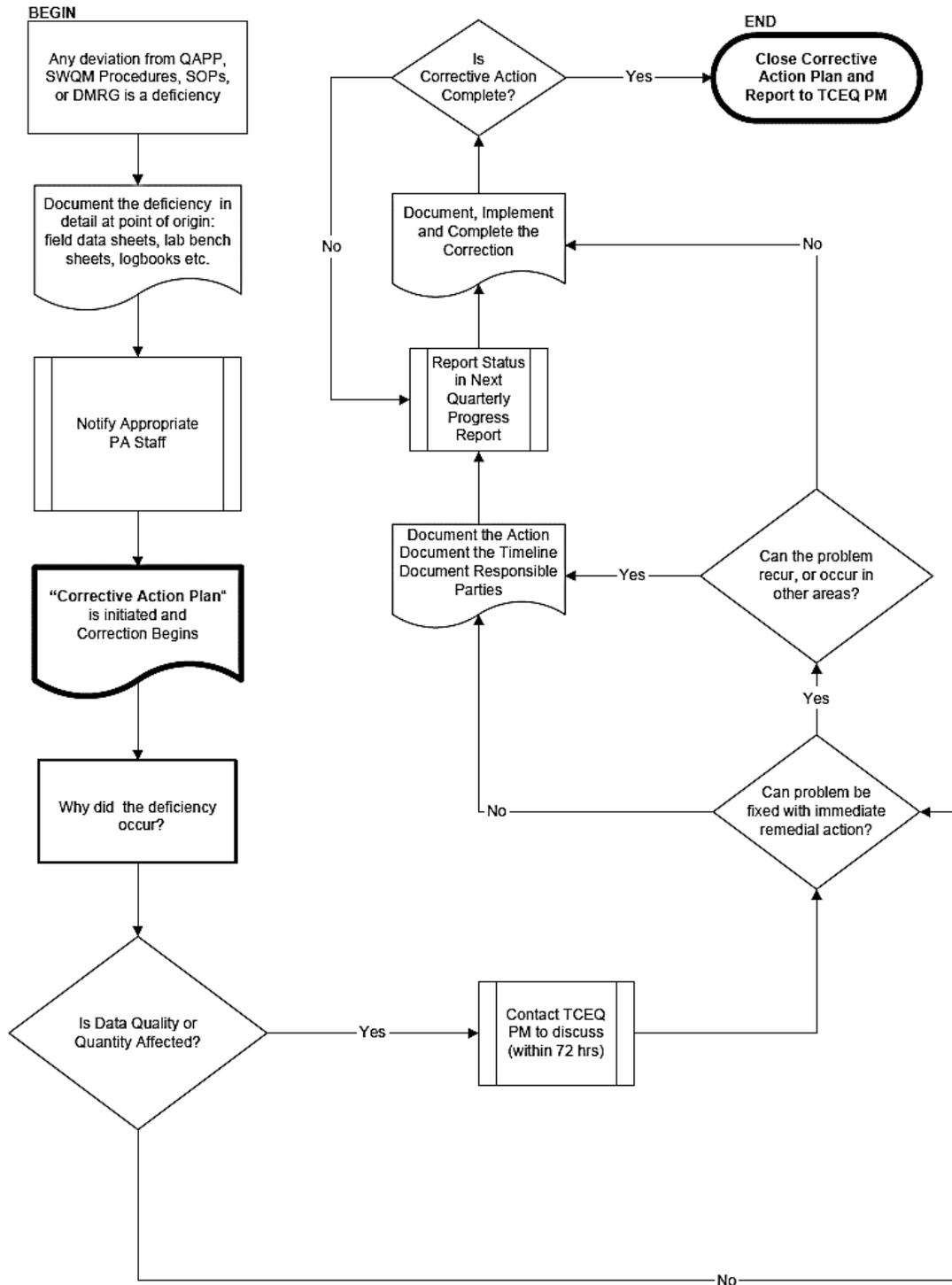
CAPs should:

- Identify the problem, nonconformity, or undesirable situation
- Identify immediate remedial actions if possible
- Identify the underlying cause(s) of the problem
- Identify whether the problem is likely to recur, or occur in other areas
- Evaluate the need for corrective action
- Use problem-solving techniques to verify causes, determine solution, and develop an action plan
- Identify personnel responsible for action
- Establish timelines and provide a schedule
- Document the corrective action

To facilitate the process a flow chart has been developed (see figure C1.1: Corrective Action Process for Deficiencies).

Figure 3: C1.1 Corrective Action Process for Deficiencies

Corrective Action Process for Deficiencies



Status of CAPs will be included with quarterly progress reports. In addition, significant conditions which, if uncorrected, could have a serious effect on safety or on the validity or integrity of data will be reported to the TCEQ immediately.

The USIBWC CRP QAO is responsible for implementing corrective actions and tracking deficiencies and corrective actions in a pre-CAP log. Upon the recording of three deficiencies for the same issue by the same partner, a CAP will be produced and submitted to partner to acknowledge the deficiency and what corrections will be made to prevent future deficiencies. Records of audit findings and corrective actions are maintained by the USIBWC CRP Project Manager. Audit reports and corrective action documentation will be submitted to the TCEQ with the Progress Report.

If audit findings and corrective actions cannot be resolved, then the authority and responsibility for terminating work are specified in the TCEQ QMP and in agreements in contracts between participating organizations.

C2 Reports to Management

Table 12: C2.1 QA Management Reports

Type of Report	Frequency (daily, weekly, monthly, quarterly, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation	Report Recipients
Monitoring Report	Quarterly	March 30, June 30, September 30, December 30	USIBWC CRP Project Manager or QAO	TCEQ Project Manager
Corrective Action Plan	Quarterly until completed	30 days from the day USIBWC became aware of the deviation	USIBWC CRP QAO	USIBWC CRP Project Manager, TCEQ Project Manager
Non-compliance Reports	As needed	With lab results to document lab issues or late cooler arrivals	Lab QAO	USIBWC CRP Project Manager
Data Review Summary	As needed	With Data Submittals	USIBWC CRP Project Manager or QAO	TCEQ Project Manager

Reports to TCEQ Project Management

All reports detailed in this section are contract deliverables and are transferred to the TCEQ in accordance with contract requirements.

Progress Report

Summarizes the USIBWC CRP's activities for each task; reports monitoring status, problems, delays, deficiencies, status of open CAPs, and documentation for completed CAPs; and outlines the status of each task's deliverables.

Monitoring Systems Audit Report and Response

Following any audit performed by the USIBWC CRP, a report of findings, recommendations and response is sent to the TCEQ in the quarterly progress report.

Data Summary

Contains basic identifying information about the data set and comments regarding inconsistencies and errors identified during data verification and validation steps or problems with data collection efforts (e.g. Deficiencies).

Reports by TCEQ Project Management

Contractor Evaluation

The USIBWC CRP participates in a Contractor Evaluation by the TCEQ annually for compliance with administrative and programmatic standards. Results of the evaluation are submitted to the TCEQ Financial Administration Division, Procurement and Contracts Section.

D1 Data Review, Verification, and Validation

All field and laboratory data will be reviewed and verified for integrity and continuity, reasonableness, and conformance to project requirements, and then validated against the project objectives and measurement performance specifications which are listed in Section A7. Only those data which are supported by appropriate quality control data and meet the measurement performance specifications defined for this project will be considered acceptable, and will be reported to the TCEQ for entry into SWQMIS.

D2 Verification and Validation Methods

All field and laboratory data will be reviewed, verified and validated to ensure they conform to project specifications and meet the conditions of end use as described in Section A7 of this document.

Data review, verification, and validation will be performed using self-assessments and peer and management review as appropriate to the project task. The data review tasks to be performed by field and laboratory staff is listed in the first two columns of Table D2.1, respectively. Potential errors are identified by examination of documentation and by manual, examination of corollary or unreasonable data, or computer-assisted. If a question arises or an error is identified, the manager of the task responsible for generating the data is contacted to resolve the issue. Issues which can be corrected are corrected and documented. If an issue cannot be corrected, the task manager consults with the higher level project management to establish the appropriate course of action, or the data associated with the issue are rejected and not reported to the TCEQ for storage in SWQMIS. Field and laboratory reviews, verifications, and validations are documented.

After the field and laboratory data are reviewed, another level of review is performed once the data are combined into a data set. This review step as specified in Table D2.1 is performed by the USIBWC CRP Data Manager and QAO. Data review, verification, and validation tasks to be performed on the data set include, but are not limited to, the confirmation of laboratory and field data review, evaluation of field QC results, additional evaluation of anomalies and outliers, analysis of sampling and analytical gaps, and confirmation that all parameters and sampling sites are included in this QAPP.

The Data Review Checklist (See Appendix F) covers three main types of review: data format and structure, data quality review, and documentation review. The Data Review Checklist is transferred with the water quality data submitted to the TCEQ to ensure that the review process is being performed.

Another element of the data validation process is consideration of any findings identified during the monitoring systems audit conducted by the TCEQ CRP Lead Quality Assurance Specialist. Any issues requiring corrective action must be addressed, and the potential impact of these issues on previously collected data will be assessed. After the data are reviewed and documented, the USIBWC CRP Project Manager validates that the data meet the data quality objectives of the project and are suitable for reporting to TCEQ.

If any requirements or specifications of the CRP are not met, based on any part of the data review, the responsible party should document the nonconforming activities and submit the information to the USIBWC CRP Data Manager with the data in the Data Summary (See Appendix F). All failed QC checks, missing samples, missing analytes, missing parameters, and suspect results should be discussed in the Data Summary.

Table 13: D2.1: Data Review Tasks

Data to be Verified	Field Task	Laboratory Task	QA Task
Sample documentation complete; samples labeled, sites identified	Field Personnel	Lab QAO	
Field QC samples collected for all analytes as prescribed in the TCEQ SWQM Procedures Manual	Field Personnel		
Standards and reagents traceable	Field Personnel	Lab QAO	
Chain of custody complete/acceptable	Field Personnel	Lab QAO	USIBWC QAO
NELAP Accreditation is current		Lab QAO	USIBWC QAO
Sample preservation and handling acceptable	Field Personnel	Lab QAO	
Holding times not exceeded		Lab QAO	USIBWC QAO
Collection, preparation, and analysis consistent with SOPs and QAPP	Field Personnel	Lab QAO	USIBWC QAO
Field documentation (e.g., biological, stream habitat) complete	Field Personnel		
Instrument calibration data complete	Field Personnel	Lab QAO	USIBWC QAO
QC samples analyzed at required frequency	Field Personnel	Lab QAO (?)	USIBWC PM
QC results meet performance and program specifications		Lab QAO	USIBWC QAO
Analytical sensitivity (LOQ/AWRL) consistent with QAPP		Lab QAO	USIBWC QAO
Results, calculations, transcriptions checked	Field Personnel	Lab QAO	USIBWC QAO
Laboratory bench-level review performed		Lab QAO	
All laboratory samples analyzed for all scheduled parameters		Lab Manager*	USIBWC PM
Corollary data agree	Field Personnel		USIBWC PM and QAO
Nonconforming activities documented	Field Personnel	Lab QAO	USIBWC QAO
Outliers confirmed and documented; reasonableness check performed			USIBWC PM and QAO
Dates formatted correctly			USIBWC PM and QAO

Data to be Verified	Field Task	Laboratory Task	QA Task
Depth reported correctly and in correct units			USIBWC PM and QAO
TAG IDs correct			USIBWC PM and QAO
TCEQ Station ID number assigned			USIBWC PM and QAO
Valid parameter codes			USIBWC PM and QAO
Codes for submitting entity(ies), collecting entity(ies), and monitoring type(s) used correctly			USIBWC PM and QAO
Time based on 24-hour clock			USIBWC PM and QAO
Check for transcription errors	Field Personnel	Lab QAO	USIBWC QAO
Sampling and analytical data gaps checked (e.g., all sites for which data are reported are on the coordinated monitoring schedule)			USIBWC PM
Field instrument pre- and post-calibration results within limits	Field Personnel		USIBWC QAO
10% of data manually reviewed			USIBWC PM and QAO
*The term "Lab Manager" includes the Technical Director at the City of Laredo Health Dept. laboratory.			

D3 Reconciliation with User Requirements

Data produced in this project, and data collected by other organizations (e.g., USGS, TCEQ, etc.), will be analyzed and reconciled with project data quality requirements. Data meeting project requirements may be used by the TCEQ for the Texas Water Quality Integrated Report in accordance with TCEQ's Guidance for Assessing and Reporting Surface Water Quality in Texas, August 2010 or most recent version, and for TMDL development, water quality standards development, and permit decisions, as appropriate. Data which do not meet requirements will not be submitted to SWQMIS nor will be considered appropriate for any of the uses noted in Section A5.

Appendix A: Measurement Performance Specifications (Table A7.1)

Measurement performance specifications define the data quality needed to satisfy project objectives. To this end, measurement performance specifications are qualitative and quantitative statements that:

- clarify the intended use of the data
- define the type of data needed to support the end use
- identify the conditions under which the data should be collected

Appendix A of this QAPP addresses measurement performance specifications, including:

- analytical methodologies
- AWRLs
- limits of quantitation
- bias limits for LCSs
- precision limits for LCSDs
- completeness goals
- qualitative statements regarding representativeness and comparability

The items identified above need to be considered for each type of monitoring activity. The CRP emphasizes that data should be collected to address multiple objectives, if possible, thereby maximizing the expenditure of resources. Caution should be applied when attempting to collect data for multiple purposes because measurement performance specifications may vary according to the purpose. For example, limits of quantitation may differ for data used to assess standards attainment and for trend analysis. When planning projects, first priority should be given to the main use of the project data and the data quality needed to support that use, then secondary goals should be considered.

Table A7.1 should be modified to reflect actual parameters, methods, etc. employed by the USIBWC CRP and its participants. Procedures for laboratory analysis must be in accordance with the most recently published edition of Standard Methods for the Examination of Water and Wastewater, 40 CFR 136, or otherwise approved independently. Only data collected that have a valid TCEQ parameter code assigned in Table A7.1 are stored in SWQMIS. Any parameters listed in Table A7.1 that do not have a valid TCEQ parameter code assigned will not be stored in SWQMIS.

Table A7.1 - Measurement Performance Specifications

TABLE A7.1 Measurement Performance Specifications					
Field Parameters					
Parameter	Units	Matrix	Method	Parameter Code	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE)	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	Field
TEMPERATURE, AIR (DEGREES CENTIGRADE)	DEG C	air	TCEQ SOP V1	00020	Field
RESERVOIR ACCESS NOT POSSIBLE LEVEL TOO LOW ENTER 1 IF REPORTING	NS	other	TCEQ Drought Guidance	00051	Field
RESERVOIR STAGE (FT ABOVE MEAN SEA LEVEL) **	FT ABOVE MSL	water	TWDB	00052	Field
RESERVOIR PERCENT FULL**	% RESERVOIR CAPACITY	water	TWDB	00053	Field
TRANSPARENCY, SECCHI DISC (METERS)	meters	water	TCEQ SOP V1	00078	Field
SPECIFIC CONDUCTANCE, FIELD (US/CM @ 25C)	us/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	Field
OXYGEN, DISSOLVED (MG/L)	mg/L	water	SM 4500-O G and TCEQ SOP V1	00300	Field
PH (STANDARD UNITS)	s.u	water	EPA 150.1 and TCEQ SOP V1	00400	Field
TURBIDITY, FIELD NEPHELOMETRIC TURBIDITY UNITS, N	NTU	water	SM 2130-B	82078	Field
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	meters	water	TCEQ SOP V2	82903	Field
AVERAGE STREAM WIDTH (METERS)	meters	water	TCEQ SOP V1	89861	Field
MAXIMUM POOL WIDTH AT TIME OF STUDY (METERS)***	meters	other	TCEQ SOP V2	89864	Field
MAXIMUM POOL DEPTH AT TIME OF STUDY(METERS)***	meters	other	TCEQ SOP V2	89865	Field
POOL LENGTH, METERS***	meters	other	TCEQ SOP V2	89869	Field

Parameter	Units	Matrix	Method	Parameter Code	Lab
% POOL COVERAGE IN 500 METER REACH***	%	other	TCEQ SOP V2	89870	Field
WIND INTENSITY (1=CALM,2=SLIGHT,3=MOD.,4=STRONG)	NU	other	NA	89965	Field
WIND DIRECTION (1=North, 2=South, 3=East, 4=West, 5=NE, 6=SE, 7=NW, 8=SW)	NU	other	NA	89010	Field
PRESENT WEATHER (1=CLEAR,2=PTCLDY,3=CLDY,4=RAIN,5=OTHER)	NU	other	NA	89966	Field
WATER SURFACE(1=CALM,2=RIPPLE,3=WAVE,4=WHITECAP)	NU	water	NA	89968	Field
PRIMARY CONTACT, OBSERVED ACTIVITY (# OF PEOPLE OBSERVED)	# of people observed	other	NA	89978	Field
EVIDENCE OF PRIMARY CONTACT RECREATION (1 = OBSERVED, 0 = NOT OBSERVED)	NU	other	NA	89979	Field
<p>Rio Grande USIBWC CRP partners that use this field table include USIBWC field offices, BBNP, TPWD, Midland College, EPCC/USIBWC CRP, UTEP, UTB, City of Laredo Env. Services Dept., Sul Ross Reporting to be consistent with SWQM guidance and based on measurement capability. **As published by the TX Water Development Board on their website *** To be routinely reported when collecting data from perennial pools.</p> <p>References: United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020 American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.) TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415). TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416)</p>					

TABLE A7.2 Measurement Performance Specifications

Flow Parameters					
Parameter	Units	Matrix	Method	Parameter Code	Lab
FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)	cfs	water	TCEQ SOP V1	00061	Field
FLOW SEVERITY:1=No Flow,2=Low,3=Normal,4=Flood,5=High,6=Dry	NU	water	TCEQ SOP V1	01351	Field
STREAM FLOW ESTIMATE (CFS)	cfs	Water	TCEQ SOP V1	74069	Field
FLOW MTH 1=GAGE 2=ELEC 3=MECH 4=WEIR/FLU 5=DOPPLER	NU	other	TCEQ SOP V1	89835	Field
<p>Rio Grande USIBWC CRP partners that use this field table include USIBWC field offices, BBNP, TPWD, Midland College, RGISC, EPCC/USIBWC CRP, UTEP, UTB, City of Laredo Env. Services Dept., Sul Ross</p> <p>References: United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020 American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.) TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415). TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416)</p>					

TABLE A7.3 Measurement Performance Specifications for A&B Environmental Services Inc.
Conventional Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Verification Sample %Rec (Method defined)	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
BIOCHEMICAL OXYGEN DEMAND (MG/L, 5 DAY - 20DEG C	mg/L	water	EPA 405.1,	00310	2	2	NA	NA	NA	A&B
ALKALINITY, TOTAL (MG/L AS CACO3)	mg/L	water	EPA 310.1, SM 2320B	00410	20	20	NA	20	NA	A&B
RESIDUE, TOTAL NONFILTRABLE (MG/L)	mg/L	water	SM 2540B, SM 2540D	00530	5	2.5	NA	NA	NA	A&B
RESIDUE, VOLATILE NONFILTRABLE (MG/L)	mg/L	water	EPA 160.4	00535	5	2.5	NA	NA	NA	A&B
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	EPA 350.3, SM 4500-NH3 D	00610	0.1	0.1	70-130	20	80-120	A&B
NITRITE PLUS NITRATE, TOTAL ONE LAB DETERMINED VALUE (MG/L AS N)	mg/L	water	EPA 300.0, EPA 353.2, EPA 353.3, EPA 9056, SM 4500-NO3 E	00630	0.05	0.05	70-130	20	80-120	A&B
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	EPA 200.7, EPA 365.2, SM 4500-P E	00665	0.06	0.05	70-130	20	80-120	A&B
CARBON, TOTAL ORGANIC, NPOC (TOC), MG/L	mg/L	water	EPA 415.1, EPA 9060, SM 5310 B	00680	2	1	70-130	10	80-120	A&B
CHLORIDE (MG/L AS CL)	mg/L	water	EPA 300.0 Rev. 2.1 (1993), EPA 9056	00940	5	0.1	70-130	20	80-120	A&B
FLUORIDE, TOTAL (MG/L AS F)	mg/L	water	EPA 300.0, EPA 340.2, EPA 9056, SM 4500-FC	00951	0.5	0.1	70-130	20	80-120	A&B
SULFATE (MG/L AS SO4)	mg/L	water	EPA 300.0 Rev. 2.1 (1993), EPA 9056	00945	5	0.1	70-130	20	80-120	A&B

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Verification Sample %Rec (Method defined)	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
BROMIDE, TOTAL (MG/L as BR)	mg/L	water	EPA 300.0, EPA 9056	71870	NA	0.1	70-130	20	80-120	A&B
CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	ug/L	water	SM 10200 H	32211	3	3	60-140	20	80-120	A&B
PHEOPHYTIN-A UG/L SPECTROPHOTOMETRIC ACID. METH.	µg/L	water	SM 10200 H	32218	3	3	60-140	NA	NA	A&B
RESIDUE, TOTAL FILTRABLE (DRIED AT 180C) (MG/L)	mg/L	water	SM 2540C	70300	10	10	NA	20	80-120	A&B

Rio Grande USIBWC CRP partners that use this field table include USIBWC field offices, BBNP, TPWD, Midland College, USIBWC El Paso HQ, EPCC/USIBWC El Paso HQ, UTEP, City of Laredo Env. Services Dept. Calcium, Sodium, Magnesium, Fluoride, Total Hardness and Potassium are listed in the Metals in Water but are part of the contract laboratory conventionals analysis for the USIBWC El Paso HQ monitoring program.
*Hardness is not used for regulatory purposes but is used to assess metals in water at inland sites (estuarine sites do not require hardness analysis).

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.)
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416)

TABLE A7.4 Measurement Performance Specifications for A&B Environmental Services Inc.

Bacteriological Parameters in Water									
Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	Log Difference of Duplicates	Bias %Rec. of LCS	Lab
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/100 mL	water	SM 9223-B**	31699	1	NA	0.50*	NA	A&B
E.COLI, COLILERT, IDEXX, HOLDING TIME	hours	water	NA	31704	NA	NA	NA	NA	A&B

Rio Grande USIBWC El Paso HQ partners that use this field table include USIBWC field offices, BBNP, TPWD, Midland College, RGISC, USIBWC El Paso HQ, EPCC/USIBWC El Paso HQ, UTEP, UTB, City of Laredo Env. Services Dept.

* This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.

** E.coli samples analyzed by SM 9223-B should always be processed as soon as possible and within 8 hours. When transport conditions necessitate delays in delivery longer than 6 hours, the holding time may be extended and samples must be processed as soon as possible and within 30 hours.

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.)

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416)

TABLE A7.5 Measurement Performance Specifications for Partners that use A&B Environmental Services Inc.

Metals in Water										
Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Verification Sample %Rec (Method defined)	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
HARDNESS, TOTAL (MG/L AS CaCO ₃)*	mg/L	water	EPA 130.2, SM 2340 B or C	00900	5	0.066	70-130	20	80-120	A&B
CALCIUM, TOTAL (MG/L AS Ca)€	mg/L	water	EPA 200.7, EPA 6010	00916	0.5	0.02	70-130	20	80-120	A&B
MAGNESIUM, TOTAL (MG/L AS Mg)€	mg/L	water	EPA 200.7, EPA 6010	00927	0.5	0.02	70-130	20	80-120	A&B
SODIUM, TOTAL (MG/L AS Na)€	mg/L	water	EPA 200.7, EPA 6010	00929	NA	0.1	70-130	20	80-120	A&B
POTASSIUM, TOTAL (MG/L AS K)€	mg/L	water	EPA 200.7, EPA 6010	00937	NA	1	70-130	20	80-120	A&B
BARIUM, TOTAL (UG/L AS Ba)	µg/L	water	EPA 200.7, EPA 200.8, EPA 6010, EPA 6020	01007	NA	10/1**	70-130	20	80-120	A&B
BERYLLIUM, TOTAL (UG/L AS Be)	µg/L	water	EPA 200.7, EPA 200.8, EPA 6010, EPA 6020	01012	NA	10/1**	70-130	20	80-120	A&B
CHROMIUM, TOTAL (UG/L AS Cr)	µg/L	water	EPA 200.7, EPA 200.8, EPA 6010, EPA 6020	01034	NA	10/1**	70-130	20	80-120	A&B
COBALT, TOTAL (UG/L AS Co)	µg/L	water	EPA 200.7, EPA 200.8, EPA 6010, EPA 6020	01037	NA	10/1**	70-130	20	80-120	A&B
COPPER, TOTAL (UG/L AS Cu)	µg/L	water	EPA 200.7, EPA 200.8, EPA 6010, EPA 6020	01042	NA	10/1**	70-130	20	80-120	A&B
IRON, TOTAL (UG/L AS Fe)	µg/L	water	EPA 200.7, EPA 200.8, EPA 6010, EPA 6020	01045	300	10/1**	70-130	20	80-120	A&B

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Verification Sample %Rec (Method defined)	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
MANGANESE, TOTAL (UG/L AS MN)	µg/L	water	EPA 200.7, EPA 200.8, EPA 6010, EPA 6020	01055	50	10/1**	70-130	20	80-120	A&B
THALLIUM, TOTAL (UG/L AT TL)	µg/L	water	EPA 200.8	01059	NA	1	70-130	20	80-120	A&B
MOLYBDENUM, TOTAL (UG/L AS MO)	µg/L	water	EPA 200.7, EPA 200.8, EPA 6010, EPA 6020	01062	NA	10/1**	70-130	20	80-120	A&B
NICKEL, TOTAL (UG/L AS NI)	µg/L	water	EPA 200.7, EPA 200.8, EPA 6010, EPA 6020	01067	NA	10/1**	70-130	20	80-120	A&B
SILVER, TOTAL (UG/L AS AG)	µg/L	water	EPA 200.7, EPA 200.8, EPA 6010	01077	NA	10/1**	70-130	20	80-120	A&B
ZINC, TOTAL (UG/L AS ZN)	µg/L	water	EPA 200.7, EPA 200.8, EPA 6010, EPA 6020	01092	NA	10/1**	70-130	20	80-120	A&B
ANTIMONY, TOTAL (UG/L AS SB)	µg/L	water	EPA 200.7, EPA 200.8, EPA 6010, EPA 6020	01097	NA	10/1**	70-130	20	80-120	A&B
TIN, TOTAL, UG/L AS SN	µg/L	water	EPA 200.7	01102	NA	10	70-130	20	80-120	A&B
ALUMINUM, TOTAL (UG/L AS AL)	ug/L	water	EPA 200.7, EPA 200.8, EPA 6010, EPA 6020	01105	NA	10/1**	70-130	20	80-120	A&B
ARSENIC, TOTAL (UG/L AS AS)	ug/L	water	EPA 200.7, EPA 200.8, EPA 6010, EPA 6020	01002	NA	10/1**	70-130	20	80-120	A&B

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Verification Sample %Rec (Method defined)	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
CADMIUM, TOTAL (UG/L AS Cd)	ug/L	water	EPA 200.7, EPA 200.8, EPA 6010, EPA 6020	01027	NA	10/1**	70-130	20	80-120	A&B
LEAD, TOTAL (UG/L AS Pb)	ug/L	water	EPA 200.7, EPA 200.8, EPA 6010, EPA 6020	01051	NA	10/1**	70-130	20	80-120	A&B
MERCURY TOTAL, WATER, METHOD 1631 ug/L	ug/L	water	EPA 1631E, EPA 245.1	71960	0.0006	0.0005	70-130	20	80-120	A&B Sub to Summit
SELENIUM, TOTAL (UG/L AS SE)	ug/L	water	EPA 200.7, EPA 200.8 Rev 5.4 (1998), EPA 6010, EPA 6020	01147	2	10/1**	70-130	20	80-120	A&B

Rio Grande USIBWC CRP partners that use this field table include USIBWC field offices, BBNP, TPWD, Midland College, USIBWC El Paso HQ, EPCC/USIBWC El Paso HQ, UTEP, City of Laredo Env. Services Dept. Mercury analysis is subcontracted by A&B to Summit Laboratories, whose adherence letter is on file.

*Hardness is not used for regulatory purposes but is used to assess metals in water at inland sites (estuarine sites do not require hardness analysis).

**The calibration curve and LOQ are different depending on the technology used. The ICP-OES method (200.7 or 6010) has an LOQ of 10 ppb. The ICP-MS method (200.8 or 6020) has an LOQ of 1 ppb. It is expressed in the table as 10/1 for 200.7/200.8.

€ Total Hardness, Calcium, Magnesium, Sodium, Potassium, and Fluoride are part of the contract laboratory conventionals analysis for the USIBWC El Paso HQ monitoring program.

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.)

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416)

TABLE A7.6 Measurement Performance Specifications for Partners that use A&B Environmental Services Inc.

Metals in Sediment										
Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Verification Sample %Rec (Method defined)	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
ARSENIC, BOTTOM DEPOSITS (MG/KG AS AS DRY WT)	mg/kg	sediment	EPA 6010, EPA 6020	01003	16.5	0.5	60-140	30	60-140	A&B
BARIUM, BOTTOM DEPOSITS (MG/KG AS BA DRY WT)	mg/kg	sediment	EPA 6010, EPA 6020	01008	NA	0.5	60-140	30	60-140	A&B
CADMIUM, TOTAL, BOTTOM DEPOSITS (MG/KG, DRY WT)	mg/kg	sediment	EPA 6010, EPA 6020	01028	2.49	0.5	60-140	30	60-140	A&B
CHROMIUM, TOTAL, BOTTOM DEPOSITS (MG/KG, DRY WT)	mg/kg	sediment	EPA 6010, EPA 6020	01029	55.5	0.5	60-140	30	60-140	A&B
COPPER, BOTTOM DEPOSITS (MG/KG AS CU DRY WT)	mg/kg	sediment	EPA 6010, EPA 6020	01043	74.5	0.5	60-140	30	60-140	A&B
LEAD, BOTTOM DEPOSITS (MG/KG AS PB DRY WT)	mg/kg	sediment	EPA 6010, EPA 6020	01052	64	0.5	60-140	30	60-140	A&B
MANGANESE, BOTTOM DEPOSITS (MG/KG AS MN DRY WG)	mg/kg	sediment	EPA 6010, EPA 6020	01053	550	0.5	60-140	30	60-140	A&B
NICKEL, TOTAL, BOTTOM DEPOSITS (MG/KG, DRY WT)	mg/kg	sediment	EPA 6010, EPA 6020	01068	24.3	0.5	60-140	30	60-140	A&B
SILVER, BOTTOM DEPOSITS (MG/KG AS AG DRY WT)	mg/kg	sediment	EPA 6010, EPA 6020	01078	1.1	0.5	60-140	30	60-140	A&B
ZINC, BOTTOM DEPOSITS (MG/KG AS ZN DRY WT)	mg/kg	sediment	EPA 6010, EPA 6020	01093	205	0.5	60-140	30	60-140	A&B

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Verification Sample %Rec (Method defined)	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
ANTIMONY, BOTTOM DEPOSITS (MG/KG AS SB DRY WT)	mg/kg	sediment	EPA 6010, EPA 6020A	01098	12.5	1.25	60-140	30	60-140	A&B
ALUMINUM, BOTTOM DEPOSITS (MG/KG AS AL DRY WT)	mg/kg	sediment	EPA 6010, EPA 6020	01108	NA	0.5	60-140	30	60-140	A&B
SELENIUM, BOTTOM DEPOSITS (MG/KG AS SE DRY WT)	mg/kg	sediment	EPA 6010, EPA 6020	01148	NA	0.5	60-140	30	60-140	A&B
MERCURY, TOT. IN BOT. DEPOS. (MG/KG) AS HG DRY WG	mg/kg	sediment	EPA 7470	71921	0.355	0.01	60-140	30	60-140	A&B
SEDIMENT PRCTL.SIZE CLASS >2.0MM GRAVEL %DRY WT*	% DRY WT	sediment	ASTM D 422, ASTM 442-63	80256	NA	NA	NA	%gravel - 20	NA	A&B
SOLIDS IN SEDIMENT, PERCENT BY WEIGHT (DRY)	% DRY WT	sediment	SM 2540G	81373	NA	NA	NA	20	NA	A&B
PARTICLE SIZE, 0.05-0.002mm SILT, DRYWT,SEDIMENT*	%	sediment	ASTM D 422, ASTM 442-63	49906	NA	NA	NA	%silt - 20	NA	A&B
SEDIMENT PRTL.SIZE CLASS.0039-.0625 SILT %DRY W*	% DRY WT	sediment	ASTM D 422, ASTM 442-63	82008	NA	NA	NA	%silt - 20	NA	A&B
PARTICLE SIZE,CLAY0.002-0.0002mm DRYWT,SEDIMENT%*	%	sediment	ASTM D 422, ASTM 442-63	49900	NA	NA	NA	%clay - 20	NA	A&B
SEDIMENT PRCTL.SIZE CLASS <.0039 CLAY %DRY WT*	%	sediment	ASTM D 422, ASTM 442-63	82009	NA	NA	NA	%clay - 20	NA	A&B
SEDIMENT PRCTL.SIZE CLASS,SAND .0625-2MM %DRYWT*	%	sediment	ASTM D 422, ASTM 442-63	89991	NA	NA	NA	%sand - 20	NA	A&B

Rio Grande CRP partners that use this field table include USIBWC Amistad Dam field office and City of Laredo Env. Services Dept. *Sediment conventionals are not used for regulatory purposes but are extremely important in determining the availability of sediment toxics. Sediment grain size and TOC are recommended when analyzing metals and/or organics in sediment.

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.)

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416)

TABLE A7.7 Measurement Performance Specifications for El Paso Water International Water Quality Laboratory

Conventional Parameters in Water										
Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
BIOCHEMICAL OXYGEN DEMAND (MG/L, 5 DAY - 20DEG C	mg/L	water	SM 5210B	00310	2	2	NA	NA	NA	IWQL
CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	µg/L	water	SM 10200 H	32211	3	3	NA	20	80-120	IWQL
TURBIDITY,LAB NEPHELOMETRIC TURBIDITY UNITS, NTU	NTU	water	SM 2130B	82079	0.5	0.1	NA	NA	NA	IWQL

The IWQL lab analyzes samples collected by the USIBWC American Dam field office.

References:
 United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
 American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.)
 TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
 TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416)

TABLE A7.8 Measurement Performance Specifications for El Paso Water International Water Quality Laboratory

Bacteriological Parameters in Water										
Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Log Difference of Duplicates	Bias %Rec. of LCS	Lab
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/100 mL	water	SM 9223-B	31699	1	1	NA	0.50*	NA	IWQL

The IWQL lab analyzes samples collected by the USIBWC American Dam field office.
 * This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.

References:

- United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
- American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.)
- TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, 2012 (RG-415).
- TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416)

TABLE A7.9 Measurement Performance Specifications for City of Laredo Health Department Lab

Field Parameters					
Parameter	Units	Matrix	Method	Parameter Code	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE)	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	Field
SPECIFIC CONDUCTANCE, FIELD (US/CM @ 25C)	us/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	Field
TEMPERATURE, AIR (DEGREES CENTIGRADE)	DEG C	air	SM 2520 and TCEQ SOP V1	00020	Field
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	Field
AVERAGE STREAM WIDTH (METERS)	meters	water	TCEQ SOP V1	89861	Field
WIND INTENSITY (1=CALM,2=SLIGHT,3=MOD.,4=STRONG)	NU	other	NA	89965	Field
WIND DIRECTION (1= North, 2= South, 3= East, 4=West, 5= NE, 6= SE, 7= NW, 8= SW)	NU	other	NA	89010	Field
PRESENT WEATHER (1=CLEAR,2=PTCLDY,3=CLDY,4=RAIN,5=OTHER)	NU	other	NA	89966	Field
PRIMARY CONTACT, OBSERVED ACTIVITY (# OF PEOPLE OBSERVED)	# of people observed	other	NA	89978	Field
EVIDENCE OF PRIMARY CONTACT RECREATION (1 = OBSERVED, 0 = NOT OBSERVED)	NU	other	NA	89979	Field

The City of Laredo Health Department field sampling crew uses this table. Reporting to be consistent with SWQM guidance and based on measurement capability.

References:

Quality Control Lab documents from City of Laredo Health Department Laboratory and NELAP certification.
 United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
 American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.)
 TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
 TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416)

TABLE A7.10 Measurement Performance Specifications for City of Laredo Health Department Lab

Bacteriological Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	Log Difference of Duplicates	Bias %Rec. of LCS	Lab
FECAL COLIFORM, MEMBR FILTER, M-FC BROTH, #/100ML	#/100ML	water	SM 9222 D	31616	1	1	0.50*	NA	Laredo
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/100 mL	water	SM 9223-B, IDEXX Colilert	31699	1	1	0.50*	NA	Laredo

The City of Laredo Health Department Lab analyzes the bacteria samples collected by the City of Laredo Health Department.
 * This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.

References:
 United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
 American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 21st Edition, 2005.
 TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
 TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416)

TABLE A7.11 Measurement Performance Specifications for City of Laredo Health Department

Flow Parameters					
Parameter	Units	Matrix	Method	Parameter Code	Lab
FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)	cfs	water	TCEQ SOP V1	00061	Field
FLOW SEVERITY:1=No Flow,2=Low,3=Normal,4=Flood,5=High,6=Dry	NU	water	TCEQ SOP V1	01351	Field
STREAM FLOW ESTIMATE (CFS)	cfs	Water	TCEQ SOP V1	74069	Field
FLOW MTH 1=GAGE 2=ELEC 3=MECH 4=WEIR/FLU 5=DOPPLER	NU	other	TCEQ SOP V1	89835	Field
<p>The City of Laredo Health Department field sampling crew uses this table.</p> <p>References: United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020 American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.) TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415). TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416)</p>					

TABLE A7.12 Measurement Performance Specifications for BPUB										
Conventional Parameters in Water										
Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Verification Sample %Rec (Method defined)	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
BIOCHEMICAL OXYGEN DEMAND (MG/L, 5 DAY - 20DEG C	mg/L	water	SM 5210B	00310	2	1	70-130	NA	NA	BPUB
RESIDUE, TOTAL NONFILTRABLE (MG/L)	mg/L	water	EPA 160.2, SM 2540D	00530	5	2	70-130	NA	NA	BPUB
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	EPA 350.3, SM 4500 NH3 D	00610	0.1	0.1	70-130	20	80-120	BPUB
RESIDUE, TOTAL FILTRABLE (DRIED AT 180C) (MG/L)	mg/L	water	SM 2540C	70300	10	10	70-130	20	80-120	BPUB
TURBIDITY, LAB NEPHELOMETRIC TURBIDITY UNITS, NTU	NTU	water	EPA 180.1	82079	0.5	0.05	70-130	NA	NA	BPUB
<p>The BPUB analyzes their own data, and also analyzes the <i>Enterococcus</i> samples submitted to them by UISBWC CRP partners. The BPUB does not collect field parameters.</p> <p>References: Quality Control Lab documents from Brownsville PUB and NELAP certification. United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020 American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.) TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415). TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416)</p>										

TABLE A7.13 Measurement Performance Specifications for BPUB									
Bacteriological Parameters in Water									
Parameter	Units	Matrix	Method	Parameter Code	ICEQ AWRL	LOQ	Log Difference of Duplicates	Bias %Rec. of LCS	Lab
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/100 mL	water	SM 9223-B	31699	1	1	0.50*	NA	BPUB
ENTEROCOCCI, ENTEROLERT, IDEXX, (MPN/100 ML)	MPN/100 mL	water	IDEXX Enterolert	31701	10**	10	0.50*	NA	BPUB
<p>The BPUB analyzes their own data, and also analyzes the Enterococcus samples submitted to them by UTB</p> <p>* This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.</p> <p>**Enterococcus Samples should be diluted 1:10 for all waters.</p> <p>References: United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020 American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.) TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, 2012 (RG-415). TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416)</p>									

Appendix B: Task 3 Work Plan & Sampling Process Design and Monitoring Schedule (Plan)

TASK 3: WATER QUALITY MONITORING

Objectives: Water quality monitoring will focus on collecting information to characterize water quality in a variety of locations and conditions. These efforts will include a combination of:

- planning and coordinating basin-wide monitoring;
- routine, regularly-scheduled monitoring to collect long-term information and support statewide assessment of water quality; and
- systematic, regularly-scheduled short-term monitoring to screen water bodies for issues.

Task Description: The study area encompasses the Rio Grande River from the Texas-New Mexico border upstream of El Paso, Texas downstream to the Gulf of Mexico, including 1,255 miles of the international border with Mexico. For planning purposes the basin has been divided into 4 sub-basins as follows: the Upper Rio Grande Sub-Basin from El Paso to Amistad Dam; the Pecos River Sub-Basin from Red Bluff Reservoir to the confluence with the Rio Grande; the Middle Rio Grande Sub-Basin extending from below Amistad Dam downstream to Falcon Dam; and the Lower Rio Grande Sub-Basin from below Falcon Dam to the Gulf of Mexico.

The Performing Party will complete the following subtasks described below:

Monitoring Description – In FY 2018, the Performing Party CRP, Performing Party field offices, and participating partner agencies will collect water quality data at a minimum of 52 stations throughout the basin. **The actual number of sites, location, frequency and parameters collected for FY 2018 will be based on priorities identified at the Basin Advisory Committee (BAC) Meetings and Coordinated Monitoring Meetings and included in the amended Appendix B schedule of this QAPP.**

Parameter groups and frequencies planned for FY 2018 include but are not limited to:

- 44 stations monitored monthly for field, conventionals, bacteria and flow (when possible);
- One of the stations will also be sampled once for metals in sediment;
- One other station will be monitored for metals in sediment;
- Two stations will be monitored for metals in water; and
- Seven stations will be monitored monthly for field and bacteria only.

For FY 2019, the Performing Party will monitor at a similar level of effort as FY 2018.

All monitoring procedures and methods will follow the guidelines prescribed in the Performing Party QAPP, the TCEQ Surface Water Quality Monitoring (SWQM) Procedures, Volume 1: Physical and Chemical Monitoring Methods (RG-415) and the TCEQ SWQM Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data (RG-416).

Coordinated Monitoring Meeting (CMM) - The Performing Party will hold annual coordinated monitoring meetings as described in the CRP Guidance. The Performing Party will hold CMMs for the Upper (split into two different meetings), Middle and Lower Rio Grande Sub-Basins (two meetings), and the Pecos River Sub-Basin for a total of 5 CMM meetings. Additional CMMs may be added to facilitate attendance of partners covering a large geographical area. Qualified monitoring organizations will be invited to attend the working meeting in which monitoring needs and purposes will be discussed segment-by-segment and station-by-station. Information from participants and stakeholders will be used to select stations and parameters that will enhance overall water quality monitoring coverage, eliminate duplication of effort, and address basin priorities. A summary of the changes to the monitoring schedule will be provided to the participants within two weeks of the

meeting. The changes to the monitoring schedule will be entered into the statewide database on the Internet (<http://cms.lcra.org>) and communicated to meeting attendees. Changes to monitoring schedules that occur during the course of the year will be entered into the statewide database on the Internet and communicated to meeting attendees.

Monitoring Activities Report - Each QPR (Task 1) will include a Monitoring Activities Report with all types of monitoring and indicate the number of sampling events and the types of monitoring conducted in the quarter.

Deliverables and Dues Dates:

September 1, 2017 through August 31, 2018

- A. Conduct water quality monitoring, summarize activities in the Monitoring Activities Report, and submit with QPR - December 15, 2017; March 15 and June 15, 2018
- B. CMMS - between March 15 and April 30, 2018
- C. CMMS Summary of Changes - within 2 weeks of the meetings
- D. Email notification that CMS updates are complete - May 31, 2018

September 1, 2018 through August 31, 2019

- A. Conduct water quality monitoring, summarize activities in the Monitoring Activities Report, and submit with QPR - September 15 and December 15, 2018; March 15 and June 15 and August 31, 2019
- B. CMMS - between March 15 and April 30, 2019
- C. CMMS Summary of Changes - within 2 weeks of the meeting
- D. Email notification that CMS updates are complete - May 31, 2019

Appendix B Sampling Process Design and Monitoring Schedule (plan)

The following language and table can be used to meet the requirements of this section. In addition to the table, reference maps should be included. The table is provided as an example only. However, consistency with the TCEQ format and general categories when filling in the monitoring table is mandatory.

Sample Design Rationale FY 2018

The sample design is based on the legislative intent of CRP. Under the legislation, the Basin Planning Agencies have been tasked with providing data to characterize water quality conditions in support of the Texas Water Quality Integrated Report, and to identify significant long-term water quality trends. Based on Steering Committee input, achievable water quality objectives and priorities and the identification of water quality issues are used to develop work plans which are in accord with available resources. As part of the Steering Committee process, the USIBWC CRP coordinates closely with the TCEQ and other participants to ensure a comprehensive water monitoring strategy within the watershed.

The following changes or additions have been made to the monitoring schedule. These changes have come about because of concerns or requests of steering committee members or monitoring entities.

- Upper:
 - New station at Rio Grande at Ft. Quitman will be added to the schedule in FY18. A SLOC will be done.
 - Station 20558 will be added back into the schedule in FY18. Will be monitored quarterly for field, bacteria and conventionals.

- Middle:
 - Stations 17410, 15818, 15817, 13202, 15816, 15814 and 21542 monitored by RGISC (RN) changed collecting entities, from RN to IB. The USIBWC Laredo FO is picking these stations up.
 - Station 13196 will be added to the monitoring schedule in FY18. This station will be added quarterly for field, bacteria, and conventionals. Monitored by USIBWC Laredo FO.
 - Station 17596 will be collected by a different USIBWC field office, but collecting entity will remain the same, IB.

- Lower:
 - Stations 13176, 16288, 13179, and 13178 have been removed from the schedule. The partner dropped out of the program.

- Pecos: No changes with CRP partners.

Table 14: Appendix B.1, shown below, contains groups of analytes and which analytes are typically analyzed by each lab. The groups are arranged similarly to Table A7 found in Appendix A. An “X” in the column indicates that the analyte is analyzed by the entity shown.

Table 14: Appendix B.1 Analyte Groups and Monitoring Entities

Analyte Group and Analyte	A&B	IWQL	BPUB	Laredo Health
Conventional				
TSS	X		X	
VSS	X			
Ammonia N	X	X	X	
Nitrite plus Nitrate N	X			
Total Phosphorus P	X			
Chloride	X			
Sulfate	X			
TDS calculated	X		X	
Chlorophyll a	X	X		
Pheophytin a	X			
Total Alkalinity	X			
Turbidity		X	X	
Biological Oxygen Demand	X	X	X	
Total Organic Carbon	X			
Hardness	X			
Calcium	X			
Magnesium	X			
Sodium	X			
Potassium	X			
Fluoride	X			
Bromide	X			
Bacteria				
<i>E. Coli</i>	X	X	X	X
<i>E. Coli</i> holding time	X			
Enterococcus			X	
Fecal Coliform				X
Metals in Water	X			
Metals in Sediment	X			

Table 15: Appendix B.2, shown below, specifies which lab each CRP partners sends their samples to for analysis. The groups are arranged similarly to Table A7 found in Appendix A. An “X” in the column indicates that the sends their samples to that particular lab.

Table 15: Appendix B.2 CRP Partners and their Affiliated Lab

Partner	A&B	IWQL	BPUB	Laredo Health
USIBWC American Dam Field Office		Bacteria Conventionals		
USIBWC Amistad Dam Field Office	Conventionals Bacteria Metals in Sed			
USIBWC Falcon Dam Field Office	Conventionals Bacteria			
USIBWC Laredo Field Office	Conventionals Bacteria			
USIBWC Presidio Field Office	Conventionals Bacteria Metals in Wat			
USIBWC Mercedes Field Office	Conventionals Bacteria			
Big Bend National Park	Conventionals Bacteria Metals in Wat			
Brownsville Public Utilities Board			Bacteria Conventionals	
El Paso Community College (with CRP)	Conventionals Bacteria			
City of Laredo Environmental Services	Conventionals Bacteria Metals in Wat Metals in Sed			
City of Laredo Health Department				Bacteria
TX Parks and Wildlife Department	Conventionals Bacteria Metals in Wat			
University of Texas RGV – Edinburg	Conventionals Bacteria			
Midland College	Conventionals Bacteria			
University of TX at El Paso- Walsh (UTEP and with CRP)	Conventionals Bacteria			
USIBWC El Paso Headquarters	Conventionals Bacteria			

*Falcon Dam Field Office Station 13103 collects only TDS, T. Phosphorus, Nitrate+Nitrite, Ammonia and bacteria when there is flow.

Table 16: Appendix B.3, shown below, contains the CRP partners and what field sheets each partner uses. An “X” in the column indicates that the partner uses that particular field sheet(s).

Table 16: Appendix B.3 CRP Partners and their Field Sheets

Partner	Field form With Turbidity	Field form without turbidity	Sediment sample field form	Drought field form	Partial Field Form
USIBWC American Dam Field Office		X			
USIBWC Amistad Dam Field Office		X	X	X	
USIBWC Falcon Dam Field Office		X			
USIBWC Laredo Field Office	X	X			
USIBWC Presidio Field Office		X		X	
USIBWC Mercedes Field Office		X			
Big Bend National Park		X		X	
Brownsville Public Utilities Board					
El Paso Community College (with CRP)		X			
City of Laredo Environmental Services		X	X	X	
City of Laredo Health Department					X
TX Parks and Wildlife Department		X		X	
University of Texas RGV – Edinburg		X			
Midland College		X		X	
University of TX at El Paso- Walsh (UTEP and with CRP)		X		X	
USIBWC El Paso Headquarters		X		X	

Site Selection Criteria

This data collection effort involves monitoring routine water quality, using procedures that are consistent with the TCEQ SWQM program, for the purpose of data submission into the SWQMIS database maintained by the TCEQ. To this end, some general guidelines are followed when selecting sampling sites, as outlined below, and discussed thoroughly in SWQM Procedures, Volumes I and II. Overall consideration is given to accessibility and safety. All monitoring activities have been developed in coordination with the CRP Steering Committee and with the TCEQ.

1. Locate stream sites so that samples can be safely collected from the centroid of flow. Centroid is defined as the midpoint of that portion of stream width which contains 50 percent of the total flow. If multiple potential sites on a stream segment are appropriate for monitoring, choose one that would best represent the water body, and not a site that displays unusual conditions or contaminant source(s). Avoid backwater areas or eddies when selecting a stream site.
2. At a minimum for reservoirs, locate sites near the dam (reservoirs) and in the major arms. Larger reservoirs might also include stations in the middle and upper (riverine) areas. Select sites that best represent the water body by avoiding coves and back water areas. A single monitoring site is considered representative of 25 percent of the total reservoir acres, but not more than 5,120 acres.
3. Routine monitoring sites are selected to maximize stream coverage or basin coverage. Very long segments may require more stations. As a rule of thumb, stream segments between 25 and 50 miles long require two stations, and longer than 50 miles require three or more depending on the existence of areas with significantly different sources of contamination or potential water quality concerns. Major hydrological features, such as the confluence of a major tributary or an instream dam, may also limit the spatial extent of an assessment based on one station.
4. Because historical water quality data can be very useful in assessing use attainment or impairment, it may be best to use sites that are on current or past monitoring schedules.
5. All classified segments (including reservoirs) should have at least one routine monitoring site that adequately characterizes the water body, and monitoring should be coordinated with the TCEQ or other qualified monitoring entities reporting routine data to TCEQ.
6. Routine monitoring sites may be selected to bracket sources of pollution, influence of tributaries, changes in land uses, and hydrological modifications.
7. Sites should be accessible. When possible, stream sites should have a USGS or IBWC stream flow gauge. If not, it should be possible to conduct flow measurement during routine visits.

Monitoring Sites for FY 2018

The sample design for SWQM is shown in Table B1.1 below.

Table B1.1 Sample Design and Schedule, FY 2018

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments
Segment 2302 Rio Grande Below Falcon Reservoir Map																						
RIO GRANDE AT EL JARDIN PUMP STATION LOCATED 350 METERS WEST OF INTERSECTION OF MONSEES ROAD AND CALLE MILPA VERDE Map	13177	2302	15	IB	IB	RT									8			8	8		8	

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments
RIO GRANDE RIVER AT HWY 281/INTERNATIONAL BLVD IN HIDALGO Map	13181	2302	15	IB	IB	RT									8			8	8		8	
RIO GRANDE AT FM 886 NEAR LOS EBANOS Map	13184	2302	15	IB	IB	RT									7			7	7		7	
RIO GRANDE RIVER AT FORT RINGGOLD 1.6 KILOMETERS DOWNSTREAM OF RIO GRANDE CITY Map	13185	2302	15	IB	IB	RT									12			12	12		12	
RIO GRANDE RIVER 4.1 KILOMETERS DOWNSTREAM OF THE CONFLUENCE WITH RIO ALAMO NEAR FRONTON TEXAS Map	13186	2302	15	IB	IB	RT									8			8	8		8	
RIO GRANDE RIVER 0.8 KILOMETERS DOWNSTREAM OF ANZALDUAS DAM AND 16.4 KILOMETERS UPSTREAM FROM HIDALGO TEXAS Map	13664	2302	15	IB	IB	RT									8			8	8		8	
RIO GRANDE 300M UPSTREAM OF PHARR INTERNATIONAL BRIDGE/US 281 Map	15808	2302	15	IB	IB	RT									8			8	8		8	

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments
<u>RIO GRANDE RIVER AT BROWNSVILLE PUB WATER TREATMENT PLANT NUMBER 1 INTAKE BETWEEN WTP RESERVOIR AND RIO GRANDE LEVEE 910 METERS WEST AND 335 METERS SOUTH TO THE INTERSECTION OF WEST ELIZABETH STREET AND SOUTH MILITARY ROAD</u> Map	20449	2302	15	IB	BO	RT									12			12				E. coli and limited conventionals
<u>RIO GRANDE APPROX 380 METERS DOWNSTREAM OF CONFLUENCE WITH LOS OLMOS CREEK</u> Map	21749	2302	15	IB	PT	RT									4			4	4		4	New site, added FY16
<u>LOS OLMOS CREEK AT US 83/EAST 2ND STREET SOUTH OF RIO GRANDE CITY</u> Map	13103	2302A	15	IB	IB	RT									3			3	3		3	
<u>LOS OLMOS CREEK AT US 83/EAST 2ND STREET SOUTH OF RIO GRANDE CITY</u> Map	13103	2302A	15	IB	PT	RT									3			3	3		3	Added FY16.
<u>ARROYO LOS OLMOS AT SH 755 NW OF RIO GRANDE CITY</u> Map	13104	2302A	15	IB	PT	RT									4			4	4		4	Added FY16.
<u>ARROYO LOS OLMOS 400M UPSTREAM OF CONFLUENCE WITH RIO GRANDE NEAR RIO GRANDE CITY</u>	21591	2302A	15	IB	PT	RT									4			4	4		4	Added FY16.

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments
Segment 2303 International Falcon Reservoir Map																						
<u>FALCON LAKE AT INTERNATIONAL BOUNDARY MONUMENT I</u> Map	13189	2303	16	IB	IB	RT									4			4			4	
<u>RIO GRANDE AT WEBB/ZAPATA COUNTY LINE</u> Map	15817	2303	16	IB	IB	RT									12			12	12		12	
<u>FALCON RESERVOIR AT SAN YGNACIO WTP INTAKE WEST OF US 83 INTERSECTION WITH FM 3169</u> Map	15818	2303	16	IB	IB	RT									2			2			2	
Segment 2304 Rio Grande Below Amistad Reservoir Map																						
<u>RIO GRANDE AT PIPELINE CROSSING 8.7 MI DOWNSTREAM LAREDO</u> Map	13196	2304	16	IB	IB	RT									4			4	4		4	Below the NLIWWTP
<u>RIO GRANDE 50 YD UPSTREAM OF CONFLUENCE OF ZACATA CREEK AND RIO GRANDE</u> Map	13200	2304	16	IB	LA	RT												12			12	
<u>RIO GRANDE LAREDO WATER TREATMENT PLANT PUMP INTAKE</u> Map	13202	2304	16	IB	LA	RT												12			12	E. coli and FC, and field
<u>RIO GRANDE LAREDO WATER TREATMENT PLANT PUMP INTAKE</u> Map	13202	2304	16	IB	IB	RT									4			4	4		4	

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments
<u>RIO GRANDE 12.8 MI DOWNSTREAM AMISTAD DAM NEAR GAGE 340 M UPSTREAM OF US 277 BRIDGE IN DEL RIO</u> Map	13208	2304	16	IB	IB	RT									2			2	2		2	
<u>RIO GRANDE 4.5 MI DOWNSTREAM OF DEL RIO AT MOODY RANCH</u> Map	13560	2304	16	IB	IB	RT									4			4	4		4	frequency reduced FY12 to add another station in Eagle Pass (20997)
<u>RIO GRANDE AT JUAREZ-LINCOLN INTERNATIONAL BRIDGE / BRIDGE #2 IN LAREDO</u> Map	15814	2304	16	IB	LA	RT												12	12		12	E. coli and FC; flow from IBWC gage; field data
<u>RIO GRANDE AT JUAREZ-LINCOLN INTERNATIONAL BRIDGE / BRIDGE #2 IN LAREDO</u> Map	15814	2304	16	IB	IB	RT									4			4	4		4	
<u>RIO GRANDE AT MASTERSON RD IN LAREDO 9.9KM DWNSTR INTL BRIDGE #1/WEST BRIDGE DWNSTR SOUTHSIDE WWTP AND UPSTREAM NUEVO LAREDO WWTP</u> Map	15815	2304	16	IB	LA	RT												12			12	E.coli and fecal coliform, and field data
<u>RIO GRANDE AT RIO BRAVO 0.5KM DWNSTR OF THE COMMUNITY OF EL CENIZO</u> Map	15816	2304	16	IB	IB	RT									4			4			4	Reactivated for FY 15

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments
RIO GRANDE AT THE COLOMBIA BRIDGE 2.7KM UPSTREAM OF THE DOLORES PUMP STATION 45.1KM UPSTREAM OF THE LAREDO WTP INTAKE Map	15839	2304	16	IB	LA	RT												12	12		12	E. coli and FC; flow from IBWC gage; field data
RIO GRANDE AT WORLD TRADE BRIDGE ON FM 3484 Map	17410	2304	16	IB	IB	RT								4				4	4		4	
RIO GRANDE AT APACHE RANCH WEST OF INTERSECTION OF PRIVATE ROAD AND EASTERN AIRSTRIP NO BETWEEN LARADO AND EAGLE PASS Map	17596	2304	16	IB	IB	RT								4				4	4		4	Collected by USIBWC Laredo FO
RIO GRANDE 115 METERS SOUTH AND 304 METERS WEST FROM THE INTERSECTION OF RANCHO VIEJO DRIVE/ZEBU COURT AND RIENDA DRIVE IN FATHER MCNABOE CITY PARK IN LAREDO Map	20650	2304	16	IB	LA	RT												12			12	E.coli and fecal

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments
<u>RIO GRANDE AT MAIN STREET BOAT RAMP APPROX 400 METERS UPSTREAM OF US 57/INTERNATIONAL BRIDGE IN EAGLE PASS</u> Map	20997	2304	16	IB	IB	RT							4		4			4	4		4	new station FY12 to fill data gap in AU 2304_08; quarterly sampling of metals in sediment added FY17.
<u>RIO GRANDE AT KICKAPOO CASINO BOAT RAMP SOUTH OF EAGLE PASS</u> Map	20999	2304	16	IB	IB	RT									8			8	8		8	replaces 18795 and 18792; removal of metals in sediment FY17.
<u>RIO GRANDE AT EL CENIZO PARK 220 METERS WEST OF INTERSECTION OF CADENA AND JIMENEZ</u> Map	21542	2304	16	IB	IB	RT									4			4			4	
<u>MANADAS CREEK AT FM 1472 NORTH OF LAREDO</u> Map	13116	2304B	16	IB	LE	RT					4		4		4			4			4	Total Metals in Water and Dissolved Metals in Water are both being analyzed. The Total Metals are submitted to TCEQ and the Dissolved Metals are not, due to when the sample is filtered. Dissolved Metals in water data can be found on IBWC website.

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments
Segment 2305 International Amistad Reservoir Map																						
<u>RIO GRANDE 3.03 KILOMETERS UPSTREAM OF RATTLESNAKE CANYON SOUTH WEST OF LANGTRY</u> Map	20624	2305	16	IB	BB	RT															1	field data collected at least once a year by canoe
<u>RIO GRANDE 1.04 KILOMETERS EAST AND 367 METERS SOUTH FROM THE SOUTH END OF FOSTERS RANCH ROAD IN VAL VERDE COUNTY</u> Map	20627	2305	16	IB	BB	RT															1	field data collected at least once a year by canoe
<u>RIO GRANDE 1.35 KILOMETERS DOWNSTREAM FROM LANGTRY CREEK AND PUMP CANYON AND 870 METERS EAST AND 350 METERS SOUTH FROM THE INTERSECTION OF STATE PARK ROAD 25 AND TORRES AVENUE IN VAL VERDE COUNTY</u> Map	20630	2305	16	IB	BB	RT															1	field data collected at least once a year by canoe

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments
Segment 2306 Rio Grande Above Amistad Reservoir Map																						
RIO GRANDE 1.895 KILOMETERS SOUTH AND 552 METERS WEST FROM THE INTERSECTION OF UNNAMED STREET AND FOSTER RANCH ROAD AND 10.1021 KILOMETERS SOUTH AND 4.37 KILOMETERS WEST FROM THE INTERSECTION OF US HIGHWAY 90 AND FOSTERS RANCH ROAD IN VAL VERDE COUNTY CAMS 759 Map	13223	2306	16	IB	BB	RT															1	Field data will be reported at least once in the year.
RIO GRANDE AT HORSE CANYON 2.4 MI DOWNSTREAM OF GERSTACKER BRIDGE Map	13224	2306	6	IB	BB	RT															1	field data will be reported at least once in the year
RIO GRANDE AT FM 2627/GERSTACKER BRIDGE DOWNSTREAM BIG BEND Map	13225	2306	6	IB	BB	RT															1	field data will be reported at least once in the year
RIO GRANDE AT STILLWELL CROSSING Map	13226	2306	6	IB	BB	RT															1	Field data collected by canoe at least once a year.
RIO GRANDE AT THE MOUTH OF SANTA ELENA CANYON Map	13228	2306	6	IB	BB	RT					2				8			8	8		8	Metals - Total Mercury sampled FY12

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments
<u>RIO GRANDE 449 METERS WEST AND 121 METERS SOUTH FROM THE INTERSECTION OF RANCH ROAD 170 AND RANCH ROAD 169 IN PRESIDIO COUNTY CAMS 758 Map</u>	13229	2306	6	IB	IB	RT					2				8			8	8		8	Metals - Total Mercury sampled FY12
<u>RIO GRANDE IMMEDIATELY DOWNSTREAM FROM MOUTH OF LOZIER CANYON 44 KM SE OF DRYDEN Map</u>	13722	2306	7	IB	BB	RT															1	field data collected at least once a year by canoe
<u>RIO GRANDE AT BOAT RAMP AT RIO GRANDE VILLAGE IN BIG BEND NATIONAL PARK Map</u>	16730	2306	6	IB	BB	RT					2				8			8	8		8	Metals - Total Mercury sampled FY12
<u>RIO GRANDE RIVER AT COLORADO CANYON APPROX 30KM SE OF REDFORD ON RR170 IN PRESIDIO COUNTY Map</u>	16862	2306	6	IB	PW	RT					2				4			4			4	Metals - Total Mercury sampled FY12; sampling frequency reduced to quarterly
<u>RIO GRANDE AT PRESIDIO RAILROAD BRIDGE 3.25KM DOWNSTREAM OF US67 SOUTH OF PRESIDIO Map</u>	17000	2306	6	IB	IB	RT												8	8		8	
<u>RIO GRANDE AT PRESIDIO/OJINAGA TOLL BRIDGE/INTERNATIONAL 0.75KM DOWNSTREAM OF US67 IN PRESIDIO Map</u>	17001	2306	6	IB	IB	RT												8	8		8	

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments
<u>RIO GRANDE AT LAJITAS RESORT/FM 170 BOAT RAMP 240 M UPSTREAM OF BLACK HILLS CREEK CONFLUENCE NEAR LAJITAS</u> Map	18441	2306	6	IB	PW	RT					2				4			4			4	Metals - Total Mercury sampled FY12
<u>RIO GRANDE AT BOQUILLAS CROSSING IN BIG BEND NATIONAL PARK</u> Map	20619	2306	6	IB	BB	RT															1	field data collected at least once a year by canoe
<u>RIO GRANDE AT TAYLORS FARM SOUTHWEST OF SANDERSON</u> Map	20623	2306	6	IB	BB	RT															1	field data collected at least once a year by canoe
<u>RIO GRANDE 50 METERS UPSTREAM OF SILBER CANYON SOUTH OF SANDERSON IN BREWSTER COUNTY</u> Map	20625	2306	6	IB	BB	RT															1	field data collected at least once a year by canoe
<u>RIO GRANDE DOWNSTREAM OF RODEO RAPIDS SOUTH OF SANDERSON IN BREWSTER COUNTY</u> Map	20626	2306	6	IB	BB	RT															1	field data collected at least once a year by canoe
<u>RIO GRANDE 1.3 KILOMETERS DOWNSTREAM OF BEAR CANYON AND APPROXIMATELY 9.3 KILOMETERS DOWNSTREAM OF COOK CREEK IN TERRELL COUNTY</u> Map	20628	2306	7	IB	BB	RT															1	field data collected at least once a year by canoe

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments		
<u>RIO GRANDE 570 METERS NORTH AND 605 METERS WEST FROM THE SOUTH END OF SHAFER CROSSING ROAD AND 1.90 KILOMETERS DOWNSTREAM OF BRITTON CANYON IN TERRELL COUNTY</u> Map	20629	2306	7	IB	BB	RT															1	field data collected at least once a year by canoe		
<u>RIO GRANDE AT THE CONFLUENCE WITH INDIAN CREEK IN TERRELL COUNTY</u> Map	20631	2306	7	IB	BB	RT															1	field data collected at least once a year by canoe		
<u>RIO GRANDE 7.5 KILOMETERS UPSTREAM FROM THE CONFLUENCE WITH SAN FRANCISCO CREEK IN BREWSTER COUNTY</u> Map	20632	2306	6	IB	BB	RT															1	field data collected at least once a year by canoe		
Segment 2307 Rio Grande Below Riverside Diversion Dam Map																								
<u>RIO GRANDE 3.38 KILOMETERS UPSTREAM FROM THE CONFLUENCE WITH THE RIO CONCHOS 6.72 KILOMETERS WEST AND 2.445 KILOMETERS NORTH FROM THE INTERSECTION OF RANCH ROAD 170 AND RODRIQUEZ ROAD IN PRESIDIO COUNTY CAMS 757</u> Map	13230	2307	6	IB	IB	RT					2				8						8	8	8	Metals - Total Mercury sampled FY12

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments
<u>RIO GRANDE AT RIVERSIDE CANAL 1.8 KM DOWNSTREAM OF ZARAGOSA INTERNATIONAL BRIDGE</u> Map	14465	2307	16	IB	IB	RT									12			12	12		12	Monitored by IBWC American Dam FO. Partial conventional analysis. Additional data for metals, organics and other conventionals available thru IBWC.
<u>RIO GRANDE UPSTREAM OF CANDELARIA 0.5 KM UPSTREAM OF CAPOTE CREEK CONFLUENCE</u> Map	17407	2307	6	IB	IB	RT									4			4	4		4	Added FY17. Due to shipping issues and remoteness, will test to see if 30 hr HT can be met.
<u>RIO GRANDE AT GUADALUPE POINT OF ENTRY BRIDGE AT FM 1109 WEST OF TORNILLO</u> Map	15704	2307	6	IB	IB	RT									4			4	4		4	Metals in water removed FY16. USIBWC Hdqrs with UTEP, CE may be UE
<u>RIO GRANDE AT ALAMO CONTROL STRUCTURE 9.7KM UPSTREAM OF FT HANCOCK PORT OF ENTRY</u> Map	15795	2307	6	IB	IB	RT									4			4			4	
Segment 2308 Rio Grande Below International Dam Map																						
<u>RIO GRANDE 1.3 KM DOWNSTREAM FROM HASKELL ST WWTP OUTFALL</u> Map	15528	2308	6	IB	IB	RT									12			12	12		12	Monitored by IBWC American Dam FO. Partial conventional analysis. Additional data for metals, organics and other conventionals available thru IBWC.
Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments
<u>RIO GRANDE 2.4 KM UPSTREAM FROM HASKELL ST WWTP</u> <u>OUTFALL SOUTH OF BOWIE HIGH SCHOOL FOOTBALL STADIUM IN EL PASO</u> Map	15529	2308	6	IB	IB	RT									12			12	12		12	Monitored by IBWC American Dam FO. Partial conventional analysis. Additional data for metals, organics and other conventionals available thru IBWC.

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments
Segment 2310 Lower Pecos River Map																						
<u>PECOS RIVER APPROX 355 METERS DOWNSTREAM FROM THE CONFLUENCE WITH INDEPENDENCE CREEK Map</u>	14163	2310	7	IB	MC	RT									3			3	6		6	Collecting conv, bacteria, flow, field 3x/yr; field and flow only 3 additional times/yr
Segment 2311 Upper Pecos River																						
<u>PECOS RIVER APPROXIMATELY 2.98 KM UPSTREAM OF THE CONFLUENCE WITH INDEPENDENCE CREEK Map</u>	14164	2311	7	IB	MC	RT									3				6		6	Collecting conv, field, flow 3x/yr; field and flow only 3 additional times/yr
<u>KOKERNOT SPRINGS 105 METERS SOUTH 20 METERS EAST FROM THE INTERSECTION OF ALPINE CREEK AND HENDRYX</u>	20558	2311	6	IB	SL	RT									4				4		4	Added back in FY18.
Segment 2314 Rio Grande Above International Dam Map																						
<u>RIO GRANDE AT COURCHESNE BRIDGE 1.7 MI UPSTREAM FROM AMERICAN DAM CAMS 718 Map</u>	13272	2314	6	IB	IB	RT									12			12	12		12	Monitored by IBWC American Dam FO. Partial conventional analysis. Additional non-accredited data available with IBWC for metals, Organics, and other conventionals.

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments
RIO GRANDE AT BORDERLAND RD. NW OF EL PASO Map	13274	2314	6	IB	IB	RT									4			4	4		4	In support of Paso del Norte Watershed Councils 319h grant and for stakeholder concerns for bacteria. Total Mercury removed FY16. USIBWC Hdqtrs with EPCC, CE may be EP.

Site Description	Station ID	Water body ID	Region	SE	CE	MT	24 hr DO	Aq Hab	Ben	Nek	Met Wat	Org Wat	Met Sed	Org Sed	Conv	Amb Tox Wat	Amb Tox Sed	Bact	Flow	Fish Tiss	Field	Comments
<u>RIO GRANDE 40M SOUTH OF VINTON BRIDGE APPROXIMATELY 4 KMS OF ANTHONY</u> Map	13275	2314	6	IB	IB	RT									4			4	4		4	In support of Paso del Norte Watershed Councils 319h grant and for stakeholder concerns for bacteria. Total Mercury removed FY16. USIBWC Hdqtrs with EPCC, CE may be EP.
<u>RIO GRANDE IMMEDIATELY UPSTREAM OF THE CONFL WITH ANTHONY DRAIN WEST OF LA TUNA PRISON NEAR THE STATE LINE</u> Map	13276	2314	6	IB	IB	RT									4			4	8		8	In support of Paso del Norte Watershed Councils 319h grant and for stakeholder recreation concerns. Total Mercury removed FY16. 4x/yr field data only. USIBWC Hdqtrs with EPCC, CE may be EP.
<u>RIO GRANDE RIVER AT AMERICAN EAGLE BRICK FACTORY BRIDGE ABANDONED RR 0.1 MI DOWNSTREAM FROM SOUTHERN PACIFIC RR AT SMELTERTOWN</u> Map	15089	2314	6	IB	IB	RT									3			5			5	Metals in water removed FY16. 2x/yr bacteria and field data only. USIBWC Hdqtrs with UTEP, CE may be UE
<u>RIO GRANDE AT ANAPRA BRIDGE ON SUNLAND PARK DRIVE 4.2 KM UPSTREAM OF AMERICAN DAM IN NEW MEXICO</u> Map	17040	2314	6	IB	IB	RT									4			4			6	Total metals in water removed FY16. 2x/yr field only. USIBWC Hdqtrs with EPCC, CE may be EP.

Appendix C: Station Location Maps

Station Location Maps

Maps of stations monitored by the USIBWC CRP are provided below. The maps were generated by the USIBWC CRP. This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. For more information concerning this map, contact the USIBWC CRP Program Manager, Leslie Grijalva, at 915-832-4770.

Figure 4: Map of the Upper Rio Grande Basin, Northern Half

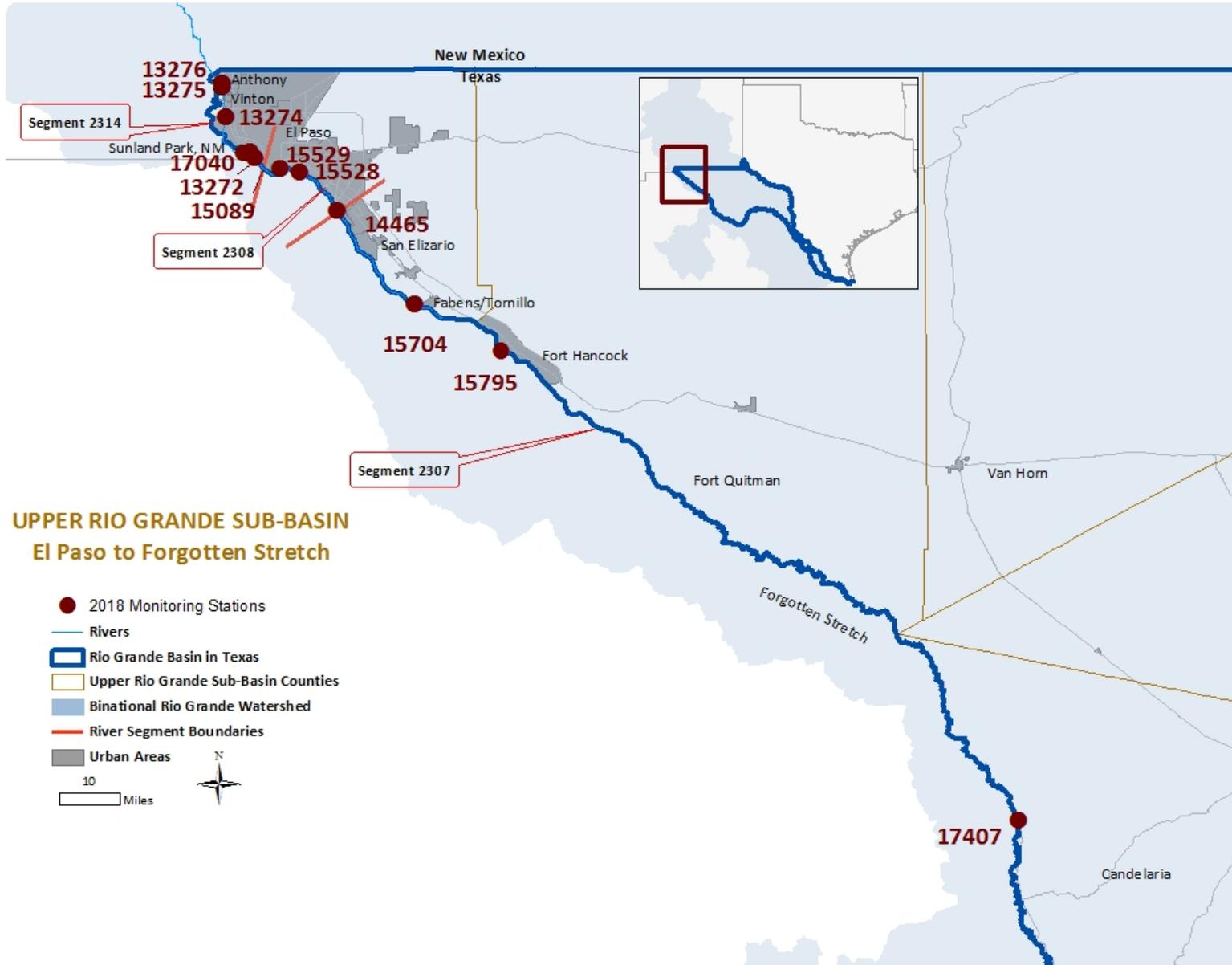


Figure 5: Map of the Upper Rio Grande Basin, Southern Half

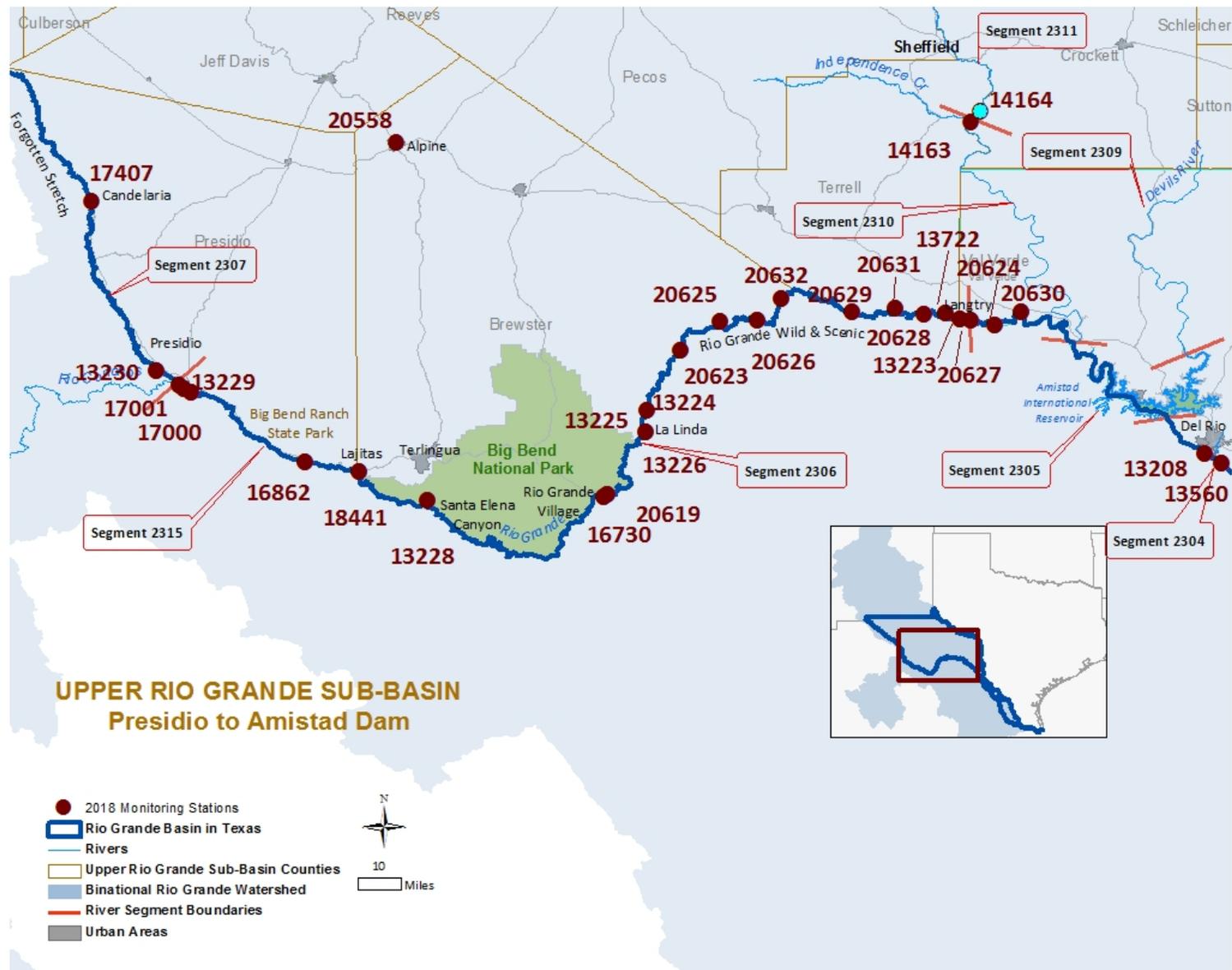


Figure 6: Map of the Middle Rio Grande Basin

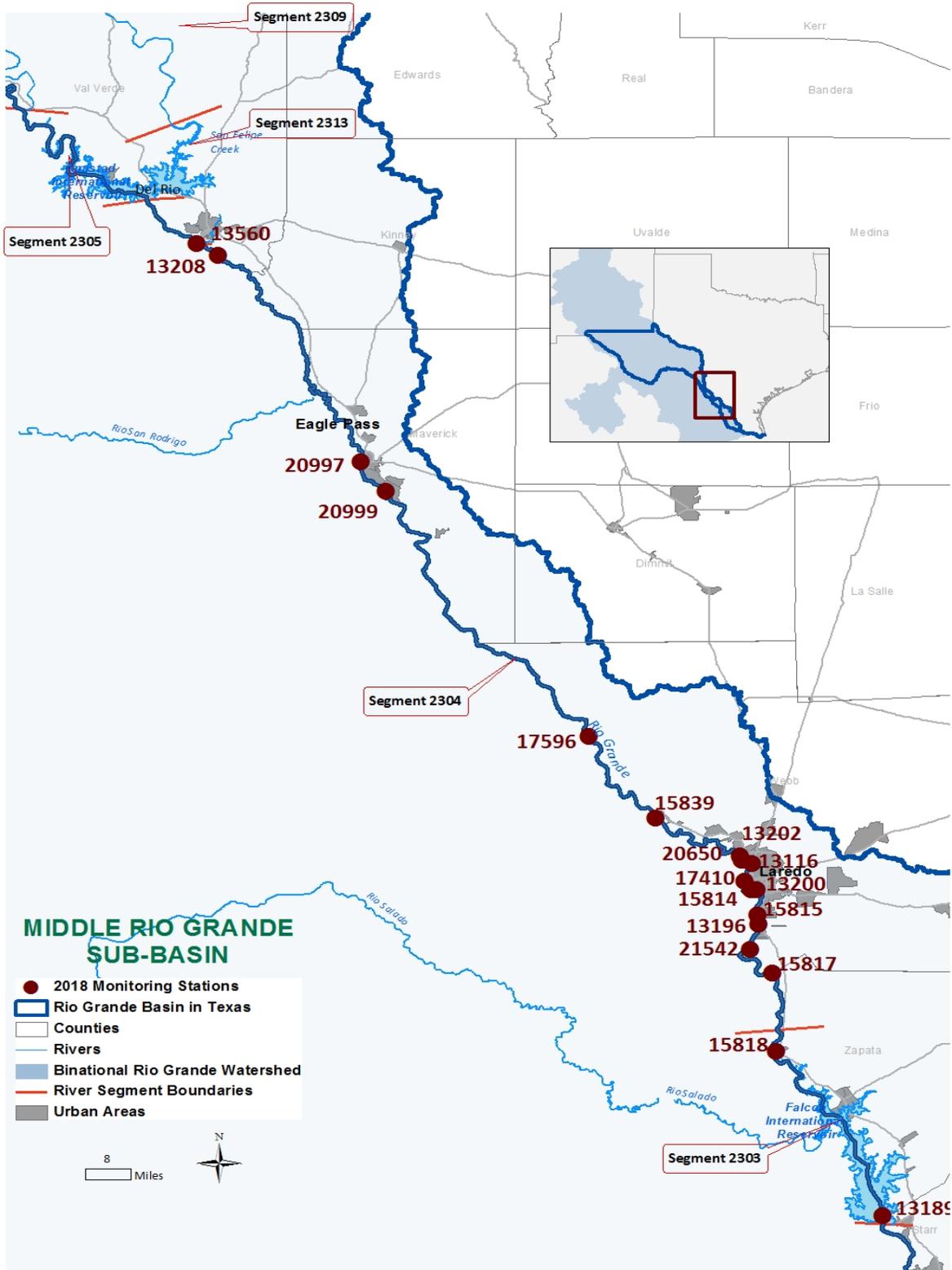
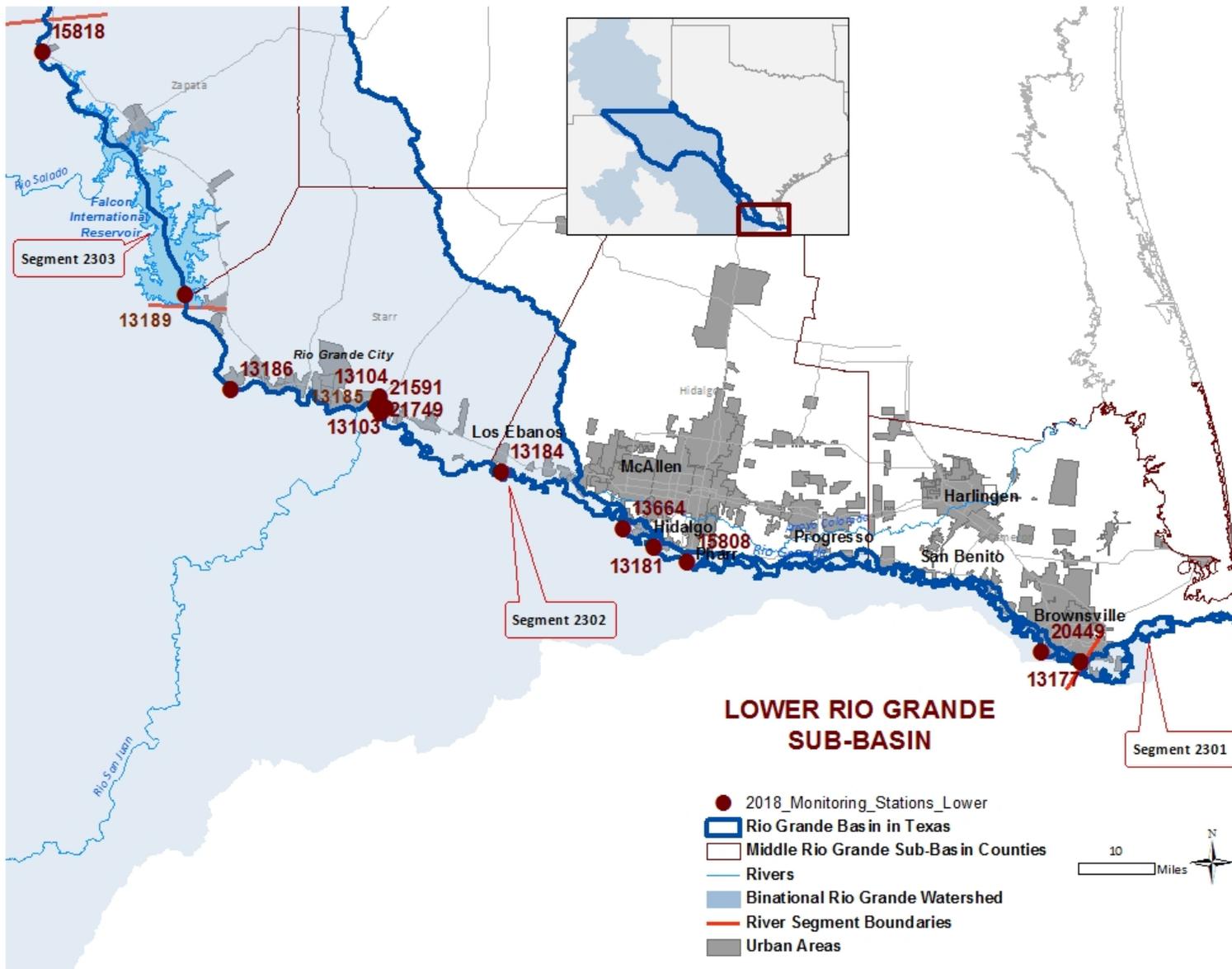


Figure 7: Map of the Lower Rio Grande Basin



Appendix D: Field Data Sheets

**UNITED STATES INTERNATIONAL BOUNDARY AND WATER COMMISSION
TEXAS CLEAN RIVERS PROGRAM
RIO GRANDE BASIN**

FIELD DATA REPORTING FORM

<input style="width:100%; height:15px;" type="text"/> TAG#	<input style="width:100%; height:15px;" type="text"/> SET #	<input style="width:100%; height:15px;" type="text"/> COLLECTOR(printed)			
<input style="width:100%; height:15px;" type="text"/> TCEQ STATION ID	<input style="width:100%; height:15px;" type="text"/> SEGMENT	<input style="width:100%; height:15px;" type="text"/> SEQUENCE	<input style="width:100%; height:15px;" type="text"/> I <input style="width:100%; height:15px;" type="text"/> B SE	<input style="width:100%; height:15px;" type="text"/> CE	<input style="width:100%; height:15px;" type="text"/> MT

Station Description _____

<input style="width:100%; height:15px;" type="text"/> M M D D Y Y Y Y DATE	GRAB SAMPLE <input style="width:100%; height:15px;" type="text"/> H H M M TIME	<input style="width:100%; height:15px;" type="text"/> DEPTH	<input style="width:100%; height:15px;" type="text"/> M = meters
--	---	--	---

00010		WATER TEMP (deg C only)		89835		FLOW MEASUREMENT METHOD 1-Gage 2-Electric 3-Mechanical 4-Weir/flume 5-Doppler
00020		AIR TEMP (deg C only)		74069		ESTIMATED FLOW (cfs)
00400		pH (SU)		89861		STREAM WIDTH (meters)
00300		D.O. (mg/L)		82903		WATER DEPTH (meters)
00094		SPECIFIC CONDUCTANCE (uS/cm)		31616		FECAL COLIFORM (CFU/100 ml)
00078		SECCHI DISK (meters)		31699		E. coli (MPN/100 ml)
72053		DAYS SINCE LAST SIGNIFICANT PRECIPITATION		31704		E. Coli Holding Time (Hours)
01351		FLOW SEVERITY 1-no flow 2-low 3-normal 4-flood 5-high 6-dry		89966		WEATHER 1-clear 2-cloudy 3-overcast 4-rain
00061		INSTANTANEOUS FLOW (cfs)		89965		WIND INTENSITY 1-calm 2-slight 3-moderate 4-strong
89978		PRIMARY CONTACT, OBSERVED ACTIVITY (# OF PEOPLE OBSERVED)		89010		WIND DIRECTION 1-north 2-south 3-east 4-west 5-NE 6-SE 7-NW 8-SW
				89979		EVIDENCE OF PRIMARY CONTACT RECREATION (1 = OBSERVED, 0 = NOT OBSERVED)

Measurement Comments and Field Observations:

Signature of Collector: _____

Rev. 08/21/2013

UNITED STATES INTERNATIONAL BOUNDARY AND WATER COMMISSION

**TEXAS CLEAN RIVERS PROGRAM
RIO GRANDE BASIN**

**FIELD DATA REPORTING FORM
FOR SEDIMENT SAMPLES**

--	--	--	--	--	--	--	--

TAG# (FOR CRP)

--	--	--

SET # (FOR CRP)

COLLECTOR(printed)	
--------------------	--

--	--	--	--	--

TCEQ STATION ID

--	--	--	--

SEGMENT

--	--	--	--	--	--

SEQUENCE
optional

I	B
---	---

SE

--	--

CE

R	T
---	---

MT

Station Description _____

COMPOSITE SAMPLE							
B	COMPOSITE CATEGORY:	T = Time	S = Space (ie Depth)	B = Both	F = Flow Wight		
M	M	D	D	Y	Y	Y	Y
START DATE							
H	H	M	M	.			
START TIME				START DEPTH (SURFACE)			
M	M	D	D	Y	Y	Y	Y
END DATE							
H	H	M	M	.			
END TIME				END DEPTH (DEPEST)			
	Number of Grabs		#	#	COMPOSITE TYPE:	## = Number of Grabs in Composite	CN = Continuous

Measurement Comments and Field Observations:

Signature of Collector: _____

Rev. 03/15/10

Note: This form should be completed in addition to the water parameters field sheet when both water and sediment samples are collected.

**UNITED STATES INTERNATIONAL BOUNDARY AND WATER COMMISSION
TEXAS CLEAN RIVERS PROGRAM
RIO GRANDE BASIN**

FIELD DATA REPORTING FORM

<input type="text"/> TAG#	<input type="text"/> SET #	<input type="text"/> COLLECTOR(printed)			
<input type="text"/> TCEQ STATION ID	<input type="text"/> SEGMENT	<input type="text"/> SEQUENCE	<input type="text"/> I <input type="text"/> B SE	<input type="text"/> R <input type="text"/> N CE	<input type="text"/> R <input type="text"/> T MT

Station Description _____

<input type="text"/> M M D D Y Y Y Y DATE	GRAB SAMPLE <input type="text"/> H H M M TIME	<input type="text"/> 0 <input type="text"/> 3 DEPTH	<input type="text"/> M M = meters
---	--	--	--------------------------------------

00010		WATER TEMP (deg C only)		89835		FLOW MEASUREMENT METHOD 1-Gage 2-Electric 3-Mechanical 4-Weir/flume 5-Doppler
00020		AIR TEMP (deg C only)		74069		ESTIMATED FLOW (cfs)
00400		pH (SU)		89861		STREAM WIDTH (meters)
00300		D.O. (mg/L)		82903		WATER DEPTH (meters)
00094		SPECIFIC CONDUCTANCE (uS/cm)		31616		FECAL COLIFORM (CFU/100 ml)
00078		SECCHI DISK (meters)		31699		E. coli (MPN/100 ml)
72053		DAYS SINCE LAST SIGNIFICANT PRECIPITATION		89966		WEATHER 1-clear 2-cloudy 3-overcast 4-rain
01351		FLOW SEVERITY 1-no flow 2-low 3-normal 4-flood 5-high 6-dry		82078		Turbidity (NTU)
00061		INSTANTANEOUS FLOW (cfs)		89965		WIND INTENSITY 1-calm 2-slight 3-moderate 4-strong
89978		PRIMARY CONTACT, OBSERVED ACTIVITY (# OF PEOPLE OBSERVED)		89010		WIND DIRECTION 1-north 2-south 3-east 4-west 5-NE 6-SE 7-NW 8-SW
				89979		EVIDENCE OF PRIMARY CONTACT RECREATION (1 = OBSERVED, 0 = NOT OBSERVED)

Measurement Comments and Field Observations:

Signature of Collector: _____

Rev. 08/21/2013

**UNITED STATES INTERNATIONAL BOUNDARY AND WATER COMMISSION
TEXAS CLEAN RIVERS PROGRAM
RIO GRANDE BASIN**

DROUGHT FIELD DATA REPORTING FORM

<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> TAG#	<input type="text"/> <input type="text"/> <input type="text"/> SET #	<input style="width:100%;" type="text"/> COLLECTOR(printed)			
<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> TCEQ STATION ID	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> SEGMENT	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> SEQUENCE	<input type="text"/> I <input type="text"/> B SE	<input type="text"/> <input type="text"/> CE	<input type="text"/> <input type="text"/> MT

Station Description _____

<input type="text"/> <input type="text"/> M M D D Y Y Y Y DATE	GRAB SAMPLE <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> H H M M TIME	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DEPTH	<input type="text"/> M = meters
--	---	--	------------------------------------

00010	WATER TEMP (deg C only)
00020	AIR TEMP (deg C only)
00400	pH (SU)
00300	D.O. (mg/L)
00094	SPECIFIC CONDUCTANCE (uS/cm)
00078	SECCHI DISK (meters)
72053	DAYS SINCE LAST SIGNIFICANT PRECIPITATION
01351	FLOW SEVERITY 1-no flow 2-low 3-normal 4-flood 5-high 6-dry
00061	INSTANTANEOUS FLOW (cfs)
89835	FLOW MEASUREMENT METHOD 1-Gage 2-Electric 3-Mechanical 4-Weir/flume 5-Doppler
89864	MAXIMUM POOL WIDTH AT TIME OF SAMPLING (meters)
89978	PRIMARY CONTACT, OBSERVED ACTIVITY (# OF PEOPLE OBSERVED)

89865	MAXIMUM POOL DEPTH AT TIME OF SAMPLING
89869	POOL LENGTH (meters)
89870	% POOL COVERAGE IN 500 METER REACH
74069	ESTIMATED FLOW (cfs)
89861	STREAM WIDTH (meters)
82903	WATER DEPTH (meters)
31616	FECAL COLIFORM (CFU/100 ml)
31699	E. coli (MPN/100 ml)
89966	WEATHER 1-clear 2-cloudy 3-overcast 4-rain
89965	WIND INTENSITY 1-calm 2-slight 3-moderate 4-strong
89010	WIND DIRECTION 1-north 2-south 3-east 4-west 5-NE 6-SE 7-NW 8-SW
89979	EVIDENCE OF PRIMARY CONTACT RECREATION (1 = OBSERVED, 0 = NOT OBSERVED)

Measurement Comments and Field Observations:

Signature of Collector: _____

**UNITED STATES INTERNATIONAL BOUNDARY AND WATER COMMISSION
TEXAS CLEAN RIVERS PROGRAM
RIO GRANDE BASIN**

FIELD DATA REPORTING FORM

<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> TAG#	<input type="text"/> <input type="text"/> SET #	<input style="width:100%;" type="text"/> COLLECTOR(printed)			
<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> TCEQ STATION ID	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> SEGMENT	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> SEQUENCE	<input type="text"/> <input type="text"/> SE/SC1	<input type="text"/> <input type="text"/> SE/SC2	<input type="text"/> <input type="text"/> MT/PC

Station Description _____

<input type="text"/> <input type="text"/> M M D D Y Y Y Y DATE	GRAB SAMPLE <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> H H M M TIME	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> 0 . 3 DEPTH	<input type="text"/> M M = meters
--	---	---	---

00010		WATER TEMP (deg C only)		31616	FECAL COLIFORM (CFU/100 ml)
00020		AIR TEMP (deg C only)		31699	E. coli (MPN/100 ml)
00094		SPECIFIC CONDUCTANCE (uS/cm)		89978	PRIMARY CONTACT, OBSERVED ACTIVITY (# OF PEOPLE OBSERVED)
72053		DAYS SINCE LAST SIGNIFICANT PRECIPITATION		89979	EVIDENCE OF PRIMARY CONTACT RECREATION (1 = OBSERVED, 0 = NOT OBSERVED)
01351		FLOW SEVERITY 1-no flow 2-low 3-normal 4-flood 5-high 6-dry			
89966		WEATHER 1-clear 2-cloudy 3-overcast 4-rain			
89965		WIND INTENSITY 1-calm 2-slight 3-moderate 4-strong			
89010		WIND DIRECTION 1-north 2-south 3-east 4-west 5 - NE 6 - SE 7 - NW 8 - SW			

Measurement Comments and Field Observations:

Signature of Collector: _____

Rev. 08/21/2013

Appendix E: Chain of Custody Forms

**CITY OF LAREDO HEALTH DEPARTMENT
2600 CEDAR
LAREDO TEXAS 78044**

**Water Bacteriology
Custody Form**

1. Name of person releasing the sample(s) under custody:

Signature Print Name

2. Date and time sample(s) under custody is released:

_____ AM
Date Time PM

3. Date sample(s) was/ were collected: _____

4. Name of person receiving the sample(s) under custody:

Signature Print Name

5. Condition of the sample(s) under custody:

6. Name of person testing sample(s) under custody:

Signature Print Name

7. Date and Time sample(s) was/were tested: _____
Date Time

8. Sample(s) Collection Sites:

Sites	Collected (Circle One)	Tested For:	
		Fecal Coliform/ E. Coli	
1. Columbia	Yes/No	Yes/No	Yes/No
2. Father McNaboe	Yes/No	Yes/No	Yes/No
3. Jefferson Intake	Yes/No	Yes/No	Yes/No
4. Bridge II	Yes/No	Yes/No	Yes/No
5. La Azteca	Yes/No	Yes/No	Yes/No
6. Rio Bravo	Yes/No	Yes/No	Yes/No
7. Masterson Road	Yes/No	Yes/No	Yes/No
8. Quintero Property	Yes/No	Yes/No	Yes/No

Other Site (s):



Analysis Request and Chain of Custody Record

Name:	Brownsville Public Utilities Board Analytical Laboratory
Address:	1385 PUB Dr. / PO Box 3270
City:	Brownsville Texas 78521
Contact:	Lee Roy Atkinson

Project #:	# 20449	Client / Project:	TEXAS CLEAN RIVERS PROGRAM
-------------------	----------------	--------------------------	-----------------------------------

Laboratory Sample Identification				Field Identification	Date	Time	Grab	Composite	Sample Container and Volume	Sample Matrix	Preservative	Immediate Analyses	Analysis Requested					Laboratory Remarks
													Collection Date	Sample Site	ID #			
YYYY	MMDD											See Attached Field Data Reporting Form						
		S#20449	001			X				Water								
		S#20449	002			X				Water								
		S#20449	003			X				Water								
		S#20449	004			X				Water								
		S#20449	005			X				Water								
		S#20449	006			X				Water								
		S#20449	007			X				Water								
		S#20449	008			X				Water								
		S#20449	009			X				Water								
		S#20449	010			X				Water								

Sampler Name and Signature:	Relinquished by:	Date:	Received by:	Date:
	Signature:	Time:	Signature:	Time:
	Relinquished by:	Date:	Received by:	Date:
	Signature:	Time:	Signature:	Time:
	Relinquished by:	Date:	Received by:	Date:
	Signature:	Time:	Signature:	Time:
	Technician Comments:			

Remarks:	Submit report to:	Texas Clean Rivers Program	Thermometer#		Laboratory Location:	Laboratory # :
		USIBWC	Serial #		<u>Analytical Laboratory</u> <u>1385 PUB Drive</u> <u>P.O. Box 3270</u> <u>Brownsville, Texas 78521</u>	EPA - TX01425 TCEQ # : T104704357
		4171 N. Mesa, Suite C-100	Factor °C			
		El Paso, TX 79902	Temperature °C			

Appendix F: Data Review Checklist and Summary Shells

Data Review Checklist

This checklist is to be used by the Planning Agency and other entities handling the monitoring data in order to review data before submitting to the TCEQ. This table may not contain all of the data review tasks being conducted.

Data Format and Structure	Y, N, or N/A
Are there any duplicate Tag Id numbers in the Events file?	
Do the Tag prefixes correctly represent the entity providing the data?	
Have any Tag Id numbers been used in previous data submissions?	
Are Tag IDs associated with a valid SLOC?	
Are sampling Dates in the correct format, MM/DD/YYYY with leading zeros?	
Are sampling Times based on the 24 hr clock (e.g. 09:04) with leading zeros?	
Is the Comments field filled in where appropriate (e.g. unusual occurrence, sampling problems, unrepresentative of ambient water quality)?	
Are Submitting Entity, Collecting Entity, and Monitoring Type codes used correctly?	
Do sampling dates in the Results file match those in the Events file for each Tag Id?	
Are values represented by a valid parameter code with the correct units?	
Are there any duplicate parameter codes for the same Tag Id?	
Are there any invalid symbols in the Greater Than/Less Than (GT/LT) field?	
Are there any Tag Ids in the Results file that are not in the Events file or vice versa?	
Data Quality Review	Y, N, or N/A
Are "less-than" values reported at the LOQ? If no, explain in Data Summary.	
Have the outliers been verified and a "1" placed in the Verify_flg field?	
Have checks on correctness of analysis or data reasonableness been performed? e.g., Is ortho-phosphorus less than total phosphorus? Are dissolved metal concentrations less than or equal to total metals? Is the minimum 24 hour DO less than the maximum 24 hour DO? Do the values appear to be consistent with what is expected for site?	
Have at least 10% of the data in the data set been reviewed against the field and laboratory data sheets?	
Are all parameter codes in the data set listed in this QAPP?	
Are all stations in the data set listed in this QAPP?	
Documentation Review	Y, N, or N/A
Are blank results acceptable as specified in this QAPP?	
Were control charts used to determine the acceptability of lab duplicates (if applicable)?	
Was documentation of any unusual occurrences that may affect water quality included in the Event file's Comments field?	
Were there any failures in sampling methods and/or deviations from sample design requirements that resulted in unreportable data? If yes, explain in Data Summary.	
Were there any failures in field and/or laboratory measurement systems that were not resolvable and resulted in unreportable data? If yes, explain in Data Summary.	
Was the laboratory's NELAP Accreditation current for analysis conducted?	

Data Summary

Data Set Information

Data Source: _____

Date Submitted: _____

Tag_id Range: _____

Date Range: _____

- I certify that all data in this data set meets the requirements specified in Texas Water Code Chapter 5, Subchapter R (TWC §5.801 et seq) and Title 30 Texas Administrative Code Chapter 25, Subchapters A & B.
- This data set has been reviewed using the criteria in the Data Review Checklist.

Planning Agency Data Manager: _____ Date: _____

Please explain in the table below any data discrepancies discovered during data review including:

- Inconsistencies with LOQs
- Failures in sampling methods and/or laboratory procedures that resulted in data that could not be reported to the TCEQ (indicate items for which the Corrective Action Process has been initiated and send *Corrective Action Status Report* with the applicable Progress Report).

Dataset ____ contains data from FY__ QAPP Submitting Entity code __ and collecting entity __. This is field and lab data that was collected by the (collecting entity). Analyses were performed by the (lab name). The following tables explain discrepancies or missing data as well as calculated data loss.

Discrepancies or missing data for the listed tag ID:

Tag ID	Station ID	Date	Parameters	Type of Problem	Comment/PreCAPs/CAPs

Data Loss

Parameter	Missing Data points out of Total	Percent Data Loss for this Dataset	Parameter	Missing Data points out of Total	Percent Data Loss for this Dataset

ATTACHMENT 1 Example Letter to Document Adherence to this QAPP

TO: (name)
(organization)

FROM: (name)
(organization)

RE: USIBWC CRP Fiscal Year 2018-19 CRP QAPP

This letter will summarize the understanding between the United States Section, International Boundary and Water Commission (USIBWC) Texas Clean Rivers Program (CRP) and the Partner on the surface water quality-monitoring program for the Rio Grande. Enclosed is a copy of the FY 2016-17 Rio Grande Basin Monitoring Program (RGBMP) Quality Assurance Project Plan (QAPP), which outlines the procedures and quality assurance requirements of the RGBMP.

Please indicate your acceptance and adherence to the RGBMP QAPP by signing and returning the terms of agreement/endorsement (Attachment 1) at the bottom of this letter to the USIBWC.

The following lists the responsibilities of Partner and USIBWC CRP to fulfill this understanding:

Partner

1. Partner will collect water quality samples during the period of September 1, 2017 through August 31, 2019, as listed in the attached Monitoring Schedule. **(Attachment 2)**
2. Partner will perform the field data collection to include instantaneous flow and submit the results to the USIBWC CRP.
3. For each water sample designated for conventional analysis, including duplicates, Partner will complete and attach to each shipment a Chain of Custody Form and submit to the USIBWC CRP contract laboratory for analysis. Partner will submit the Field Data Reporting Forms to the USIBWC.
4. Partner will follow the procedures for sampling as described in the Surface Water Quality Procedures Manual, TCEQ, 2012 or subsequent editions, the RGBMP QAPP and the USIBWC CRP SOP for YSI 556 Calibration and Maintenance.
5. Partner will notify the USIBWC CRP staff of any problems with the monitoring effort and will work with staff to resolve problems as they occur.
6. If possible, Partner should participate in the annual coordinated monitoring meeting to be scheduled between March 15 and April 30 of the contract years in order to provide input on the monitoring schedule and local water quality issues.
7. Partner will participate in a monitoring systems audit every two years to ensure proper monitoring procedures.

US International Boundary and Water Commission Clean Rivers Program

1. Staff from the USIBWC CRP will meet as needed with Partner to assess the effectiveness of this monitoring effort and will work with Partner to resolve problems as they occur. USIBWC CRP will perform a monitoring systems audit of Partner once every two years.
2. The USIBWC CRP will incur laboratory costs for the samples and field splits collected by Partner.
3. The USIBWC CRP will also incur the shipping costs for the samples being sent to the contract laboratory. Please contact the USIBWC CRP staff to obtain shipping account information.
4. On an as-needed basis, staff from the USIBWC CRP will provide any training and supplies necessary to accomplish the objectives of the CRP monitoring program.

The USIBWC CRP appreciates the willingness of Partner to participate in this cooperative effort to collect water quality information in the Rio Grande Basin. If you have any questions please contact me at 915-832-4770.

Sincerely,

Leslie Grijalva
Acting Quality Assurance Officer
USIBWC Clean Rivers Program

Enclosure(s): As Stated
bcc: CRP files

Terms of Agreement

The USIBWC Clean Rivers Program Sampling Partners agree to the long- term collection or analysis of water quality samples and environmental data at designated monitoring stations on a prescribed schedule. The types of samples and data collected by each partner may vary in time, commitment, and geography. A Sampling Partner’s signature on the Section A1 Approval Page of the Rio Grande Basin Monitoring Program Quality Assurance Project Plan indicates acknowledgment that the Sampling Partner does not expect to be paid for his/her work, compensated for expenses associated with said in-kind work, and will abide by the Texas Commission on Environmental Quality procedures.

In addition, USIBWC non-federal entity Sampling Partners release, waive, discharge and covenant not to sue the USIBWC, including its officers and employees, with respect to any and all liability, claims or causes of action whatsoever related to any damages or injury that they may sustain, whether caused by the negligence of the USIBWC or otherwise, while performing tasks under this QAPP. USIBWC Sampling Partners are aware and fully responsible for guarding against any risks involved with such activity, and choose to participate voluntarily and at their own risk. They voluntarily assume full responsibility for any property damage or personal injury that they may sustain while participating in, or related to the above activity.

ENDORSEMENT

I acknowledge receipt of the “RIO GRANDE BASIN MONITORING PROGRAM QUALITY ASSURANCE PROJECT PLAN, FY2018-2019”. I understand the document(s) describe quality assurance, quality control, data management and reporting, and other technical activities that must be implemented to ensure the results of work performed will satisfy stated performance criteria. My signature on this document signifies that I have read and approved the document contents pertaining to my program. Furthermore, I will ensure that all staff members participating in Clean Rivers Program activities will be required to familiarize themselves with the document contents and adhere to them as well.

Signature Date

Sampling Partner

Adherence letters may vary as needed to address specific partners. Copies of the signed forms should be sent by the USIBWC CRP to the TCEQ CRP Project Manager within 60 days of TCEQ approval of this QAPP.