

Amendment # 2

To the Nueces River Authority Clean Rivers Program FY 2020/2021 QAPP

***Prepared by the Nueces River Authority
(NRA) in Cooperation with the Texas
Commission on Environmental Quality
(TCEQ)***

Effective: Immediately upon approval by all parties

Questions concerning this QAPP should be directed to:

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Justification

This document details the changes made to the basin-wide Quality Assurance Project Plan for FY 2020 activities. NRA is adding Metals in Water monitoring using Lower Colorado River Authority Environmental Laboratory Services (LCRA ELS) at four existing sites. Streamflow reporting will be added to two stations in Basin 24.

Summary of Changes

Section A1: LCRA ELS personnel Dale Jurecka and Angel Mata and TCEQ personnel Dana Squires were added to the Approval Page.

List of Acronyms: LCRA ELS was added to the List of Acronyms.

Section A3: Added LCRA ELS personnel and TCEQ personnel Dana Squires contact information to the Distribution List.

Section A4: Added LCRA ELS personnel Dale Jurecka and Angel Mata and TCEQ personnel Dana Squires and the description of their responsibilities to the Project/Task Organization section. Sam Sugarek replaces Rocky Freund as Data Manager.

Figure A4.1: Added LCRA ELS and staff, Dale Jurecka and Angel Mata, and TCEQ personnel Dana Squires to the Organization Chart. Sam Sugarek replaces Rocky Freund as Data Manager.

Section A6: Revised the number of bay and tidal sites from 10 to 9. A river site (13029) was inadvertently monitored as a tidal site (Enterococcus). Added language concerning conducting metals sampling on a twice per year basis.

Table A9.1: Added LCRA ELS to the Documents and Records Table.

Table B2.1: Added Dissolved Metals and Total Metals in Water section to Sample Storage, Preservation and Handling Requirements Table. Footnote was edited to account for LCRA ELS bottles and sampling procedure. Container numbers were renumbered for BCRA GD.

Table B2.2: Sample Containers section was edited to add bottle descriptions for metals-in-water samples using LCRA ELS. Language was added to indicate that field filtering will be done in the field and that LCRA ELS will acidify the samples in the lab. Bottles were renumbered for BCRA GD.

Section B3: Added sample handling procedures for LCRA ELS to the section.

Section B5: Added Field Blank and Field Equipment Blank section for metals-in-water sampling.

Section B10: Added LCRA ELS to the Data Management section.

Table D2.1: Added LCRA-ELS to the Laboratory and Quality Assurance Task columns.

Appendix A: Table A7.8 was added to the list of tables to indicate Metals in Water analysis will be conducted by LCRA ELS.

Appendix B, Task 3, Water Quality Monitoring: Added metals in water monitoring summary to the Monitoring Description.

Appendix B, Sampling Process Design and Monitoring Schedule (Plan), Sample Design Rationale FY 2020: Added metals in water locations to Sample Design Rationale FY 2020 section.

Appendix B, Table B1.1 Sample Design and Schedule, FY 2020: In Basin 21, metals in water were added to the schedule on a twice per year basis at Stations 12980 and 17389. In Basin 24, metals in water were added to the schedule on a twice per year basis at Stations 13405 and 18848. Flow reporting was added to stations 22003 and 22004 in Segment 2491C

Appendix E: The Chain of Custody form for LCRA ELS was added.

Detail of Changes

A1 Approval Page

Texas Commission on Environmental Quality Water Quality Planning Division

Electronically Approved by Kyle Girten 4/9/2020

Sarah Eagle, Work Leader
Clean Rivers Program

Date

Electronically Approved

4/9/2020

Rebecca DuPont
Project Manager

Date

Electronically Approved 4/8/2020

Kelly Rodibaugh
Project Quality Assurance Specialist

Date

Electronically Approved 4/8/2020

Cathy Anderson, Team Leader
Data Management and Analysis

Date

Monitoring Division

Electronically Approved by Sharon Coleman 4/8/2020

Dana D. Squires
Lead Quality Assurance Specialist

Date

Nueces River Authority (NRA)

Electronically Approved **4/9/2020**

Sam Sugarek Date
NRA Project Manager

Electronically Approved **4/9/2020**

Sam Sugarek Date
NRA QAO

**Lower Colorado River Authority Environmental Laboratory Services
(LCRA ELS)**

Electronically Approved *4/9/2020*

Dale Jurecka Date
LCRA ELS Lab Manager

Electronically Approved *4/8/2020*

Angel Mata Date
LCRA ELS Lab Quality Assurance Officer

List of Acronyms

AWRL	Ambient Water Reporting Limit
BCRAGD	Bandera County River Authority and Groundwater District
BMP	Best Management Practices
CAP	Corrective Action Plan
CCSL	Center for Coastal Studies Laboratory
CE	Collecting Entity
COC	Chain of Custody
CRP	Clean Rivers Program
DMRG	Surface Water Quality Monitoring Data Management Reference Guide, December 2016, or most recent version
DM&A	Data Management and Analysis
EPA	United States Environmental Protection Agency
FY	Fiscal Year
GIS	Geographical Information System
GPS	Global Positioning System
LCRA ELS	Lower Colorado River Authority - Environmental Laboratory Services
LCS	Laboratory Control Sample
LCS D	Laboratory Control Sample Duplicate
LIMS	Laboratory Information Management System
LM	Laboratory Manager
LOD	Limit of Detection
LOQ	Limit of Quantitation
MT	Monitoring Type
NELAP	National Environmental Lab Accreditation Program
QA	Quality Assurance
QM	Quality Manual
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QAS	Quality Assurance Specialist
QC	Quality Control
QMP	Quality Management Plan
RM	Routine Monitoring
SARA REL	San Antonio River Authority Regional Environmental Laboratory
SE	Submitting Entity
SLOC	Station Location
SOP	Standard Operating Procedure
SWQM	Surface Water Quality Monitoring
SWQMIS	Surface Water Quality Monitoring Information System
TAMU-CC	Texas A&M University – Corpus Christi
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
TCEQ	Texas Commission on Environmental Quality
TNI	The NELAC Institute
TSWQS	Texas Surface Water Quality Standards
VOA	Volatile Organic Analytes
WUL	City of Corpus Christi Water Utilities Laboratory

A3 Distribution List

Texas Commission on Environmental Quality

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Sam Sugarek, Quality Assurance Officer
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Center for Coastal Studies Laboratory (CCSL) - Texas A&M Corpus Christi

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Brien Nicolau, QAO
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San Antonio River Authority Regional Environmental Laboratory (SARA REL)

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Patty Carvajal, Lab Quality Assurance Officer
(210) 302-3672

Bandera County River Authority and Groundwater District (BCRAGD)

P.O. Box 177
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David Mauk, General Manager
(830) 796-7260

Corrina Fox, Operations Manager/Quality Assurance Officer
(830) 796-7260

Lower Colorado River Authority Environmental Laboratory Services (LCRA ELS)
P.O. Box 220
Austin, Texas 78767

Dale Jurecka, Lab Manager
(512) 730-6337

Angel Mata, QAO
(512) 356-6022

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. 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 approves all QA audits, corrective actions, 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.

Dana D. Squires ***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.

Rebecca DuPont ***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 Nueces River Authority audits. Verifies QAPPs are being followed by contractors and that projects are producing data of known quality. Coordinates project planning with the Nueces River Authority Project Manager. Reviews and approves data and reports produced by contractors. 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 contractors meet 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). Ensures DM&A staff perform data management-related tasks.

Sarah Kirkland ***CRP Data Manager, DM&A Team***

Responsible for coordination and tracking of CRP data sets from initial submittal through CRP Project Manager review and approval. Ensures that data are reported following instructions in the Data Management Reference Guide, most current version. Runs automated data validation checks in the Surface Water Quality Management Information System (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 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.

NUECES RIVER AUTHORITY

Sam Sugarek

Nueces River Authority Project Manager

Responsible for writing and maintaining the QAPP and monitoring its implementation. 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 Nueces River Authority participants and that projects are producing data of known quality. Ensures that subparticipants 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. 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.

Sam Sugarek

Nueces River Authority Quality Assurance Officer

Responsible for coordinating the implementation of the QA program. 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 Nueces River Authority Project 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. Assists the NRA Project Manager in conducting 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.

Sam Sugarek

Nueces River Authority 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 Nueces River Authority internet sites.

Kevin Reese

Nueces River Authority Web/Database Manager

Maintains quality-assured data on NRA internet sites along with all other CRP Website Requirements.

Sam Sugarek

Nueces River Authority Field Supervisor

Coordinates field sampling and data collection activities and supervises the field personnel in conducting sampling events. Ensures that all field personnel are properly trained and equipped to conduct the necessary

monitoring and that all sampling procedures are followed according to the QAPP. Ensures that personnel, supplies, and equipment are available at all appropriate times. Responsible for overseeing the Aquatic Resource Specialist in completing sample documentation including labeling samples and ensuring the correct sites are identified. Supervises field and laboratory data entry to the NRA database. Reviews data entered into NRA database and informs NRA Project Manager of any needed corrections.

Shellie McCumber

Nueces River Authority Aquatic Resource Specialist

Conducts field sampling and data collection activities following procedures outlined in the QAPP. Responsible for completing sample documentation including labeling samples and ensuring the correct sites are identified. Responsible for ensuring all instrument calibration data is complete. Enters data into NRA database and informs NRA Project Manager of any needed corrections.

City of Corpus Christi-Water Utilities Laboratory (WUL)

Marisa Juarez

WUL, Laboratory Manager

Responsible for the overall performance, administration, and reporting of analyses performed by the WUL. Responsible for supervision of laboratory personnel involved in generating analytical data for the project. Ensures that laboratory personnel have adequate training and a thorough knowledge of the QAPP and related SOPs. Responsible for oversight of all laboratory operations ensuring that all QA/QC requirements are met, documentation is complete and adequately maintained, and results are reported accurately. Enforces corrective action, as required.

Laura Lira

WUL, Laboratory QAO

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

***Center for Coastal Studies Laboratory at Texas A&M University –
Corpus Christi (CCSL)***

Paul Zimba

CCSL, Laboratory Manager

Responsible for the overall performance, administration, and reporting of analyses performed by CCSL. Responsible for supervision of laboratory and field personnel involved in generating analytical data for the project. Ensures that laboratory and field personnel have adequate training and a thorough knowledge of the QAPP and related SOPs. Responsible for oversight of all laboratory operations ensuring that all QA/QC requirements are met, documentation is complete and adequately maintained, and results are reported accurately. Enforces corrective action, as required.

Brien Nicolau

CCSL, Laboratory QAO

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

San Antonio River Authority Regional Environmental Laboratory (SARA REL)

Shannon Tollison

SARA REL, Laboratory Supervisor

Responsible for overall performance, administration, and reporting of analyses performed by SARA's Regional Environmental Laboratory Services. Responsible for supervision of laboratory personnel involved in generating analytical data for the project. Ensures that laboratory personnel have adequate training and a thorough knowledge of the QAPP and related SOPs. Responsible for oversight of all laboratory operations ensuring that all QA/QC requirements are met, documentation is complete and adequately maintained, and results are reported accurately. Additionally, the lab director will review and verify all field and laboratory data for integrity and continuity, reasonableness and conformance to project requirements, and then validated against the data quality objectives listed in Appendix A.

Patty Carvajal

SARA REL, Laboratory QAO

Maintains operating procedures that are in compliance with the QAPP, amendments and appendices. Responsible for the overall quality control and quality assurance of analyses performed by SARA's Regional Environmental Laboratory. Assists with monitoring systems audits for CRP projects. Conducts in-house audits to ensure compliance with written SOPs and to identify potential problems. Responsible for supervising and verifying all aspects of the QA/QC in the laboratory.

Lower Colorado River Authority Environmental Laboratory Services (LCRA ELS)

Dale Jurecka

LCRA ELS, Laboratory Manager

Responsible for the overall performance, administration, and reporting of analyses performed by LCRA's ELS. Responsible for supervision of laboratory and field personnel involved in generating analytical data for the project. Ensures that laboratory and field personnel have adequate training and a thorough knowledge of the QAPP and related SOPs. Responsible for oversight of all laboratory operations ensuring that all QA/QC requirements are met, documentation is complete and adequately maintained, and results are reported accurately. Enforces corrective action, as required.

Angel Mata

LCRA ELS, Laboratory QAO

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

Bandera County River Authority and Groundwater District (BCRAGD)

David Mauk

General Manager

Responsible for overall performance, administration, and reporting of analyses performed by BCRAGD field staff. Responsible for supervision of field personnel involved in generating analytical data for the project. Ensures that field personnel have adequate training and a thorough knowledge of the QAPP and related SOPs. Responsible for oversight of all field operations ensuring that all QA/QC requirements are met, documentation is complete and adequately maintained, and results are reported accurately. Additionally, the general manager will review and verify all field work and laboratory calibrations for integrity and continuity, reasonableness and conformance to project requirements.

Corrina Fox

BCRAGD Operations Manager/QAO

Maintains operating procedures that are in compliance with the QAPP, amendments and appendices. Responsible for the overall quality control and quality assurance of analyses performed by BCRAGD's field staff. Assists with monitoring systems audits for CRP projects. Additionally, the QAO will review and verify all field and laboratory data for integrity and continuity, reasonableness and conformance to project requirements, and then validated against the data quality objectives.

Responsible for coordinating the implementation of the QA program. Responsible for identifying, receiving, and maintaining project quality assurance records. Notifies the NRA QAO of particular circumstances which may adversely affect the quality of data. Coordinates and monitors deficiencies, nonconformance and corrective action. Coordinates and maintains records of data verification and validation. Coordinates their search and review of technical QA material and data related to water quality monitoring system design and analytical techniques.

Levi Sparks

BCRAGD Watershed Protection Coordinator / Field Supervisor / Lab Supervisor

Coordinates field sampling and data collection activities and supervises the field personnel in conducting sampling events. Ensures that all field personnel are properly trained and equipped to conduct the necessary monitoring and that all sampling procedures are followed according to the QAPP. Ensures that personnel, supplies, and equipment are available at all appropriate times. Responsible for overseeing the Natural Resource Specialist in completing sample documentation including labeling samples and ensuring the correct sites are identified. Ensures that samples are sent properly to lab for analysis. Responsible for recording all reagents into the reagent log and labeling all reagent bottles in accordance with the Nueces River Authority QAPP and the BCRAGD SOP for CRP. Conducts all pre- and post-calibrations and maintains all sampling equipment.

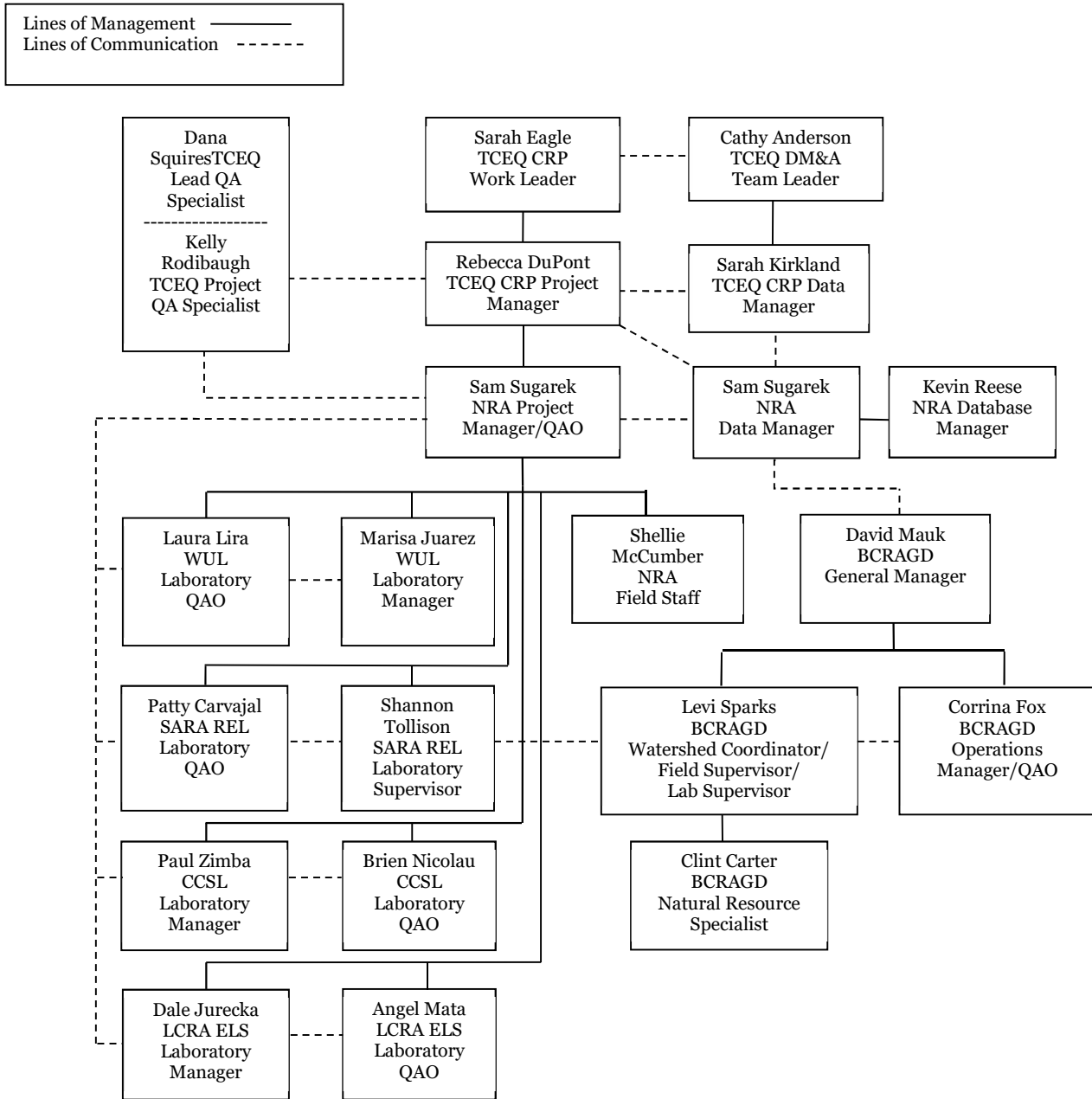
Clint Carter

BCRAGD Natural Resource Specialist

Conducts field sampling and data collection activities following procedures outlined in the QAPP. Responsible for completing sample documentation including labeling samples and ensuring the correct sites are identified. Ensures that samples are sent properly to lab for analysis.

Project Organization Chart

Figure A4.1. Organization Chart - Lines of Communication



A6 Project/Task Description

NRA will monitor a minimum of 9 bay and tidal sites quarterly for conventional, bacteria, and field parameters. NRA will also monitor 2 bay and tidal locations on a semi-annual basis for conventional, bacteria, and field parameters. NRA will monitor a minimum of 33 river and lake sites quarterly for conventional, bacteria, flow (where applicable), and field parameters. NRA will also monitor 2 river locations on a quarterly basis for Chlorophyll-*a*, TDS, bacteria, and field parameters. NRA will also monitor one river site for bacteria and field parameters only and one river site for field parameters only. NRA will also conduct 24-hour dissolved oxygen monitoring at two sites given sufficient water. NRA will monitor for metals in water at 4 locations on a twice per year frequency.

Bandera County River Authority and Groundwater District (BCRAGD) will conduct routine quarterly monitoring, collecting field, conventional, bacteria and, where applicable, flow data at 3 river stations in basin 20.

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.

Amendments to the QAPP

Revisions to the 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 Nueces River Authority Project Manager to the CRP Project Manager electronically. The Nueces River Authority will submit a completed QAPP Amendment document, including a justification of the amendment, a table of changes, and all pages, sections, and attachments affected by the amendment. Amendments are effective immediately upon approval by the Nueces River Authority Project Manager, the Nueces River Authority QAO, the CRP Project Manager, the CRP Lead QA Specialist, the TCEQ QA Manager or designee, the CRP Project QA Specialist, 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 will 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 the QAPP by way of attachment and distributed to personnel on the distribution list by the Nueces River Authority Project Manager. If adherence letters are required, the Nueces River Authority 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 the QAPP. The Nueces River Authority 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 Nueces River Authority and the TCEQ Project Manager and TCEQ technical staff. Appendices will be written in an abbreviated format and will reference the Nueces River Authority QAPP where appropriate. Appendices will be approved by the Nueces River Authority Project Manager, the Nueces River Authority QAO, the Laboratory (as applicable), and the CRP Project Manager, the CRP Project QA Specialist, the CRP Lead QA Specialist and additional parties affected by the Appendix, as appropriate. Copies of approved QAPP appendices will be distributed by the Nueces River Authority to project participants before data collection activities commence. The Nueces River Authority 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 the QAPP. The Nueces River Authority will maintain this documentation as part of the project's QA records, and ensure that the documentation is available for review.

Table A9.1 Project Documents and Records

*NRA stores all documentation including electronic and paper documents at least 7 years.

Document/Record	Location	Retention (yrs)	Format
QAPPs, amendments and appendices	NRA, BCRAGD	7*	Paper, electronic
Field SOPs	NRA, BCRAGD	7*	Paper, electronic
Laboratory Quality Manuals	WUL, SARA REL, CCSL, LCRA ELS	5	Paper, electronic
Laboratory SOPs	WUL, SARA REL, CCSL, LCRA ELS	5	Paper, electronic
QAPP distribution documentation	NRA, BCRAGD	7*	Paper, electronic
Field staff training records	NRA, BCRAGD	7*	Paper, electronic
Field equipment calibration/maintenance logs	NRA, BCRAGD	7*	Paper
Field instrument printouts	NRA, BCRAGD	7*	Electronic
Field notebooks or data sheets	NRA, BCRAGD	7*	Paper
Laboratory Data Results	NRA, BCRAGD	7*	Paper
Chain of custody records	NRA, BCRAGD, WUL, CCSL, SARA REL, LCRA ELS	7*	Paper
Laboratory calibration records	WUL, SARA REL, CCSL, LCRA ELS	5	Paper, electronic
Laboratory instrument printouts	WUL, SARA REL, CCSL, LCRA ELS	5	Paper, electronic
Laboratory data reports/results	WUL/SARA REL, CCSL, LCRA ELS	5	Paper, electronic
	NRA, BCRAGD	7*	Paper, electronic
Laboratory equipment maintenance logs	WUL, SARA REL, CCSL, LCRA ELS	5	Paper, electronic
Corrective Action Documentation	WUL, SARA REL, CCSL, LCRA ELS	5	Paper, electronic
	NRA, BCRAGD	7*	Paper, electronic

Table B2.1 Sample Storage, Preservation and Handling Requirements

Table B2.1 Sample Storage, Preservation and Handling Requirements

Parameter	Matrix	Container	Preservation	Sample Vol. (mL)	Holding Time
Routine Chemical					
Alkalinity	Water	1 or 8 ^d	cool to <6° C but >0° C *	500	14 days
Chloride	Water	1 or 8 ^d	cool to <6° C but >0° C *	100	28 days
Sulfate	Water	1 or 8 ^d	cool to <6° C but >0° C *	100	28 days
TDS	Water	1 or 8 ^d	cool to <6° C but >0° C *	250	7 days
Turbidity	Water	8 ^d	cool to <6° C but >0° C *	250	48 hours
TKN	Water	2 or 9 ^d	cool to <6° C but >0° C 1-2 ml conc. H ₂ SO ₄ pH<2*	250	28 days
Ammonia-N	Water	2 or 9 ^d	cool to <6° C but >0° C 1-2 ml conc. H ₂ SO ₄ pH<2*	100	28 days
Total Phosphorus	Water	2 or 9 ^d	cool to <6° C but >0° C 1-2 ml conc. H ₂ SO ₄ pH<2*	100	28 days
TOC	Water	4 or 9 ^d	cool to <6° C but >0° C 1-2 ml conc. H ₂ SO ₄ pH<2*	250	28 days
Nitrate	Water	1 and 2 or 8 ^d	cool to <6° C but >0° C 1-2 ml	250	48 hours
Nitrite	Water	1 and 2 or 8 ^d	cool to <6° C but >0° C 1-2 ml	250	48 hours
TSS	Water	1 or 8 ^d	cool to <6° C but >0° C *	1000	7 days
Chlorophyll-a	Water	3 or 10 ^d	cool to <6° C but >0° C *	250	Filter ≤ 48 hours, Samples must be filtered as soon as possible and filters stored frozen up to 24 days
Pheophytin	Water	3 or 10 ^d	cool to <6° C but >0° C *	250	Filter ≤ 48 hours, Samples must be filtered as soon as possible and filters stored frozen up to 24 days
Microbiological					
<i>E. coli</i> IDEXX Colilert	Water	5 or 11 ^d	cool to <6° C but >0° C, Sodium Thiosulfate*	100	8 hours ^c
Enterococcus	Water	5 or 11 ^d	cool to <6° C but >0° C, Sodium Thiosulfate*	100	8 hours
Metals in Water					
Dissolved Metals	Water	6 ^f	Filter at site with 0.45 µm filter, add HNO ₃ (in the lab) to pH < 2	250	6 months
Total Metals	Water	6 ^f	Add HNO ₃ (in the lab) to pH < 2	250	6 months
Total Mercury	Water	7 ^e	Add HNO ₃ (in the lab) to pH < 2	250	28 Days

Containers 1 through 5 correspond to WUL, and containers 8 through 10 correspond to SARA ELS, and containers 6 and 7 corresponds to LCRA ELS.

* Samples are acid-preserved (if required) and stored on ice immediately upon collection (within 15 minutes)

(^c) *E. coli* samples should always be processed as soon as possible and incubated no later than 8 hours from time of collection. When transport conditions necessitate sample incubation after 8 hours from time of collection, the holding time may be extended and samples must be processed as soon as possible and within 30 hours.

(^d) For the SARA REL Lab only.

(^f) For the LCRA ELS Lab only.

Sample Containers

Sample containers are new, supplied by the laboratories conducting the analyses and are shipped to NRA or BCragd directly. Sample containers with preservative arrive pre-acidified with sulfuric acid (containers 2 and 4) or preloaded with sodium thiosulfate (containers 5 and 11). Containers 6 and 7 are supplied by LCRA ELS; the samples are field filtered by NRA staff. Acidification of metals in water samples will be performed by LCRA ELS in the lab.

Certificates from sample container manufacturers are maintained in a notebook by the laboratory.

Table B2.2 Sampling Containers

NRA Sampling Containers		
Container #	Bottle Description	Lab
1	1000mL Polyethylene bottle	WUL
2	500mL Polyethylene bottle, preserved in the lab	WUL
3	500mL Brown polyethylene bottle	CCSL*
4	500mL Glass bottle, preserved in the lab	WUL
5	290mL IDEXX bottle	WUL
6	250mL Polyethylene bottle	LCRA ELS
7	250mL Glass or Teflon bottle	LCRA ELS
BCRAGD Sampling Containers		
8	4000mL Cubitainer	SARA REL
9	1000mL Cubitainer, preserved in the field	SARA REL
10	2000mL Brown polyethylene bottle	SARA REL
11	300mL Whirlpack	SARA REL

*NRA purchases new containers (container 3) to be used for parameter analysis by CCSL.

B3 Sample Handling and Custody

Sample Handling

At each site visited, sample containers are placed in a re-sealable plastic bag and are immediately placed on ice in an ice chest. Chain of custody (COC) forms are filled out noting the station ID, date, and time and corresponding analysis to be completed by laboratory personnel. Samples to WUL and CCSL are delivered immediately to the respective lab after sampling. Upon delivery, lab personnel receive the samples and note the temperature of the samples, time, date, and provide a signature on the COC form. Copies of the signed COC forms are made and stored with field data sheets and lab data results at NRA.

For metals in water sampling, NRA will collect a dissolved metals in water and a total metals in water sample at each metals monitoring station. Dissolved metals in water samples are field filtered and placed in a re-sealable plastic bag along with the unfiltered total metals in water sample. Samples are then placed in an ice chest (no ice is required) with the COC sealed in a waterproof storage bag inside the cooler. The cooler is then sealed with duct tape and a signed and dated chain of custody seal for shipment to LCRA ELS. Samples are then shipped to LCRA ELS for analysis. Upon delivery, lab personnel receive the samples and note the temperature of the samples, time, date, and provide a signature on the COC form.

Samples obtained by BCragd are immediately placed on ice in an ice chest for transport back to BCragd offices. Chain of custody (COC) forms provided by the SARA Lab are filled out noting the station ID, date, and time and corresponding analysis to be completed by laboratory personnel. The ice chest with the COC forms are then sealed for transport to SARA by courier. Upon delivery, lab personnel receive the samples and note the temperature of the samples, time, date, and provide a signature on the COC form.

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. Field blanks for total metals-in-water samples will be collected at a frequency of one per day of sampling. Only those samples collected on dates with associated field blanks collected on the same day will be submitted to TCEQ.

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, or corrective action will be implemented.

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. The 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. NRA will collect a field equipment blank for each day of sampling when dissolved metals-in-water are collected. Only those samples collected on dates with associated field equipment blanks collected on the same day will be submitted to TCEQ.

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.

B10 Data Management

Data Management Process

NRA's field data sheets are used to record field and acquired data (streamflow and precipitation information) from each monitoring station for each sampling event. Laboratory data results from WUL, LCRA ELS, and CCSL are received electronically by NRA via email following each sampling event.

BCRAGD submits field data and lab results to NRA electronically via email.

NRA staff transcribes data and uploads photographs from each sampling event (NRA and BCRAGD) to NRA's online data entry forms called DataIn Scripts. Data is input into the database based on the source or type of data.

There is an online form for 24-hour dissolved oxygen data, routine CRP data analyzed by WUL, LCRA ELS, and CCSL, routine CRP data analyzed by SARA, and one for profile measurements. Each input form includes the field parameters. There is an additional input form for adding pictures. The data is stored in NRA's temporary database. The data are extracted from this database and formatted for submittal to TCEQ.

The forms are designed to limit the amount of information that has to be typed in order to reduce typographical errors. The forms contain: a drop-down list of stations associated with each input type; input fields associated with the event record include the tag number, date, time, depth, source codes, program code, comment, and quarter. The quarter field is only used in NRA's temporary database. The forms also include the results records information via input fields for all field parameters and lab parameters. Where applicable, outliers are flagged via an associated input field. The information entered into the database is printed and double-checked against the field data sheets and lab results pages by the NRA Field Supervisor. Data entry errors are noted and given to the NRA QAO to correct.

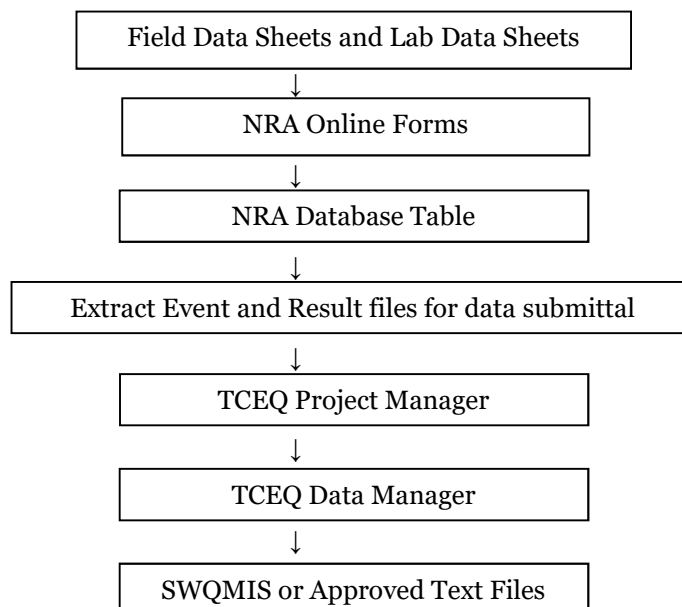
The data will be supplied to the TCEQ Project Manager as ASCII pipe-delimited text files in the Event/Result file formats as described in the most current version of the DMRG. The data files are then forwarded to the TCEQ Data Manager.

After approval by TCEQ and inclusion in SWQMIS, the data are entered into NRA's CRP database table that is available online. There are two loading procedures:

- Procedure 1: Once a month, non-NRA data are downloaded from SWQMIS via the "CRP Data Tool" (<https://www80.tceq.texas.gov/SwqmisWeb/public/crpweb.faces>) website for all segments within NRA's area of responsibility. The event and result files are formatted for upload into NRA's database. A script is run that loads these data into NRA's database. This allows not only new data to be inserted, but data that has been modified in the SWQMIS database to be updated in the NRA's database. This provides users access to all approved data in NRA's area of responsibility via NRA's website (<https://www.nueces-ra.org/CP/CRP/SWQM/index.php>), regardless of the collecting and submitting entities.
- Procedure 2: NRA data are loaded using the event and result files that were used for the data submittal after they have been approved. NRA's data are loaded separately to preserve NRA's tag assignment to the profile data.

Errors discovered in these records after inclusion in SWQMIS are manually corrected in NRA databases by the NRA QAO.

The following flow chart summarizes the data path.





NRA Online Database

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.

Name of Entity	Tag Prefix	Submitting Entity	Collecting Entity
Nueces River Authority	O	NR	NR
Nueces River Authority	O	NR	BA

Data Errors and Loss

Time of lab analysis is compared to holding times for all parameters by WUL, CCSL, BCRA GD, SARA REL, LCRA ELS and NRA. In the event that a holding time is not met, the accompanying narrative is reviewed for an explanation and/or validity of the reported data. This information is entered into the comment field of the event table and the data exceeding the holding times is excluded from the reported data set, if applicable.

To detect and correct errors prior to submission to TCEQ, the scripts that convert the data entered in the online forms check the entered value against the parameter codes minimum and maximum accepted values. In the event that the data are outside the range, the script returns an error message instructing the user to either re-enter the data or to verify the value and place a “1” in an associated box that is equivalent to the “Remark” field of the results table. Date and time entries must also be in valid formats for the scripts to process the data. A report of the records that were added to the table is displayed which can be used to review the data against the field and laboratory data sheets.

Table D2.1: Data Review Tasks

Data to be Verified	Field Task	Laboratory Task	Quality Assurance Task	NRA Data Manager Task
Sample documentation complete; samples labeled, sites identified	NRA/BCRAGD Field Supervisor		NRA QAO BCRAGD QAO	
Field QC samples collected for all analytes as prescribed in the TCEQ SWQM Procedures Manual	NRA/BCRAGD Field Supervisor		NRA, BCRAGD QAO	
Standards and reagents traceable	NRA/BCRAGD Field Supervisor	WUL, CCSL, SARA REL and LCRA ELS QAO	NRA, CCSL, BCRAGD, SARA REL, WUL and LCRA ELS QAO	
Chain of custody complete/acceptable	NRA/BCRAGD Field Supervisor	WUL, CCSL, SARA REL and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL and LCRA ELS QAO	
NELAP Accreditation is current		WUL, CCSL, SARA REL and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL, CCSL and LCRA ELS QAO	
Sample preservation and handling acceptable	NRA/BCRAGD Field Supervisor	WUL, SARA REL, CCSL and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL, CCSL and LCRA ELS QAO	
Holding times not exceeded		WUL, SARA REL, CCSL and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL, CCSL and LCRA ELS QAO	NRA DM

Collection, preparation, and analysis consistent with SOPs and QAPP	NRA/BCRAGD Field Supervisor	WUL, SARA REL, CCSL and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL, CCSL and LCRA ELS QAO	
Field documentation (e.g., biological, stream habitat) complete	NRA/BCRAGD Field Supervisor		NRA QAO BCRAGD QAO	
Instrument calibration data complete	NRA/BCRAGD Field Supervisor	WUL, SARA REL, CCSL and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL, CCSL and LCRA ELS QAO	
QC samples analyzed at required frequency	NRA/BCRAGD Field Supervisor	WUL, CCSL, SARA REL and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL, CCSL and LCRA ELS QAO	
QC results meet performance and program specifications		WUL, SARA REL, CCSL and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL, CCSL and LCRA ELS QAO	
Analytical sensitivity (LOQ/AWRL) consistent with QAPP		WUL, CCSL, SARA REL and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL, CCSL and LCRA ELS QAO	
Results, calculations, transcriptions checked		WUL, CCSL, SARA REL and LCRA ELS QAO		
Laboratory bench-level review performed		WUL, CCSL, SARA REL and LCRA ELS QAO		
All laboratory samples analyzed for all scheduled parameters		WUL, CCSL, SARA REL and LCRA ELS QAO	NRA QAO	
Corollary data agree				NRA QAO
Nonconforming activities documented	NRA/BCRAGD Field Supervisor	NRA and BCRAGD PM & QAO, WUL, SARA REL LS, CCSL LM & QAO and LCRA ELS LM	NRA, BCRAGD, SARA REL, WUL, CCSL and LCRA ELS QAO	
Outliers confirmed and documented; reasonableness check performed	NRA Field Supervisor			NRA DM
Dates formatted correctly				NRA DM
Depth reported correctly and in correct units			NRA QAO BCRAGD QAO	
TAG IDs correct				NRA DM
TCEQ Station ID number assigned				NRA DM
Valid parameter codes			NRA QAO	NRA DM
Codes for submitting entity(ies), collecting entity(ies), and monitoring type(s) used correctly			NRA QAO	NRA DM
Time based on 24-hour clock			NRA QAO	NRA DM
Check for transcription errors	NRA Field Supervisor		NRA QAO	
Sampling and analytical data gaps checked (e.g., all sites for which data are reported are on the coordinated monitoring schedule)				NRA DM
Field instrument pre- and post-calibration results within limits	NRA, BCRAGD Field Supervisor		NRA QAO BCRAGD QAO	
10% of data manually reviewed		WUL LM, CCSL LM,	NRA QAO	

		LCRA ELS and SARA REL LS		
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Appendix A:

Measurement Performance Specifications (Table A7.1-8)

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 the 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 should be considered for each type of monitoring activity. The CRP encourages that data be collected to address multiple objectives to optimize resources; however, 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 will be given to the main use of the project data and the data quality needed to support that use, then secondary goals will be considered.

Tables A7.1-8 reflects actual parameters, methods, etc. employed by the Nueces River Authority 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 Tables A7 are stored in SWQMIS. Any parameters listed in Tables A7 that do not have a valid TCEQ parameter code assigned will not be stored in SWQMIS.

Table A7.1-8 - Measurement Performance Specifications

Appendix A: Table A7

TABLE A7.8 Measurement Performance Specifications for the Nueces River Authority

Metals in Water (Dissolved)

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
ALUMINUM, DISSOLVED (UG/L AS AL)	ug/L	water	EPA 200.7 Rev 4.4 (1994)	01106	200	50	70-130	20	80-120	LCRA ELS
ARSENIC, DISSOLVED (UG/L AS AS)	µg/L	water	EPA 200.8	01000	5	2	70-130	20	80-120	LCRA ELS
BARIUM, DISSOLVED (UG/L AS BA)	µg/L	water	EPA 200.8	01005	1000	1	70-130	20	80-120	LCRA ELS
BERYLLIUM, DISSOLVED (UG/L AS BE)	µg/L	water	EPA 200.8	01010	2	1	70-130	20	80-120	LCRA ELS
CALCIUM, DISSOLVED (MG/L AS CA)	mg/L	water	EPA 200.7	00915	NA	0.2	70-130	20	80-120	LCRA ELS
CADMIUM, DISSOLVED (UG AS CD)	µg/L	water	EPA 200.7_8 Rev 5.4 (1998)	01025	0.1 for waters <50mg/L hardness ----- 0.3 for waters >50mg/L hardness	0.1	70-130	20	80-120	Energy Lab
CHROMIUM, DISSOLVED (UG/L AS CR)	µg /L	water	EPA 200.8 Rev 5.4 (1998)	01030	10	1	70-130	20	80-120	LCRA ELS
COBALT, DISSOLVED (UG/L AS CO)	µg/L	water	EPA 200.8	01035	NA	1	70-130	20	80-120	LCRA ELS
COPPER, DISSOLVED (UG/L AS CU)	µg /L	water	EPA 200.8 Rev 5.4 (1998)	01040	1 for waters <50mg/L hardness ----- 3 for waters ≥50mg/L hardness	1	70-130	20	80-120	LCRA ELS
IRON, DISSOLVED (UG/L)	µg/L	water	EPA 200.7	01046	NA	50	70-130	20	80-120	LCRA ELS
MERCURY DISSOLVED, IN WATER (UG/L)	µg/L	water	EPA 245.1	71890	NA	0.2	70-130	20	80-120	LCRA ELS
MOLYBDENUM, DISSOLVED (UG/L AS MO)	µg/L	water	EPA 200.8	01060	NA	1	70-130	20	80-120	LCRA ELS
NICKEL, DISSOLVED (UG/L AS NI)	µg /L	water	EPA 200.8 Rev 5.4 (1998)	01065	10	1	70-130	20	80-120	LCRA ELS
POTASSIUM, DISSOLVED (MG/L AS K)	mg/L	water	EPA 200.7	00935	NA	0.2	70-130	20	80-120	LCRA ELS

Metals in Water (Dissolved)

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
SELENIUM, DISSOLVED (UG/L AS SE)	µg/L	water	EPA 200.8	01145	NA	2	70-130	20	80-120	LCRA ELS
SILVER, DISSOLVED (UG/L AS AG)	µg /L	water	EPA 200.8 Rev 5.4 (1998)	01075	0.5	0.5	70-130	20	80-120	LCRA ELS
SODIUM, DISSOLVED (MG/L AS NA)	mg/L	water	EPA 200.7	00930	NA	0.2	70-130	20	80-120	LCRA ELS
STRONTIUM, DISSOLVED, UG/L AS SR	µg/L	water	EPA 200.7	01080	NA	10	70-130	20	80-120	LCRA ELS
THALLIUM, DISSOLVED (UG/L AS TL)	µg/L	water	EPA 200.8	01057	1	1	70-130	20	80-120	LCRA ELS
TITANIUM, DISSOLVED, UG/L AS TI	µg/L	water	EPA 200.8	01150	NA	1	70-130	20	80-120	LCRA ELS
VANADIUM, DISSOLVED (UG/L AS V)	µg/L	water	EPA 200.8	01085	NA	1	70-130	20	80-120	LCRA ELS
ZINC, DISSOLVED (UG/L AS ZN)	µg /L	water	EPA 200.8 Rev 5.4 (1998)	01090	5	5	70-130	20	80-120	LCRA ELS

Metals in Water (Total)

HARDNESS, TOTAL (MG/L AS CaCO ₃)*	mg/L	water	SM 2340 B	82394	5	1.32	NA	20	80-120	LCRA ELS
ANTIMONY, TOTAL (UG/L AS SB)	µg/L	water	EPA 200.8	01097	NA	1	70-130	20	80-120	LCRA ELS
BARIUM, TOTAL (UG/L AS BA)	µg/L	water	EPA 200.8	01007	NA	1	70-130	20	80-120	LCRA ELS
BERYLLIUM, TOTAL (UG/L AS BE)	µg/L	water	EPA 200.8	01012	NA	1	70-130	20	80-120	LCRA ELS
CALCIUM, TOTAL (MG/L AS CA)	mg/L	water	EPA 200.7	00916	0.5	0.2	70-130	20	80-120	LCRA ELS
CHROMIUM, TOTAL (UG/L AS CR)	µg/L	water	EPA 200.8	01034	NA	1	70-130	20	80-120	LCRA ELS
COBALT, TOTAL (UG/L AS CO)	µg/L	water	EPA 200.8	01037	NA	1	70-130	20	80-120	LCRA ELS
COPPER, TOTAL (UG/L AS CU)	µg/L	water	EPA 200.8	01042	NA	1	70-130	20	80-120	LCRA ELS
IRON, TOTAL (UG/L AS FE)	µg/L	water	EPA 200.7	01045	300	50	70-130	20	80-120	LCRA ELS
MAGNESIUM, TOTAL (MG/L AS MG)	mg/L	water	EPA 200.7	00927	0.5	0.2	70-130	20	80-120	LCRA ELS
MANGANESE, TOTAL (UG/L AS MN)	µg/L	water	EPA 200.8	01055	50	1	70-130	20	80-120	LCRA ELS
MERCURY, TOTAL, (UG/L AS MG)	µg /L	water	EPA 245.1	71900	0.006	0.005	70-130	20	80-120	Energy Lab
MOLYBDENUM, TOTAL (UG/L AS MO)	µg/L	water	EPA 200.8	01062	NA	1	70-130	20	80-120	LCRA ELS

Metals in Water (Total)

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
NICKEL, TOTAL (UG/L AS NI)	µg/L	water	EPA 200.8	01067	NA	1	70-130	20	80-120	LCRA ELS
POTASSIUM, TOTAL (MG/L AS K)	mg/L	water	EPA 200.7	00937	NA	2	70-130	20	80-120	LCRA ELS
SELENIUM, TOTAL (UG/L AS SE)	µg /L	water	EPA 200.8 Rev 5.4 (1998)	01147	2	2	70-130	20	80-120	LCRA ELS
SILVER, TOTAL (UG/L AS AG)	µg/L	water	EPA 200.8	01077	NA	0.5	70-130	20	80-120	LCRA ELS
SODIUM, TOTAL (MG/L AS NA)	mg/L	water	EPA 200.7	00929	NA	0.2	70-130	20	80-120	LCRA ELS
THALLIUM, TOTAL (UG/L AS TL)	µg/L	water	EPA 200.8	01059	NA	1	70-130	20	80-120	LCRA ELS
TIN, TOTAL, UG/L AS SN	µg/L	water	EPA 200.7	01102	NA	50	70-130	20	80-120	LCRA ELS
TITANIUM, TOTAL, UG/L AS TI	µg/L	water	EPA 200.8	01152	NA	1	70-130	20	80-120	LCRA ELS
ZINC, TOTAL (UG/L AS ZN)	µg/L	water	EPA 200.8	01092	NA	5	70-130	20	80-120	LCRA ELS
<p>*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). 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>										

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 the characterization of a variety of locations and conditions. This will include a combination of the following:

- 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 Performing Party, working closely with TCEQ, conducts watershed monitoring to identify and evaluate surface water quality issues and to establish priorities for corrective action. Under this program, the Performing Party is responsible for the San Antonio – Nueces Coastal Basin, the Nueces River Basin, the Nueces – Rio Grande Coastal Basin, and the adjacent bays and estuaries.

The Performing Party will complete the following subtasks:

Monitoring Description – In FY2020, the Performing Party will monitor a minimum of 10 bay and tidal sites quarterly for conventional, bacteria, and field parameters and 33 river and lake sites quarterly for conventional, bacteria, flow(where applicable), and field parameters. The Performing Party will also conduct 24-hour dissolved oxygen monitoring at two sites given sufficient water.

In FY 2021, the Performing Party will monitor at a similar level of effort as in FY 2020. The actual number of sites, location, frequency, and parameters collected for FY 2021 will be based on priorities identified at the Basin Steering Committee and Coordinated Monitoring meetings and included in the amended Appendix B schedule of the QAPP.

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

Appendix B Sampling Process Design and Monitoring Schedule (plan)

Sample Design Rationale FY 2020

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 Nueces River Authority coordinates closely with the TCEQ and other participants to ensure a comprehensive water monitoring strategy within the watershed.

Segment 2004A – One quarterly monitoring station located on Aransas Creek (Station ID 12941) will be added due to recommendations made by the TCEQ basin assessor. Bacteria, field and flow data will be the only parameters monitored.

Segment 2102 – Two quarterly monitoring stations on the Nueces River (Station Id 21815 and 12965) will be monitored for Chlorophyll-*a*, TDS and bacteria only to monitor work being done through implementation of the WPP. Two quarterly monitoring stations exist (20936 and 12964) in this segment for assessment.

Segment 2104 – One 24-hour dissolved oxygen monitoring site located on the Nueces River at FM624 (Station Id 12974) will transition to a quarterly field parameters only station due to recommendations by the TCEQ basin assessor.

Segment 2107 - One 24-hour dissolved oxygen monitoring station located on the Atascosa River (Station ID 12981) will be dropped due to a delisting of the dissolved oxygen impairment in the segment. One existing quarterly station located on the Atascosa River (Station ID 12980) will have metals in water testing added on a twice per year frequency.

Segment 2116 – One existing quarterly station located on Choke Canyon Reservoir (Station ID 17389) will have metals in water testing added on a twice per year frequency.

Segment 2472 – One quarterly monitoring station located at Port Bay (Station ID 13405) will transition to a bi-annual routine plus metals in water monitoring station.

Segment 2483A – One quarterly monitoring station located at Conn Brown Harbor (Station ID 18848) will transition to a bi-annual routine plus metals in water monitoring station.

Segment 2485 – One quarterly monitoring station located on Oso Bay (Station ID 13442) will be added due to a stakeholder request from TPWD.

Segment 2485A – One quarterly monitoring station located on Oso Creek (Station ID 13029) will have the indicator bacteria changed from Enterococcus to *E. coli* due to stakeholder input.

Segment 2491C – Flow reporting for Hidalgo Drain (Station 22003) and Raymondville Drain (Station 22004) will be added to the monitoring schedule.

Segment 2492 - One quarterly monitoring station located on Los Olmos Creek (Station ID 13034) will transition to a monthly monitoring station upon execution of this QAPP amendment. A GLO CMP grant will fund monitoring during 2 months per quarter in which CRP monitoring doesn't occur.

Segment 2494C – One quarterly monitoring station located on San Martin Lake in the Lower Rio Grande Valley (Station ID 22170) will be added to support the efforts of the Lower Laguna Madre and Brownsville Ship Channel WPP.

Monitoring Sites for FY 2020

Table B1.1 Sample Design and Schedule, FY 2020

Basin 20																						
Site Description	Station ID	Waterbody ID	Reg	SE	CE	MT	24 hr DO	AqHab	Benthics	Nekton	Metal Water	Organic Water	Metal Sed	Organic Sed	Conv	Amb Tox Water	Amb Tox Sed	Bacteria	Flow	Fish Tissue	Field	Comments
MISSION RIVER TIDAL NEAR SOUTH BANK IMMEDIATELY DOWNSTREAM OF THE FM 2678 BRIDGE BETWEEN REFUGIO AND BAYSIDE	12943	2001	14	NR	NR	RT									4			4			4	
MISSION RIVER IMMEDIATELY UPSTREAM OF US 77 BRIDGE AT REFUGIO	12944	2002	14	NR	NR	RT									4			4	4		4	
ARANSAS RIVER TIDAL AT BOAT RAMP ON FM 629 TERMINUS SOUTH OF BONNIE VIEW	12947	2003	14	NR	NR	RT									4			4			4	
ARANSAS RIVER TIDAL IMMEDIATELY UPSTREAM OF US 77 BRIDGE BETWEEN WOODSBORO AND SINTON	12948	2003	14	NR	NR	RT									4			4			4	
ARANSAS RIVER AT COUNTY ROAD EAST OF SKIDMORE	12952	2004	14	NR	NR	RT									4			4	4		4	
Basin 20 - Continued																						

Site Description	Station ID	Waterbody ID	Reg	SE	CE	MT	24 hr DO	AqHab	Benthics	Nekton	Metal Water	Organic Water	Metal Sed	Organic Sed	Conv	Amb Tox Water	Amb Tox Sed	Bacteria	Flow	Fish Tissue	Field	Comments
ARANSAS CREEK AT US 181 NORTH OF SKIDMORE IN BEE COUNTY	12941	2004A	14	NR	NR	RT									4			4	4		4	
POESTA CREEK, 77 M DOWNSTREAM OF SH 202	12937	2004B	14	NR	NR	RT									4			4	4		4	
Basin 21																						
NUECES RIVER AT BLUNTZER BRIDGE ON FM 666	12964	2102	14	NR	NR	RT									4			4	4		4	
NUECES RIVER AT LA FRUTA BRIDGE ON SH 359	12965	2102	14	NR	NR	RT									4			4	4		4	TDS, Chlorophyll-a/Pheophytin only
NUECES RIVER BELOW LAKE CORPUS CHRISTI AT HAZEL BAZEMORE PARK BOAT RAMP 4.5 KM UPSTREAM OF I-37	20936	2102	14	NR	NR	RT									4			4	4		4	
NUECES RIVER IMMEDIATELY UPSTREAM OF THE SALTWATER BARRIER DAM AT LABONTE PARK	21815	2102	14	NR	NR	RT									4			4	4		4	TDS, Chlorophyll-a/Pheophytin only
Basin 21 - Continued																						

<i>Site Description</i>	<i>Station ID</i>	<i>Waterbody ID</i>	<i>Reg</i>	<i>SE</i>	<i>CE</i>	<i>MT</i>	<i>24 hr DO</i>	<i>AqHab</i>	<i>Benthics</i>	<i>Nekton</i>	<i>Metal Water</i>	<i>Organic Water</i>	<i>Metal Sed</i>	<i>Organic Sed</i>	<i>Conv</i>	<i>Amb Tox Water</i>	<i>Amb Tox Sed</i>	<i>Bacteria</i>	<i>Flow</i>	<i>Fish Tissue</i>	<i>Field</i>	<i>Comments</i>
LAKE CORPUS CHRISTI MID-LAKE AT THE DAM 380 M NNW OF NORTHERN TIP OF DAM USGS SITE	12967	2103	14	NR	NR	RT									4			4			4	
LAKE CORPUS CHRISTI APPROX. 0.2 MI OFF WESTERN SHORE DIRECTLY WEST OF HIDEAWAY HILL	17384	2103	14	NR	NR	RT									4			4			4	
NUECES RIVER AT LIVE OAK CR 151 NEAR RIVER CREEK ACRES UPSTREAM OF LAKE CORPUS CHRISTI	17648	2103	14	NR	NR	RT									4			4	4		4	
NUECES RIVER AT FM 1042 BRIDGE 1.2 MILES NORTH OF SIMMONS	12972	2104	14	NR	NR	RT									4			4	4		4	
NUECES RIVER AT SH 16 SOUTH OF TILDEN	12973	2104	16	NR	NR	RT									4			4	4		4	
NUECES RIVER AT FM 624	12974	2104	16	NR	NR	RT													4		4	
NUECES RIVER BRIDGE ON FM 190 NORTH OF ASHERTON	12976	2105	16	NR	NR	BS	4												4		4	
Basin 21 - Continued																						

<i>Site Description</i>	<i>Station ID</i>	<i>Waterbody ID</i>	<i>Reg</i>	<i>SE</i>	<i>CE</i>	<i>MT</i>	<i>24 hr DO</i>	<i>AqHab</i>	<i>Benthics</i>	<i>Nekton</i>	<i>Metal Water</i>	<i>Organic Water</i>	<i>Metal Sed</i>	<i>Organic Sed</i>	<i>Conv</i>	<i>Amb Tox Water</i>	<i>Amb Tox Sed</i>	<i>Bacteria</i>	<i>Flow</i>	<i>Fish Tissue</i>	<i>Field</i>	<i>Comments</i>
FRIO RIVER AT SH 72 IN THREE RIVERS TX	12977	2106	14	NR	NR	RT									4			4	4		4	
NUECES RIVER BRIDGE ON US 281 SOUTH OF THREE RIVERS	12979	2106	14	NR	NR	RT									4			4	4		4	
ATASCOSA RIVER AT FM 99 BRIDGE WEST OF WHITSETT	12980	2107	14	NR	NR	RT					2				4			4	4		4	
ATASCOSA RIVER AT FM 541 4.75 KM UPSTREAM OF THE CONFLUENCE WITH LIVEOAK CREEK IN ATASCOSA COUNTY	20764	2107	13	NR	NR	BS	4												4		4	
ATASCOSA RIVER AT FM 541 4.75 KM UPSTREAM OF THE CONFLUENCE WITH LIVEOAK CREEK IN ATASCOSA COUNTY	20764	2107	13	NR	NR	RT									4			4	4		4	
SAN MIGUEL CREEK AT SH 16 NORTH OF TILDEN	12983	2108	16	NR	NR	RT									4			4	4		4	
LEONA RIVER 370 M UPSTREAM OF FM 140	18418	2109	13	NR	NR	RT									4			4	4		4	
SABINAL RIVER BRIDGE AT US 90 WEST OF SABINAL	12993	2110	13	NR	NR	RT									4			4	4		4	

Basin 21 - Continued

<i>Site Description</i>	<i>Station ID</i>	<i>Waterbody ID</i>	<i>Reg</i>	<i>SE</i>	<i>CE</i>	<i>MT</i>	<i>24 hr DO</i>	<i>AqHab</i>	<i>Benthics</i>	<i>Nekton</i>	<i>Metal Water</i>	<i>Organic Water</i>	<i>Metal Sed</i>	<i>Organic Sed</i>	<i>Conv</i>	<i>Amb Tox Water</i>	<i>Amb Tox Sed</i>	<i>Bacteria</i>	<i>Flow</i>	<i>Fish Tissue</i>	<i>Field</i>	<i>Comments</i>
SABINAL RIVER AT FM 187 5.6 MI SOUTH OF VANDERPOOL	14939	2111	13	NR	BA	RT									4			4	4		4	
SABINAL RIVER AT RANCH ROAD 187 APPROX 10 KILOMETERS SOUTH OF UTOPIA AND 400 METERS UPSTREAM OF THE CONFLUENCE WITH ONION CREEK	21948	2111	13	NR	BA	RT									4			4	4		4	
NUECES RIVER IMMEDIATELY DOWNSTREAM OF SH 55 SOUTHBOUND BRIDGE APPROXIMATELY 2.5 KM SOUTH OF LAGUNA	16704	2112	13	NR	NR	RT									4			4	4		4	
HONDO CREEK MID CHANNEL IMMEDIATELY DOWNSTREAM OF SH 173 SOUTHEAST OF HONDO	18408	2114	13	NR	NR	RT									4			4			4	
SECO CREEK AT SH 470 APPROXIMATELY 10 MI WEST OF TARPLEY	13017	2115	13	NR	BA	RT									4			4	4		4	

Basin 21 - Continued

<i>Site Description</i>	<i>Station ID</i>	<i>Waterbody ID</i>	<i>Reg</i>	<i>SE</i>	<i>CE</i>	<i>MT</i>	<i>24 hr DO</i>	<i>AqHab</i>	<i>Benthics</i>	<i>Nekton</i>	<i>Metal Water</i>	<i>Organic Water</i>	<i>Metal Sed</i>	<i>Organic Sed</i>	<i>Conv</i>	<i>Amb Tox Water</i>	<i>Amb Tox Sed</i>	<i>Bacteria</i>	<i>Flow</i>	<i>Fish Tissue</i>	<i>Field</i>	<i>Comments</i>
CHOKY CANYON RESERVOIR NEAR THE DAM 422 M SOUTH AND 129 M EAST OF SPILLWAY CHANNEL USGS SITE AC	13019	2116	14	NR	NR	RT									4			4			4	
CHOKY CANYON RESERVOIR MID LAKE 15 M E OF LIVE OAK/MCMULLEN COUNTY LINE NEAR OLD HWY 99 1.25 KM NORTH OF CC STATE PARK POINT	13020	2116	14	NR	NR	RT									4			4			4	
CHOKY CANYON RESERVOIR APPROX 0.45 KM SOUTHEAST OF FM 99 SOUTHERN MOST BRIDGE CROSSING THE FRIO RIVER ARM	17389	2116	16	NR	NR	RT					2				4			4			4	
FRIO RIVER AT SH 16 IN TILDEN	13023	2117	16	NR	NR	RT									4			4	4		4	
FRIO RIVER IMMEDIATELY UPSTREAM OF SH 97 NORTH OF FOWLERTON	18373	2117	16	NR	NR	RT									4			4	4		4	
Basin 22																						

<i>Site Description</i>	<i>Station ID</i>	<i>Waterbody ID</i>	<i>Reg</i>	<i>SE</i>	<i>CE</i>	<i>MT</i>	<i>24 hr DO</i>	<i>AqHab</i>	<i>Benthics</i>	<i>Nekton</i>	<i>Metal Water</i>	<i>Organic Water</i>	<i>Metal Sed</i>	<i>Organic Sed</i>	<i>Conv</i>	<i>Amb Tox Water</i>	<i>Amb Tox Sed</i>	<i>Bacteria</i>	<i>Flow</i>	<i>Fish Tissue</i>	<i>Field</i>	<i>Comments</i>
ARROYO COLORADO AT US 77 IN SW HARLINGEN	13079	2202	15	NR	NR	RT									4			4	4		4	
PETRONILA CREEK 181 METERS WEST AND 6 METERS SOUTH FROM THE INTERSECTION OF ALICE ROAD AND LOST CREEK ROAD	20806	2204	14	NR	NR	RT									4			4			4	
PETRONILA CREEK AT FM 665 EAST OF DRISCOLL	13096	2204	14	NR	NR	RT									4			4	4		4	
PETRONILA CREEK AT FM 892 SE OF DRISCOLL	13094	2204	14	NR	NR	RT									4			4	4		4	


Basin 24

<i>Site Description</i>	<i>Station ID</i>	<i>Waterbody ID</i>	<i>Reg</i>	<i>SE</i>	<i>CE</i>	<i>MT</i>	<i>24 hr DO</i>	<i>AqHab</i>	<i>Benthics</i>	<i>Nekton</i>	<i>Metal Water</i>	<i>Organic Water</i>	<i>Metal Sed</i>	<i>Organic Sed</i>	<i>Conv</i>	<i>Amb Tox Water</i>	<i>Amb Tox Sed</i>	<i>Bacteria</i>	<i>Flow</i>	<i>Fish Tissue</i>	<i>Field</i>	<i>Comments</i>
PORT BAY AT MIDDLE OF SH 188 WEST OF ROCKPORT	13405	2472	14	NR	NR	RT					2				2			2			2	
REDFISH BAY AT SH 361 AT 3RD BRIDGE BETWEEN ARANSAS PASS AND PORT ARANSAS	13426	2483	14	NR	NR	RT									4			4			4	
CONN BROWN HARBOR MID HARBOR 50 M NORTHEAST OF THE INTERSECTION OF HUFF ST AND EAST MADDOX AVE IN ARANSAS PASS	18848	2483A	14	NR	NR	RT					2				2			2			2	
OSO BAY IMMEDIATELY OFFSHORE AT TIP OF PENINSULA AT PADRE ISLAND DRIVE/SOUTHBOUND AT SH 358	13440	2485	14	NR	NR	RT									4			4			4	
OSO BAY 40 M UPSTREAM OF OCEAN DRIVE AND APPROXIMATELY 50 M WEST OF EASTERN LANDFALL OF BRIDG	13442	2485	14	NR	NR	RT									4			4			4	
OSO CREEK IMMEDIATELY DOWNSTREAM OF SH 286 SOUTH OF CORPUS CHRISTI	13028	2485A	14	NR	NR	RT									4			4			4	

Basin 24 - Continued

<i>Site Description</i>	<i>Station ID</i>	<i>Waterbody ID</i>	<i>Reg</i>	<i>SE</i>	<i>CE</i>	<i>MT</i>	<i>24 hr DO</i>	<i>AqHab</i>	<i>Benthics</i>	<i>Nekton</i>	<i>Metal Water</i>	<i>Organic Water</i>	<i>Metal Sed</i>	<i>Organic Sed</i>	<i>Conv</i>	<i>Amb Tox Water</i>	<i>Amb Tox Sed</i>	<i>Bacteria</i>	<i>Flow</i>	<i>Fish Tissue</i>	<i>Field</i>	<i>Comments</i>
OSO CREEK IMMEDIATELY DOWNSTREAM OF FM 763 SOUTHWEST OF CORPUS CHRISTI	13029	2485A	14	NR	NR	RT									4			4			4	
HIDALGO MAIN FLOODWATER CHANNEL AT FM 1420 1.65 KM SOUTH OF INTERSECTION WITH FM 490 EAST OF RAYMONDVILLE	22003	2491C	15	NR	NR	RT									4			4	4		4	
RAYMONDVILLE DRAIN AT WILLACY COUNTY ROAD 445 800 METERS NORTH OF INTERSECTION WITH FM 3142 EAST OF RAYMONDVILLE	22004	2491C	15	NR	NR	RT									4			4	4		4	
LOS OLMOS CREEK IMMEDIATELY UPSTREAM OF US 77 SOUTH OF RIVIERA	13034	2492	14	NR	NR	RT									12			12			12	8x CMP, 4x CRP
SAN FERNANDO CREEK AT US 77 AT KINGSVILLE	13033	2492A	14	NR	NR	RT									4			4	4		4	
SAN MARTIN LAKE MID ESTUARY 2.04 KM EAST AND 0.80 KM NORTH OF THE HWY 48 BRIDGE NORTHEAST OF BROWNSVILLE	22170	2494C	15	NR	NR	RT									4			4			4	

Appendix E: Chain of Custody Forms

<p>CUSTOMER RECORD and ANALYSIS</p>		<p>NUECES RIVER AUTHORITY</p>
<p>Send Results to: Sam Sugarek Nueces River Authority</p>		<p>Lab Analysis Request</p>
<p>Address: 602 N. Staples. St. #280 Corpus Christi, TX 78401</p>		

Phone:	Fax:	Project Name:	Project No.:				Metals in Water (Dissolved)	Metals in Water (Total)																															
361-653-2110	361-653-2115	Clean Rivers Program Monitoring	CRP NRA/LCRA ELS																																				
Sampling by:		Matrix		Sample preservation		Sampling																																	
Sam Sugarek		No. Containers	Liquid	Conductivity of water at site	Field filtered	HNO3																																	Date
Shellie McCumber																																							
Site Identification: Lab Only																																							

Relinquished by:	Date	Time	Received By:	Date	Time	Remarks: X = laboratory measurement