

Amendment # 1

To the Nueces River Authority Clean Rivers Program FY 2022/2023 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:

Sam Sugarek
Director of Water Quality Programs
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Corpus Christi, Texas 78401
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Justification

This document details the changes made to the basin-wide Quality Assurance Project Plan to update Appendix B for Fiscal year 2023. This document also updates personnel changes and addresses any other changes made to the quality program since the last amendment.

Summary of Changes

Section/Figure/Table	Page	Change	Justification
Section A1	2	Replaced Rebecca DuPont, TCEQ CRP Work Leader, with Kyle Girtten as Acting CRP Work Leader	Personnel changes at TCEQ
	2	Replaced Rebecca DuPont, Acting CRP Quality Assurance Specialist, with Luis Medina, CRP Project Quality Assurance Specialist	Personnel changes at TCEQ
	2	Replaced Rebecca DuPont, Project Manager Clean Rivers Program, with Kiran Freeman.	Personnel changes at TCEQ
	2	Replaced Dana Squires, Lead CRP Quality Assurance Specialist with Jason Natho, Acting Lead CRP Quality Assurance Specialist	Personnel changes at TCEQ
	4	Replaced Laura Lira, WUL Laboratory Quality Assurance Officer, with Marisa Juarez	Personnel changes at City of Corpus Christi WUL
	5	Replaced CCSL with PENS lab	Lab changes at Texas A&M University – CCSL, to PENS Lab
Section A2	9	Remove CCSL from list of acronyms and add PENS	Changing labs that run chlorophyll/pheophytin
Section A3	13	Replaced Rebecca Dupont, Project Manager Clean Rivers Program, with Kiran Freeman. Telephone number, office number, and email address were updated.	Personnel changes at TCEQ
		Replaced Dana Squires, Lead CRP Quality Assurance Specialist with Jason Natho, Acting Lead CRP Quality Assurance Specialist. Contact information was updated.	Personnel changes at TCEQ
	11	Replaced Laura Lira, WUL QAO, with Marisa Juarez. Name. email address,	Personnel changes at WUL

		telephone # were updated	
	11	Added email addresses for LCRA ELS staff	Email addresses were needed for LCRA ELS
	12	Added Physical and Environmental Sciences (PENS Lab) and staff, Hao Yu – Research Associate, and Richard Coffin – Quality Assurance Officer to the Distribution List. Names, e-mail addresses, titles, and phone numbers were added.	Lab change to PENS from CCSL.
Section A4	13	Replaced Rebecca DuPont, TCEQ CRP Work Lead with Kyle Girtten as Acting CRP Work Lead	Personnel changes at TCEQ
	13	Replaced Dana Squires with Jason Natho as “Acting Lead CRP Quality Assurance Specialist”	Personnel changes at TCEQ
	13	Replaced Sam Sugarek, CRP Project Manager, with Kiran Freeman	Sam Sugarek was inadvertently inserted here.
	13	Replaced Sarah Kirkland, CRP Data Manager, DM&A Team with Scott Delgado	Personnel changes at TCEQ
	14	Replaced Rebecca Dupont, Acting CRP Project Quality Assurance Specialist, with Luis Medina, CRP Project Quality Assurance Specialist	Personnel changes at TCEQ
	14	Replaced Sam Sugarek, Nueces River Authority Data Manager, with Jessica Wright	Personnel changes at NRA
	14	Replaced Shellie McCumber, Nueces River Authority Aquatic Resource Specialist, with Jessica Wright	Personnel changes at NRA
	14	Italicized “Aquatic Resource Specialist” for Jessica Wright’s title	Title edit for NRA
	15	Replaced Laura Lira, WUL QAO, with Marisa Juarez	Personnel changes at WUL
	15	Replaced Laboratory from Center for Coastal Studies (CCSL) with Department of Physical and	Lab changes from CCSL to PENS Lab.

		Environmental Sciences (PENS)	
	15	Substituted Center for Coastal Studies Lab Manager with Department of Physical and Environmental Sciences (PENS) Research Associate Hao Yu	Personnel changes at CCSL which has been replaced with PENS Lab
	15	Replaced Brien Nicolau, CCSL Laboratory QAO, with Richard Coffin at PENS Lab	Personnel changes at CCSL which has been replaced with PENS Lab
Figure A4.1	18	Replaced Rebecca DuPont, TCEQ CRP Work Leader with Kyle Girtten, as “Acting” CRP Work Leader	Personnel changes at TCEQ
	18	Replaced Rebecca DuPont, “Acting TCEQ Project QA Specialist” with Luis Medina as “TCEQ Project QA Specialist	Personnel changes at TCEQ
	18	Replaced Dana Squires title from “Lead CRP Quality Assurance Specialist” with Jason Natho as “Acting Lead CRP QA Specialist”	Personnel changes at TCEQ
	18	Replaced Rebecca DuPont, TCEQ CRP Project Manager, with Kiran Freeman	Personnel changes at TCEQ
	18	Replaced Sarah Kirkland, TCEQ CRP Data Manager, with Scott Delgado	Personnel changes at TCEQ
	18	Replaced Shellie McCumber, Nueces River Authority Aquatic Resource Specialist, with Jessica Wright	Personnel changes at NRA
	18	Replaced Shellie McCumber, Nueces River Authority Data Manager, with Jessica Wright	Personnel changes at NRA
	18	PENS Laboratory staff added, and CCSL staff removed	Lab staff changes
	18	Replaced Laura Lira, WUL QAO, with Marisa Juarez	Personnel changes at WUL

Section A6	21	Changed the number of bay and tidal sites from 10 to 9. The second sentence was modified to include metals. A sentence was added after the second sentence: "One quarterly bay and tidal station will have semi-annual metals monitoring." The number of river and lake monitoring sites was changed from 33 to 38 and A sentence was added: "Five quarterly river sites will have semi-annual metals monitoring." was added to the sentence. A paragraph outlining the monitoring project for Choke Canyon Reservoir was added.	Describes changes to monitoring design for FY2023 due to supplemental funding
Table A9.1	24	Change CCSL to PENS to reflect the changes in the chlorophyll/pheophytin lab	To reflect changes going from CCSL to PENS Lab
Section B1	25	Change CCSL to PENS to reflect the changes in the chlorophyll/pheophytin lab	To reflect changes going from CCSL to PENS Lab
Section B2 Table B2.2	27	Change CCSL to PENS to reflect the changes in the chlorophyll/pheophytin lab	To reflect changes going from CCSL to PENS Lab
Section B3	29	Change CCSL to PENS to reflect the changes in the chlorophyll/pheophytin lab	To reflect changes going from CCSL to PENS Lab
Section B4	29	Change CCSL to PENS to reflect the changes in the chlorophyll/pheophytin lab	To reflect changes going from CCSL to PENS Lab
	29	Replaced EPA Method 447.0 with 445.0	To reflect changes going from CCSL to PENS Lab
Section B10	35	Change CCSL to PENS to reflect the changes in the chlorophyll/pheophytin lab	To reflect changes going from CCSL to PENS Lab
Table D2.1 Data Review Tasks	43	Change CCSL to PENS to reflect the changes in the chlorophyll/pheophytin lab	To reflect changes going from CCSL to PENS Lab

Appendix A7.1, A 7.3, and A7.8	48	Changing Labs from CCSL to PENS	Changing Labs from CCSL to PENS
	48	Replaced EPA Method 447.0 with 445.0	To reflect changes going from CCSL to PENS Lab
	51	Correct water odor parameter code in A 7.3 from 98871 to 89971	Incorrect parameter code for water odor existed in QAPP
	57	Updated Metals in Water LOQs in Table A7.8 LOQs for Total Chromium, Total Copper, Total Mercury, Total Molybdenum, Total Nickel, and Total Zinc were edited to match LCRA ELS and Energy Lab specifications.	Incorrect LOQs from a previous version of the QAPP were inadvertently used in the FY 2022/23 document
	55	Cadmium was moved from the cell below calcium to the cell above calcium	To keep the list of parameters in alphabetical order
	56	Change parameter code for hardness from 00900 to 82394	To match what LCRA reports
	56	Change parameter code for Total Mercury from 71960 to 71900	Must have been a transcription error
Task 3: Water Quality Monitoring, Monitoring Description	59	Monitoring Description was reworded into bullet points.	To match formatting with NRA CRP contract.
	59	'Metals' was added to two semi-annual bay and tidal sites.	Noted to include metals sampling that will take place.
	59	The number of river and lake sites was changed from 33 to 38. 5 river sites will also include semi-annual metal monitoring.	Edited to include the 2 new sites in the Upper Basin, 2 additional sites on Leona and middle Frio, and 1 new station on Choke Canyon.
	59	A paragraph was added that outlines the Choke Canyon Reservoir monitoring changes.	Describes monitoring changes on Choke Canyon Reservoir
	60	Changes in monitoring descriptions were made to Segments 2104, 2109, 2112, 2116, 2117, 2472, and 2483.	Updates to the segments were needed after monitoring changes were made.
Appendix B	63-73	Updated Table B1.1	Describes changes to monitoring for FY2023 using

			additional funds
	65	Add 2x frequency under Metal Water at Station 12972	
	67	Add quarterly Leona River Station 12985, to the schedule	
	68	Add quarterly Nueces River Stations 13005, 22330, and 22331 to the schedule	
	69	Change monitoring frequency at Choke Canyon Station 13019 from quarterly to monthly and add 12x 24-hour DO monitoring	
	69	Change monitoring frequency at Choke Canyon Station 13020 from quarterly to monthly and add 12x 24-hour DO monitoring	
	69	Change monitoring frequency at Choke Canyon Station 17389 from quarterly to monthly, add 2x metals monitoring and 12x 24 H DO monitoring	
	69	Add new station on Choke Canyon Reservoir 22328 at a monthly frequency and quarterly 24-H DO	
	69	Add quarterly Station 13024 on Frio River	
	69	Add 2x frequency under Metal Water at Station 13023	
	71	Add 2x frequency under Metal Water at Port Bay Station 13405	
	71	Add 2x frequency under Metal Water at Conn Brown Harbor Station 18848	
Appendix C	75-76	Updated maps of monitoring stations	Monitoring maps were updated to reflect 2023 monitoring changes

Detail of Changes

A1 Approval Page

Texas Commission on Environmental Quality
Water Quality Planning Division

Electronically Approved 10/03/2022

Kyle Girtten, Acting Work Leader Date
Clean Rivers Program

Electronically Approved 10/06/2022

Kiran Freeman, Project Manager Date
Clean Rivers Program

Electronically Approved 10/03/2022

Luis Medina Date
Project Quality Assurance Specialist
Clean Rivers Program

Electronically Approved 10/03/2022

Cathy Anderson, Team Leader Date
Data Management and Analysis

Monitoring Division

Electronically Approved 10/06/2022

Jason Natho Date
Acting Lead CRP Quality Assurance Specialist

Nueces River Authority (NRA)

Electronically Approved	10/03/2022
Sam Sugarek	Date
NRA Project Manager	

Electronically Approved	10/03/2022
Sam Sugarek	Date
NRA Quality Assurance Officer	

Lower Colorado River Authority Environmental Laboratory Services (LCRA ELS)

Electronically Approved	10/05/2022
Dale Jurecka	Date
LCRA ELS Lab Manager	

Electronically Approved	10/05/2022
Angel Mata	Date
LCRA ELS Lab Quality Assurance Officer	

City of Corpus Christi Water Utilities Laboratory (WUL)

Electronically Approved 10/04/2022

Marisa Juarez Date
WUL Laboratory Manager

Electronically Approved 10/04/2022

Marisa Juarez Date
WUL Laboratory Quality Assurance Officer

Texas A&M University – Corpus Christi Department of Physical and Environmental Sciences (PENS)

Electronically Approved 10/03/2022

Hao Yu Date
PENS Research Associate

Electronically Approved 10/04/2022

Richard Coffin Date
PENS Laboratory Quality Assurance Officer

**San Antonio River Authority Regional Environmental Laboratory
(SARA REL)**

Electronically Approved	10/03/2022
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Zachary Jendrusch	Date
SARA REL Lab Supervisor	

Electronically Approved	10/04/2022
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Patty Carvajal	Date
SARA REL Lab Quality Assurance Officer	

***Bandera County River Authority and Groundwater District
(BCRAGD)***

Electronically Approved	10/06/2022
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David Mauk	Date
BCRAGD General Manager	

Electronically Approved	10/04/2022
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Clint Carter	Date
BCRAGD 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
CE	Collecting Entity
COC	Chain of Custody
CRP	Clean Rivers Program
DMRG	Surface Water Quality Monitoring Data Management Reference Guide, July 2019, 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
LCSD	Laboratory Control Sample Duplicate
LIMS	Laboratory Information Management System
LOD	Limit of Detection
LOQ	Limit of Quantitation
MT	Monitoring Type
NELAP	National Environmental Laboratory Accreditation Program
PENS	Department of Physical and Environmental Sciences Laboratory at Texas A&M-Corpus Christi
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
TMDL	Total Maximum Daily Load
TCEQ	Texas Commission on Environmental Quality
TNI	The NELAC Institute
TSWQS	Texas Surface Water Quality Standards

A3 Distribution List

Texas Commission on Environmental Quality

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Team Leader, Data Management and Analysis

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Clint Carter, Quality Assurance Officer
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The NRA 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-participants, or other units of government. The NRA will document distribution of the plan and any amendments and appendices, maintain this documentation as part of the project's quality assurance records, and ensure the documentation is available for review.

A4 PROJECT/TASK ORGANIZATION

Description of Responsibilities

TCEQ

Kyle Girten

Acting 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.

Jason Natho

Acting Lead CRP 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.

Kiran Freeman

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.

Scott Delgado

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).

Luis Medina

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 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. 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.

Jessica Wright

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.

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.

Jessica Wright

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.

Marisa Juarez

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.

Department of Physical and Environmental Sciences Laboratory at Texas A&M University – Corpus Christi (PENS)

Hao Yu

PENS, Research Associate

Responsible for the overall performance, administration, and reporting of analyses performed by PENS. 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.

Richard Coffin

PENS, Laboratory QAO

Responsible for the overall quality control and quality assurance of analyses performed by PENS. 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)

Zachary Jendrusch

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.

Clint Carter

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.

Clint Carter

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.

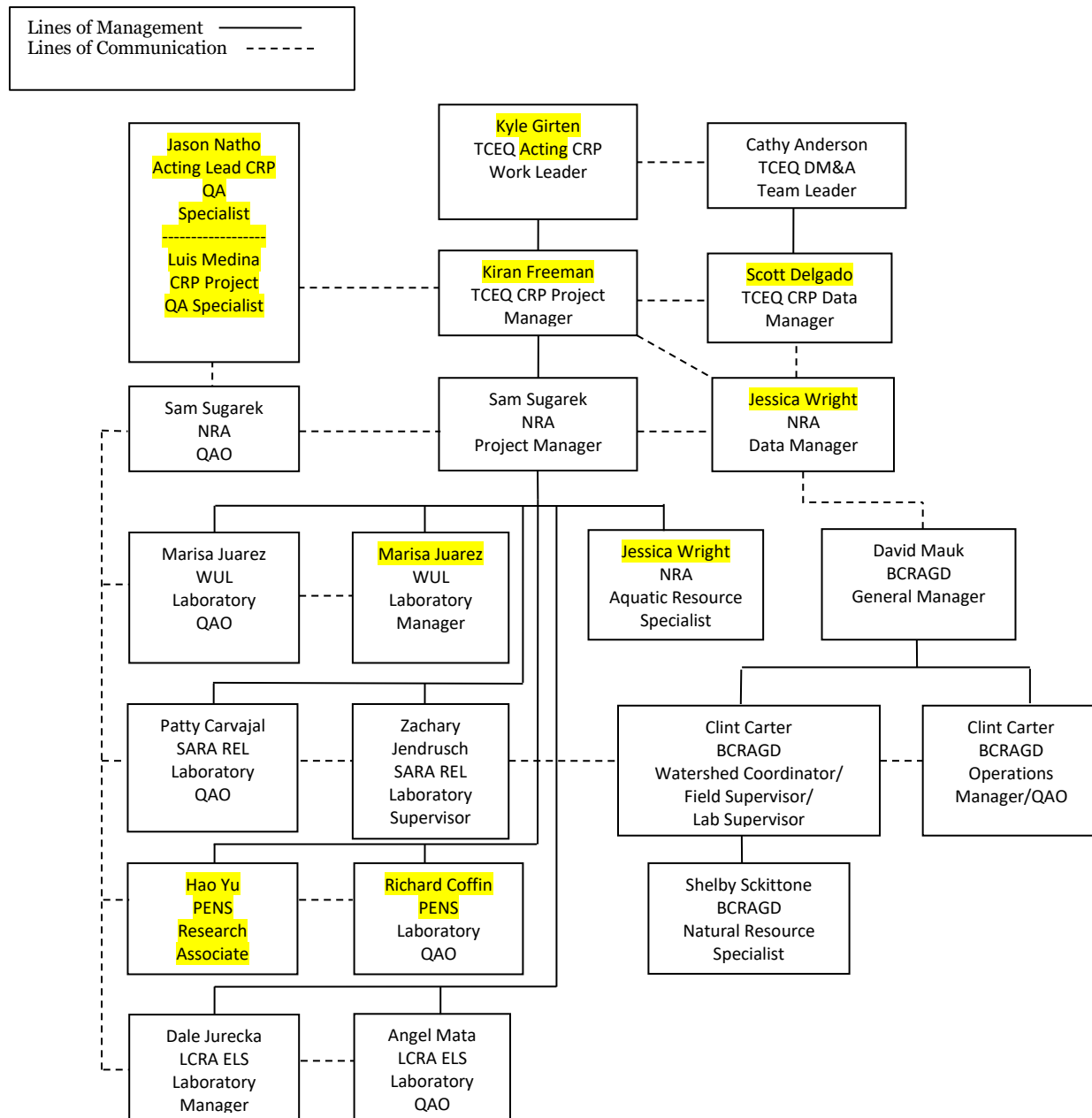
Shelby Skittone

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, metals and field parameters. One quarterly bay and tidal station will have semi-annual metals monitoring. NRA will monitor a minimum of 38 river and lake sites quarterly for conventional, bacteria, flow (where applicable), and field parameters. Five quarterly river sites will have semi-annual metals monitoring. 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 3 sites given sufficient water. NRA will monitor for metals in water at 3 locations on a twice per year frequency.

The Performing Party will conduct additional monitoring in Choke Canyon Reservoir (Segment 2116). This includes additional monitoring events at three existing monitoring sites such that monthly monitoring is conducted for nutrients, field parameters, and 24-hour field parameters. In addition to the existing monitoring sites, the Performing Party will conduct monthly monitoring for nutrient and field parameters, and 24-hour field parameter monitoring at least once per quarter, at one new site.

Bandera County River Authority and Groundwater District (BCRAGD) will conduct routine quarterly monitoring, collecting field, conventional, bacteria and, where applicable, flow data at 4 river monitoring 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, sub-participants, 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**

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, PENS , LCRA ELS	5	Paper, electronic
Laboratory SOPs	WUL, SARA REL, PENS , 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, PENS , SARA REL, LCRA ELS	7*	Paper
Laboratory calibration records	WUL, SARA REL, PENS , LCRA ELS	5	Paper, electronic
Laboratory instrument printouts	WUL, SARA REL, PENS , LCRA ELS	5	Paper, electronic
Laboratory data reports/results	WUL/SARA REL, PENS , LCRA ELS	5	Paper, electronic
	NRA, BCRAGD	7*	Paper, electronic
Laboratory equipment maintenance logs	WUL, SARA REL, PENS , LCRA ELS	5	Paper, electronic
Corrective Action Documentation	WUL, SARA REL, PENS , LCRA ELS	5	Paper, electronic
	NRA, BCRAGD	7*	Paper, electronic

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

B1 Sampling Process Design

Sampling under this QAPP is conducted by NRA and BCRAGD. NRA uses the CC-WUL for conventional parameters including bacteria and **PENS** for chlorophyll-*a* and pheophytin analysis. NRA has the option to use the CC-WUL to run chlorophyll-*a* and pheophytin analysis as needed. BCRAGD uses the SARA-REL for all routine chemical analysis including bacteria.

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

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	PENS*
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 **PENS**.

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. *All COC forms to be used in the project should be included in Appendix E for the TCEQ's review.*

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

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 **PENS** 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 Nueces River Authority.

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 is 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

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 shall be made available for review by the TCEQ. Exceptions to this rule include laboratories that only analyze parameters that do not require laboratory accreditation (e.g. Chlorophyll-*a* and pheophytin samples run by **PENS** using EPA 445.0 which doesn’t require TCEQ accreditation).

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 **PENS** 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 CC 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 corrected.

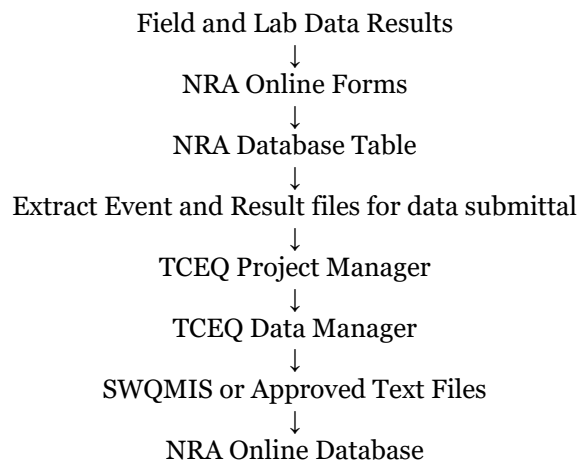
The data will be supplied to the TCEQ Project Manager as ASCII pipe-delimited text files in the Event/Result file formats as described in the most current version of the DMRG. The data files are then forwarded to the TCEQ Data Manager.

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 determined by comparing lab and field data to data inputted and are manually corrected in NRA databases by the NRA QAO.

The following flow chart summarizes the data path.



Data Dictionary

Terminology and field descriptions are included in the 2019 DMRG, or most recent version.

Name of Entity	Tag Prefix	Submitting Entity	Collecting Entity
Nueces River Authority	O	NR	NR
Bandera County River Authority and Groundwater District	O	NR	BA

Data Errors and Loss

Time of lab analysis is compared to holding times for all parameters by WUL, **PENS**, 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, PENS , SARA REL and LCRA ELS QAO	NRA, PENS , BCRAGD, SARA REL, WUL and LCRA ELS QAO	
Chain of custody complete/acceptable	NRA/BCRAGD Field Supervisor	WUL, PENS , SARA REL and LCRA ELS QAO	NRA, PENS , BCRAGD, SARA REL, WUL and LCRA ELS QAO	
NELAP Accreditation is current		WUL, PENS , SARA REL and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL, PENS and LCRA ELS QAO	
Sample preservation and handling acceptable	NRA/BCRAGD Field Supervisor	WUL, SARA REL, PENS and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL, PENS and LCRA ELS QAO	
Holding times not exceeded		WUL, SARA REL, PENS and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL, PENS and LCRA ELS QAO	NRA DM
Collection, preparation, and analysis consistent with SOPs and QAPP	NRA/BCRAGD Field Supervisor	WUL, SARA REL, PENS and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL, PENS 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, PENS and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL, PENS and LCRA ELS QAO	
QC samples analyzed at required frequency	NRA/BCRAGD Field Supervisor	WUL, PENS , SARA REL and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL, PENS and LCRA ELS QAO	
QC results meet performance and program specifications		WUL, SARA REL, PENS and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL, PENS and LCRA ELS QAO	
Analytical sensitivity (LOQ/AWRL) consistent with QAPP		WUL, PENS , SARA REL and LCRA ELS QAO	NRA, BCRAGD, SARA REL, WUL, PENS and LCRA ELS QAO	
Results, calculations, transcriptions checked		WUL, PENS , SARA REL and LCRA ELS QAO		
Laboratory bench-level review performed		WUL, PENS , SARA REL and LCRA ELS QAO		
All laboratory samples analyzed for all scheduled parameters		WUL, PENS , 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,	NRA, BCRAGD, SARA REL, WUL, PENS and LCRA ELS QAO	

		SARA REL LS, PENS LM & QAO and LCRA ELS LM		
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, PENS LM, LCRA ELS and SARA REL LS	NRA QAO	

Appendix A: Measurement Performance Specifications (Table A7.1 & A7.8)

TABLE A7.1 Measurement Performance Specifications for the Nueces River Authority										
Conventional Parameters in Water										
Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD) of LCS/LCSD)	Bias %Rec. of LCS	Lab
ALKALINITY, TOTAL (MG/L AS CaCO ₃)	mg/L	water	SM2320B	00410	20	20	NA	20	NA	WUL
RESIDUE, TOTAL NONFILTRABLE (MG/L)	mg/L	water	SM2540D	00530	5	NA	NA	NA	NA	WUL
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	EPA350.1 Rev. 2.0 (1993)	00610	0.1	0.1	70-130	20	80-120	WUL
NITRITE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00615	0.05	0.02	70-130	20	80-120	WUL
NITRATE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00620	0.05	0.02 5	70-130	20	80-120	WUL
NITRITE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 353.2	00615	0.05	0.02	70-130	20	80-120	WUL
NITRATE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 353.2	00620	0.05	0.02	70-130	20	80-120	WUL
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	EPA 351.4	00625	0.2	0.2	70-130	20	80-120	WUL
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	EPA365.1	00665	0.06	0.06	70-130	20	80-120	WUL
CARBON, TOTAL ORGANIC, NPOC (TOC), MG/L	mg/L	water	SM5310 C	00680	2	0.3	NA	NA	NA	WUL
CHLORIDE (MG/L AS CL)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00940	5	0.3	70-130	20	80-120	WUL
SULFATE (MG/L AS SO ₄)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00945	5	0.1	70-130	20	80-120	WUL
RESIDUE, TOTAL FILTRABLE (DRIED AT 180C) (MG/L)	mg/L	water	SM2540C	70300	10	2.5	NA	20	80-120	WUL
CHLOROPHYLL-A, FLUOROMETRIC METHOD, UG/L	µg/L	water	EPA 445.0	70953	3	2	NA	NA	NA	WUL
PHEOPHYTIN-A UG/L FLUOROMETRIC METHOD	µg/L	water	EPA 445.0	32213	3	2	NA	NA	NA	WUL
CHLOROPHYLL-A, FLUOROMETRIC METHOD, UG/L	µg/L	water	EPA 445.0	70953	3	2	NA	NA	NA	PENS
PHEOPHYTIN-A UG/L FLUOROMETRIC METHOD	µg/L	water	EPA 445.0	32213	3	2	NA	NA	NA	PENS
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 A7.3 Measurement Performance Specifications for the Nueces River Authority and BCRAGD									
Field Parameters									
Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD) of LCS/LCSD	Bias %Rec of LCS
TEMPERATURE, WATER (DEGREES CENTIGRADE)	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	NA	NA	NA	NA	NA
AIR TEMPERATURE	DEG C	air	TCEQ SOP	00020	NA	NA	NA	NA	NA
TRANSPARENCY, SECCHI DISC (METERS)	meters	water	TCEQ SOP V1	00078	NA	NA	NA	NA	NA
SPECIFIC CONDUCTANCE, FIELD (US/CM @ 25C)	µs/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA	NA	NA	NA	NA
OXYGEN, DISSOLVED (MG/L)	mg/L	water	SM 4500-O G and TCEQ SOP V1	00300	NA	NA	NA	NA	NA
PH (STANDARD UNITS)	s.u.	water	EPA 150.1 and TCEQ SOP V1	00400	NA	NA	NA	NA	NA
SALINITY - PARTS PER THOUSAND	ppt	water	SM 2520 and TCEQ SOP V1	00480	NA	NA	NA	NA	NA
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	NA	NA	NA	NA	NA
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	meters	water	TCEQ SOP V2	82903	NA	NA	NA	NA	NA
RESERVOIR STAGE (FEET ABOVE MEAN SEA LEVEL) †	FT ABOVE MSL	water	TWDB	00052	NA	NA	NA	NA	NA
RESERVOIR PERCENT FULL†	% RESERVOIR CAPACITY	water	TWDB	00053	NA	NA	NA	NA	NA
RESERVOIR ACCESS NOT POSSIBLE LEVEL TOO LOW ENTER 1 IF REPORTING	NS	other	TCEQ Drought Guidance	00051	NA	NA	NA	NA	NA
MAXIMUM POOL WIDTH AT TIME OF STUDY (METERS)*	meters	other	TCEQ SOP V2	89864	NA	NA	NA	NA	NA
MAXIMUM POOL DEPTH AT TIME OF STUDY(METERS)*	meters	other	TCEQ SOP V2	89865	NA	NA	NA	NA	NA
POOL LENGTH, METERS*	meters	other	TCEQ SOP V2	89869	NA	NA	NA	NA	NA
% POOL COVERAGE IN 500 METER REACH*	%	other	TCEQ SOP V2	89870	NA	NA	NA	NA	NA

WIND INTENSITY (1=CALM,2=SLIGHT, 3=MOD.,4=STRONG)	NU	other	NA	89965	NA	NA	NA	NA	NA
PRESENT WEATHER (1=CLEAR,2=PTCLDY, 3=CLDY,4=RAIN,5=OTHER)	NU	other	NA	89966	NA	NA	NA	NA	NA
WATER SURFACE (1=CALM,2=RIPPLE, 3=WAVE,4=WHITECAP)	NU	water	NA	89968	NA	NA	NA	NA	NA
WATER COLOR (1=BROWN,2=REDDISH, 3=GREEN, 4=BLACK, 5=CLEAR,6=OTHER)	NU	water	TCEQ SOP	89969	NA	NA	NA	NA	NA
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGGS, 4=MUSKY,5=FISHY, 6=NONE, 7=OTHER)	NU	water	TCEQ SOP	89971	NA	NA	NA	NA	NA
TIDE STAGE (1=LOW,2=FALLING, 3=SLACK,4=RISING,5=HI)	NU	water	NA	89972	NA	NA	NA	NA	NA
RAINFALL IN 1 DAY INCLUSIVE PRIOR TO SAMPLE (IN)	inches	other	TCEQ SOP	82553	NA	NA	NA	NA	NA
RAINFALL IN 7 DAY INCLUSIVE PRIOR TO SAMPLE (IN)	inches	other	TCEQ SOP	82554	NA	NA	NA	NA	NA
TURBIDITY (1=LOW,2=MEDIUM, 3=HIGH)	NU	water	TCEQ SOP	88842	NA	NA	NA	NA	NA
WIND DIRECTION (1=NORTH,2=SOUTH, 3=EAST, 4=WEST, 5=NORTHEAST, 6=SOUTHEAST, 7=NORTHWEST, 8=SOUTHWEST)	NU	other	NA	89010	NA	NA	NA	NA	NA

* To be routinely reported when collecting data from perennial pools.

† As published by the Texas Water Development Board on their website <http://wiid.twdb.state.tx.us/ims/resinfo/BushButton/lakestatus.asp?selcat=3&slbasin=2>

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 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)	µg/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
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
CALCIUM, DISSOLVED (MG/L AS CA)	mg/L	water	EPA 200.7	00915	NA	0.2	70-130	20	80-120	LCRA ELS
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	1.0	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

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD) of LCS/LCSD)	Bias %Rec. of LCS	Lab
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
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

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD) of LCS/LCSD)	Bias %Rec. of LCS	Lab
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	1NA	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, WATER	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
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 AT 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

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 FY 2022, the Performing Party will monitor the following for a minimum:

- Nine bay and tidal sites quarterly for conventional, bacteria, and field parameters,
- Two bay and tidal sites on a semi-annual basis for conventional, bacteria, metals, and field parameters
- One bay or tidal site monitored quarterly will also include semi-annual metals monitoring
- 38 river and lake sites quarterly for conventional, bacteria, flow (where applicable), and field parameters (Five river sites will also include semi-annual metals monitoring),
- One river site quarterly for bacteria and field parameters only,
- One river site quarterly for field parameters only, and
- Three sites will be monitored for 24-hour dissolved oxygen if there is sufficient water.

The Performing Party will conduct additional monitoring in Choke Canyon Reservoir (Segment 2116). This includes additional monitoring events at three existing monitoring sites such that monthly monitoring is conducted for nutrients, field parameters, and 24-hour field parameters. In addition to the existing monitoring sites, the Performing Party will conduct monthly monitoring for nutrient and field parameters, and 24-hour field parameter monitoring at least once per quarter, at one new site.

In FY 2023, the Performing Party will monitor at a similar level of effort as in FY 2022. The actual number of sites, location, frequency, and parameters collected for FY 2023 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 will be completed in accordance with 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 FY2022

Due to the delayed execution of the NRA FY22-23 CRP Contract Amendment 1, NRA was unable to conduct additional monitoring in FY22.

Sample Design Rationale FY 2023

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 2104 – One quarterly monitoring station located on the Nueces River at FM 1042 (Station Id 12972) will include metals in water monitoring on a semi-annual frequency.

Segment 2109 – One quarterly monitoring station located on the Leona River at FM 1581 (Station Id 12985) will be added due to additional monitoring funds.

Segment 2112 – Three quarterly monitoring stations located on the Upper Nueces River (Station Ids 22331, 22330, and 13005) will be added due to additional monitoring funds.

Segment 2116 - Three quarterly monitoring stations located on Choke Canyon Reservoir (Station Ids 17389, 13019, and 13020) will be monitored on a monthly frequency for nutrients, chlorophyll-a, pheophytin, and 24-hour DO parameters. Station 17389 will include metals in water monitoring on a semi-annual frequency. One quarterly routine plus quarterly 24-hour DO monitoring station located on Choke Canyon Reservoir (Station Id 22328) will be added due to additional monitoring funds.

Segment 2117 - One quarterly monitoring station located on the Frio River at SH 16 (Station Id 13023) will include metals in water monitoring on a semi-annual frequency. One quarterly monitoring located a I-35 north of Dilley (Station ID 13024) will be added due to additional monitoring funds.

Segment 2472 - One quarterly monitoring station located on Port Bay at SH 188 (Station Id 13405) will include metals in water monitoring on a semi-annual frequency.

Segment 2483 - One quarterly monitoring station located on Conn Brown Harbor (Station Id 18848) will include metals in water monitoring on a semi-annual frequency.

Table B1.1 Sample Design and Schedule, FY 2023

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	
CHILTIPI CREEK MID CHANNEL AT UNNAMED BRIDGE POSSIBLY AKA PLYMOUTH ROAD 2.11 KM DOWNSTREAM OF N END FM 631 NE OF SINTON	12930	2003A	14	NR	NR	RT					2				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 AT COUNTY ROAD EAST OF SKIDMORE	12952	2004	14	NR	NR	RT									4			4	4		4	
Basin 20 - 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>
ARANSAS CREEK AT US 181 NORTH OF SKIDMORE IN BEE COUNTY	12941	2004A	14	NR	NR	RT												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 I- a/Pheoph ytin 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 HILLS	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					2				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	
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>
NUECES RIVER BRIDGE ON FM 190 NORTH OF ASHERTON	12976	2105	16	NR	NR	BS	4												4		4	
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	

Basin 21 - 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
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 [LM1]								4			4	4		4	
SAN MIGUEL CREEK AT SH 16 NORTH OF TILDEN	12983	2108	16	NR	NR	RT					2				4			4	4		4	
LEONA RIVER 370 M UPSTREAM OF FM 140	18418	2109	13	NR	NR	RT	4								4			4	4		4	

LEONA RIVER AT FM 1581 SOUTHWEST OF PEARSALL	12985	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>
UPPER SABINAL RIVER IMMEDIATELY UPSTREAM OF FM 187 APPROXIMATELY 140 M NORTHEAST OF ENTRANCE OF LOST MAPLES STATE NATURAL AREA	22306	2110	13	NR	BA	RT									4			4	4		4	
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	
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>
NUECES RIVER AT SH 55 SOUTH OF BARKSDALE	13005	2112	13	NR	NR	RT									4			4	4		4	
NUECES RIVER AT CR 414 AT MONTELL	22331	2112	13	NR	NR	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	

NUECES RIVER AT CHALK BLUFF RESORT AND PARK	22330	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	
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>
COMMISSIONERS CREEK 760 METERS DOWNSTREAM OF THE IMPOUNDMENT AT CAMP OF THE OZARKS APPROXIMATELY 355 METERS SOUTH OF FM 470 NEAR THE CITY OF TARPLEY	22227	2114A	13	NR	BA	RT									4			4	4		4	
SECO CREEK AT SH 470 APPROXIMATELY 10 MI WEST OF TARPLEY	13017	2115	13	NR	BA	RT									4			4	4		4	

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	12								12			12			12	
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 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	12								12			12			12	
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	12				2				12			12			12	

CHOKO CANYON RESERVOIR APPROXIMATELY 553 METERS BELOW THE CONFLUENCE WITH SAN MIGUEL CREEK	22328	2116	16	NR	NR	RT	4								12			12			12	
FRIO RIVER AT SH 16 IN TILDEN	13023	2117	16	NR	NR	RT					2				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>
FRIO RIVER IMMEDIATELY UPSTREAM OF SH 97 NORTH OF FOWLERTON	18373	2117	16	NR	NR	RT									4			4	4		4	
FRIO RIVER AT IH 35 NORTHBOUND BRIDGE NORTH OF DILLEY	13024	2117	16	NR	NR	RT									4			4	4		4	
ARROYO COLORADO AT US 77 IN SW HARLINGEN	13079	2202	15	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	

PETRONILA CREEK AT FM 665 EAST OF DRISCOLL	13096	2204	14	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	
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	

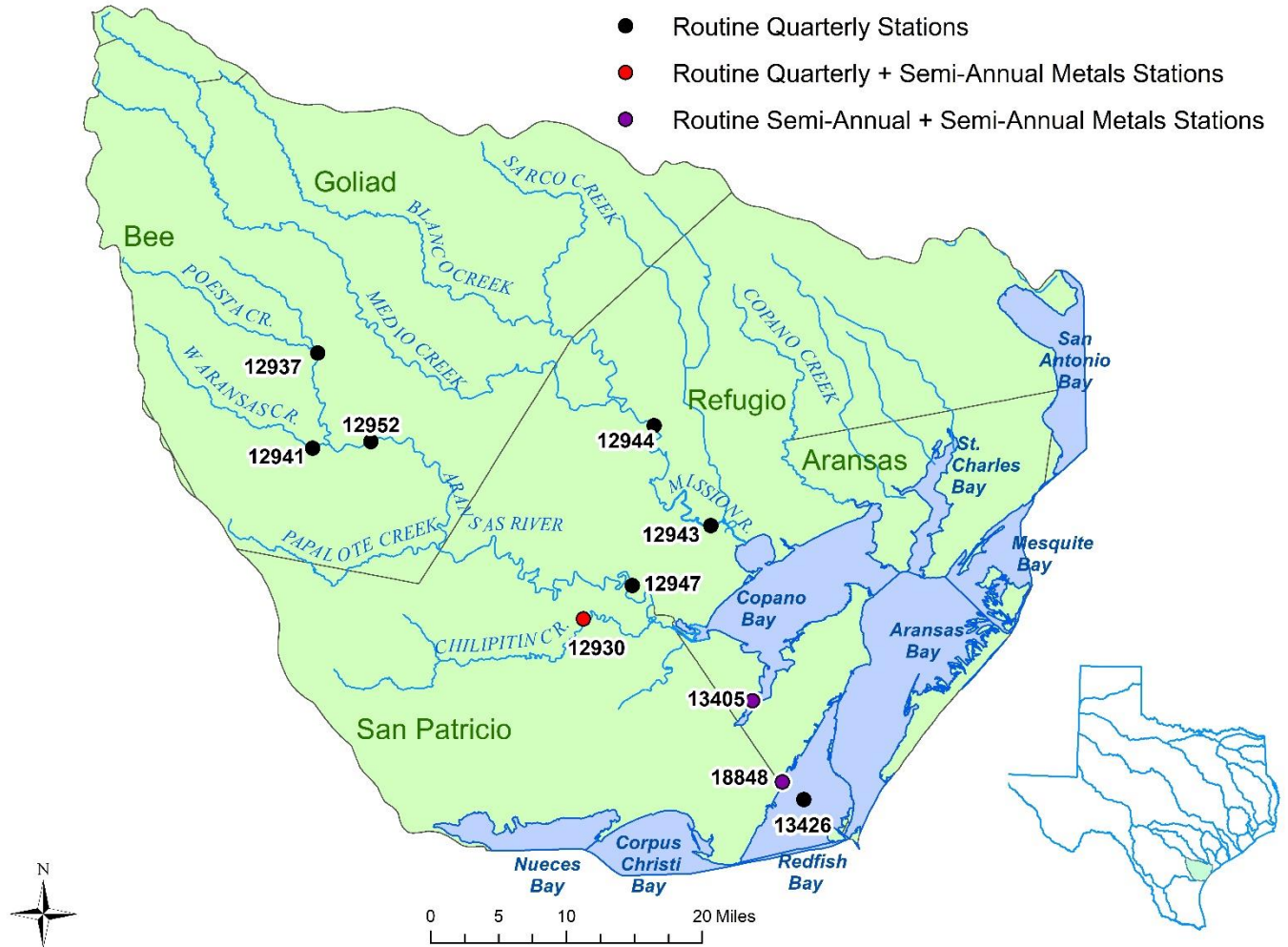
CONN BROWN HARBOR MID HARBOR 50 M NORTHEAST OF THE INTERSECTION OF HUFF ST AND EAST MADDOX AVE IN ARANSAS PASS	18848	2483A	14	NR	NR	RT						2			2			2			2	
OSO BAY IMMEDIATELY OFFSHORE AT TIP OF PENINSULA AT PADRE ISLAND DRIVE/SOUTHBOU ND AT SH 358	13440	2485	14	NR	NR	RT									4			4			4	
Basin 24 - 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 BAY 40 M UPSTREAM OF OCEAN DRIVE AND APPROXIMATELY 50 M WEST OF EASTERN LANDFALL OF BRIDGE	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	
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	
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>
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									4			4			4	
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 C: Station Location Maps

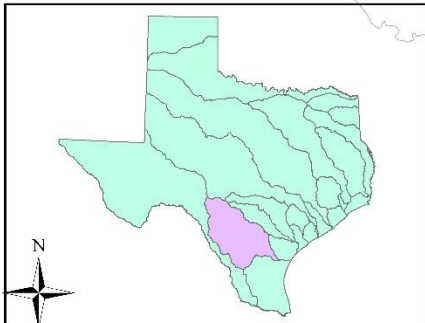
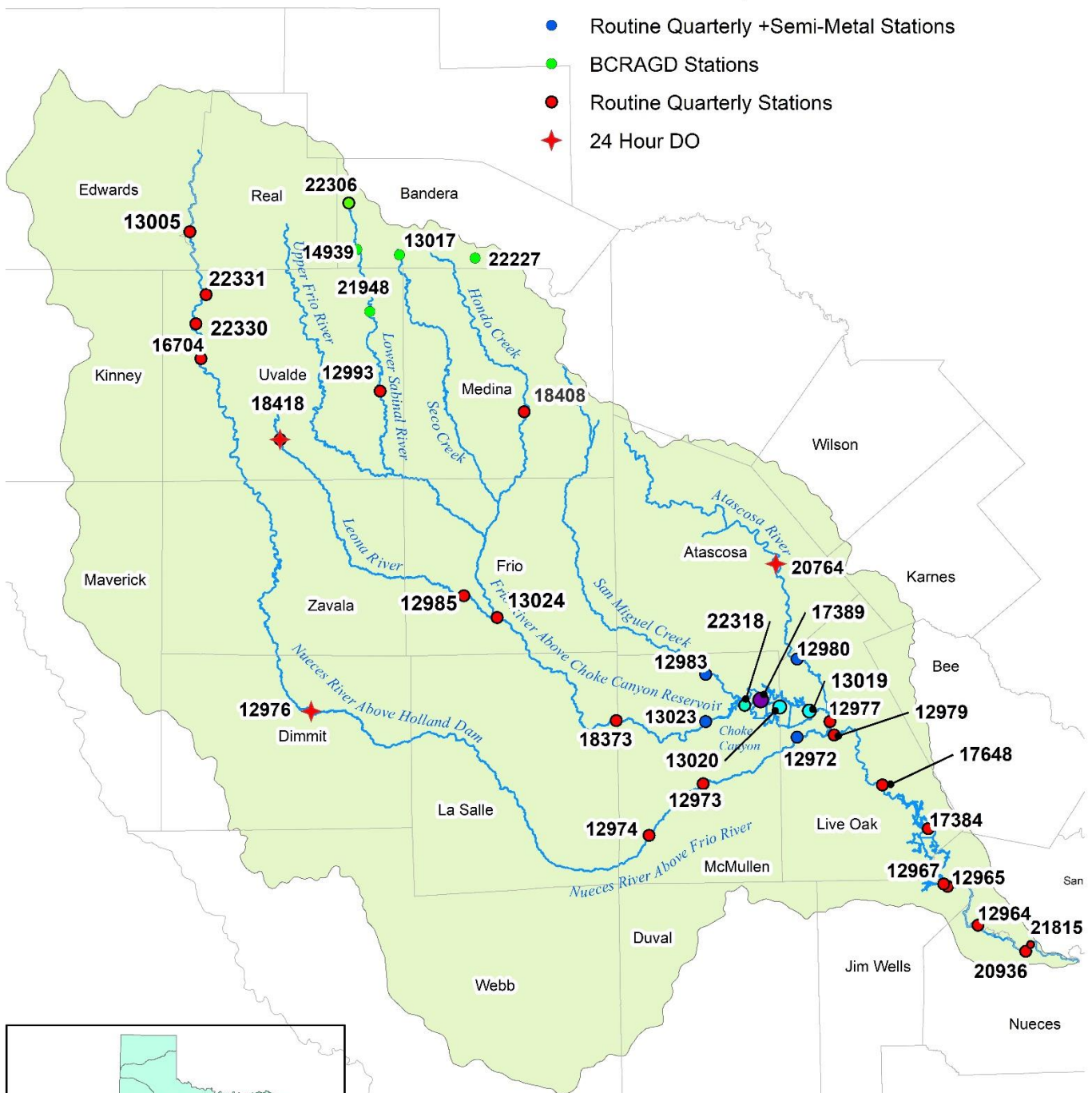
San Antonio-Nueces Coastal Basin



Nueces River Basin

NRA Monitoring Stations

- Routine Monthly
- Routine Monthly + Semi-Annual Metals + 24 Hr DO
- Routine Quarterly + Semi-Metal Stations
- BCRAGD Stations
- Routine Quarterly Stations
- ★ 24 Hour DO



0 12.5 25 50 Miles