Quality Assurance Project Plan
Nueces River Authority

500 IH 69, Suite 805
Robstown, Texas 78380

Clean Rivers Program

Water Quality Planning Division

Texas Commission on Environmental Quality

P.O. Box 13087, MC 234

Austin, Texas 78711-3087

Effective Period: FY 2024 to FY 2025

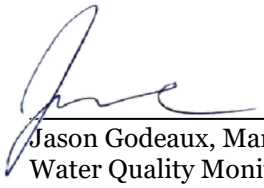
Questions concerning this QAPP should be directed to:

Jessica Wright
Manager of Water Quality
500 IH 69, Suite 805
Robstown, Texas 78380
(214) 789-6389
jwright@nueces-ra.org

A1 Approval Page

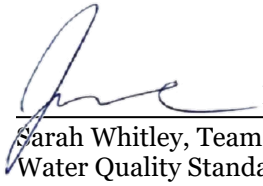
Texas Commission on Environmental Quality

Water Quality Planning Division



10/6/2023

Jason Godeaux, Manager Date
Water Quality Monitoring and Assessment Section



For Sarah Whitley 10/6/2023

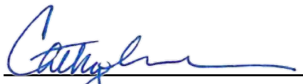
Sarah Whitley, Team Leader Date
Water Quality Standards and Clean Rivers Program

Lawrence Grant Bassett 10/5/2023

Grant Bassett, Date
Project Quality Assurance Specialist
Clean Rivers Program

10/5/2023

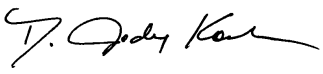
Kiran Freeman, Project Manager Date
Clean Rivers Program



10/05/2023

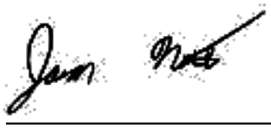
Cathy Anderson, Team Leader Date
Data Management and Analysis

Monitoring Division



10/06/2023

D. Jody Koehler Date
TCEQ Quality Assurance Manager



10/06/2023

Jason Natho Date
acting Lead CRP Quality Assurance Specialist

Nueces River Authority (NRA)

10/5/2023
Marisa Balarin-Juarez Date
NRA Director of Wastewater and Water Quality Programs

Jessica Wright 10/4/23
Jessica Wright Date
NRA Project Manager

Jessica Wright 10/4/23
Jessica Wright Date
NRA Quality Assurance Officer

Courtney Taylor 10/05/23
Courtney Taylor Date
NRA Data Specialist

City of Corpus Christi Water Utilities Laboratory (WUL)

10/4/2023

Michael McCall
WUL Lab Manager

Date

10/04/2023

LaDona Parr
WUL Lab Quality Assurance Officer

Date

Texas A&M University – Corpus Christi (TAMU-CC)

Department of Physical and Environmental Sciences (PENS)

Yu Hao 10/04/2023

Hao Yu Date
PENS Lab Research Associate

Richard Coffin Digitally signed by Richard Coffin
Date: 2023.10.04 14:09:19 -05'00'

Richard Coffin Date
PENS Lab Quality Assurance Officer

San Antonio River Authority Regional Environmental Laboratory (SARA REL)

Zachary Jendrusch	Date
SARA REL Lab Supervisor	
Jeanette Hernandez	Date
SARA REL Lab Quality Assurance Officer	

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

Dale Jurecka 10/4/23	Angel Mata 10/04/2023
Dale Jurecka Date	Angel Mata Date
LCRA-ELS Lab Manager	LCRA-ELS Lab Quality Assurance Officer

Energy Laboratories, Inc. (Energy Lab)

Cindy Rohrer 10/5/2023

Cindy Rohrer Date
Energy Lab Manager

Leigh Ann Wise 10/05/2023

Leigh Ann Wise Date
Energy Lab Quality Assurance Officer

Bandera County River Authority and Groundwater District (BCRAGD)

10/4/2023
David Mauk Date
BCRAGD General Manager

10/4/23
Clint Carter Date
BCRAGD Quality Assurance Officer

10/4/2023
Shelby Sckittone Date
BCRAGD Natural Resource Specialist

A2 Table of Contents

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
DM&A	Data Management and Analysis
EPA	United States Environmental Protection Agency
FY	Fiscal Year
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 Lab Accreditation Program
NRA	Nueces River Authority
PENS	TAMU-CC Department of Physical and Environmental Sciences
PM	Project Manager
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
RT	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
WUL	City of Corpus Christi Water Utilities Laboratory

A3 Distribution List

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

Kiran Freeman, Project Manager
Clean Rivers Program
MC-234
(512) 239-1810
Kiran.Freeman@tceq.texas.gov

Jason Natho
acting Lead CRP Quality Assurance Specialist
MC-165
(512) 239-1672
Jason.Natho@tceq.texas.gov

Cathy Anderson
Team Leader, Data Management and Analysis
MC-234
(512) 239-1805
Cathy.Anderson@tceq.texas.gov

Nueces River Authority
500 IH 69, Suite 805
Robstown, TX 78380

Marisa Balarin-Juarez, Director of Wastewater and Water Quality Programs
(361)653-2110
mbalarinjuarez@nueces-ra.org

Jessica Wright, Project Manager
(214) 789-6389
jwright@nueces-ra.org

Jessica Wright, Quality Assurance Officer
(214) 789-6389
jwright@nueces-ra.org

City of Corpus Christi Water Utilities Laboratory (WUL)
13101 Leopard St.
Corpus Christi, Texas 78410

Michael McCall, Lab Manager
(361)826-1201
michaelm10@cctexas.com

LaDona Parr, Lab Quality Assurance Officer
(361)826-1204
ladonas@cctexas.com

Texas A&M University – Corpus Christi (TAMU-CC) Department of Physical and Environmental Sciences (PENS)
6300 Ocean Drive, NRC Suite 3506
Corpus Christi, Texas 78412

Hao Yu, Lab Research Associate
(361)825-2465
hao.yu@tamucc.edu

Richard Coffin, Lab Quality Assurance Officer
(361)825-2465
richard.coffin@tamucc.edu

San Antonio River Authority Regional Environmental Laboratory (SARA REL)
600 E. Euclid
San Antonio, Texas 78212

Zachary Jendrusch, Lab Supervisor
(210)302-3275
zjendrusch@sariverauthority.org

Jeanette Hernandez, Lab Quality Assurance Officer
(210)302-3283
jhernandez@sariverauthority.org

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

Dale Jurecka, Lab Manager
(512)730-6337
dale.jurecka@lcra.org

Angel Mata, Lab Quality Assurance Officer
(512)365-6022
angel.mata@lcra.org

Energy Laboratories, Inc. (Energy Lab)
1120 S 27th St.
Billings, MT 59101

Cindy Rohrer, Lab Manager
(406)252-6325
crohrer@energylab.com

Leigh Ann Wise, Lab Quality Assurance Officer
(406)252-6325
lwise@energylab.com

Bandera County River Authority and Groundwater District (BCRAGD)
P.O. Box 177
Bandera, Texas 78003-0177

David Mauk, General Manager
(830)796-7260
dmauk@bcragd.org

Clint Carter, Quality Assurance Officer
(830)796-7260
ccarter@bcragd.org

Shelby Sckittone, Natural Resource Specialist
(830)796-7260
shelbys@bcragd.org

The Nueces River Authority (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, subparticipants, 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

Sarah Whitley
Team Leader, Water Quality Standards and Clean Rivers Program
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 QMP. Enforces corrective action, as required, where QA protocols are not met. Ensures CRP personnel are fully trained.

Jason Natho
acting CRP Lead Quality Assurance Specialist
Participates in the development, approval, implementation, and maintenance of written QA standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Assists program and project manager in developing and implementing quality system. Reviews and approves CRP QAPPs, QAPP amendments, and QAPP special appendices. Prepares and distributes annual audit plans. Conducts monitoring systems audits of Planning Agencies. Concurs with 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 audit records for the CRP.

Kiran Freeman
CRP Project Manager (PM)
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). Coordinates the review and approval of CRP QAPPs in coordination with the CRP Project Quality Assurance Specialist. Ensures maintenance of QAPPs. Assists CRP Lead QA Specialist in conducting Basin Planning Agency audits. Verifies QAPPs are being followed by contractors and that projects are producing data of known quality. Coordinates project planning with the Basin Planning Agency Project Manager. Reviews and approves data and reports produced by 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, July 2019 or most current version (DMRG). 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).

Grant Bassett
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. Reviews and approves CRP QAPPs in coordination with other CRP staff. Coordinates documentation and monitors implementation of corrective actions for the CRP.

NRA

Marisa Balarin-Juarez
Director of Wastewater and Water Quality Programs
Manages overall performance, administration, and deadlines. 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, TCEQ's *Surface Water Quality Monitoring Procedures, Volumes 1 and 2*, and scientific principles of water quality. Ensure the project manager has all necessary equipment and supervises maintenance and upkeep of all equipment. Always ensures safety as top priority. Provides training as needed to meet project requirements or staff interests that support project goals. Responsible for monitoring upcoming deadlines. Outlines steps to obtain monitoring goals to meet project milestones and disseminates information accordingly to water quality staff. Ensures proper completion of all reimbursement requests and other administrational forms, such as the Financial Status Reports in a timely manner to TCEQ CRP Project Manager. Works with NRA and CRP Project Managers to clearly define project budget requirements. Approves laboratory invoices for payment.

Jessica Wright
Field Supervisor / Project Manager / QAO
Coordinates field sampling and data collection activities Supervises field personnel in conducting sampling events. Ensures that all field personnel are properly trained and equipped to conduct the necessary monitoring. Ensures that all sampling procedures are followed according to the QAPP. Ensures that personnel, supplies, and equipment are available at all appropriate times. Supervises field and laboratory data entry to the NRA database. Uses photos and background knowledge of the site location to cross-validate field and laboratory results.

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 basin planning agency 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.

Responsible for coordinating the implementation of the QA program. Responsible for writing and maintaining the QAPP and monitoring its implementation. Responsible for maintaining records of QAPP distribution, including appendices and amendments. Responsible for maintaining written records of sub-tier commitment to requirements specified in this QAPP. Responsible for identifying, receiving, and maintaining project QA records. Responsible for coordinating with the TCEQ CRP PM to resolve QA-related issues. Notifies the NRA Director of Wastewater and Water Quality Programs of particular circumstances which may adversely affect the quality of data. Coordinates and monitors deficiencies and corrective action. Coordinates and maintains records of data verification and validation. Coordinates the research and review of technical QA material and data related to water quality monitoring system design and analytical techniques. Conducts monitoring systems audits on project participants to determine compliance with project and program specifications, issues written reports, and follows through on findings. Ensures that field staff is properly trained and that training records are maintained.

Courtney Taylor
Data Specialist
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. Verifies results make sense with field observations and scientific background. Double-checks all written values were written in the correct units and rounding. Reviews data entered into NRA database and informs NRA Project Manager of any needed corrections. Helps field supervisor coordinate bottle drop off and pickup with TAMU-CC PENS laboratory.

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. Works with the laboratory to obtain the appropriate amount of bottles required for sampling. Retains copies of all Chain of Custody forms. Ensures WUL billing matches analyses requested and correct project charge code. Responsible for ensuring all instrument calibration data is complete. Enters data into NRA database and informs NRA Project Manager of any needed corrections.

WUL

Michael McCall
Lab 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.

LaDona Parr
Lab QAO
Responsible for the overall quality control and quality assurance of analyses performed by the WUL. Monitors the implementation of the 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.

TAMU-CC PENS

Hao Yu
Lab 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
Lab QAO
Responsible for the overall quality control and quality assurance of analyses performed by PENS. Monitors the implementation of the 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.

SARA REL

Zachary Jendrusch
Lab Supervisor
Responsible for overall performance, administration, and reporting of analyses performed by SARA REL. 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 supervisor 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.

Jeanette Hernandez
Lab QAO
Maintains operating procedures in compliance with the QAPP, amendments and appendices. Responsible for the overall quality control and quality assurance of analyses performed by SARA REL. 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.

LCRA-ELS

Dale Jurecka
Lab Manager
Responsible for the overall performance, administration, and reporting of analyses performed by LCRA-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. Supplies field personnel with cooler, field blank, equipment blank, dissolved and total metals blank bottles, and sampling bottles.

Angel Mata
Lab QAO
Responsible for the overall quality control and quality assurance of analyses performed by LCRA-ELS. Monitors the implementation of the 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.

Energy Laboratories, Inc. (Billings, MT)

Cindy Rohrer
Lab Manager
Responsible for the overall performance, administration, and reporting of analyses performed by Energy Laboratories, Inc (Energy Lab). Responsible for supervision of laboratory and field 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. Supplies field personnel with cooler, field blank, equipment blank, mercury blank, dissolved and total metals blank bottles, and sampling bottles.

Leigh Ann Wise
Lab QAO
Responsible for the overall quality control and quality assurance of analyses performed by Energy Lab. Monitors the implementation of the QAPP within the laboratory to ensure complete compliance with QA data quality objectives, as defined by the contract and in the QAPP. Ensures methods performed meet Texas Surface Water Quality Monitoring Program's Ambient Water Reporting Limits (AWRLs). 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. Verifies chain of custody requirements are met.

BCRAGD

David Mauk
General Manager
Manages 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
Watershed Protection Coordinator / Field Supervisor / QAO
Coordinates field sampling and data collection activities and supervises 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 NRA QAPP and the BCRAGD SOP for CRP. Conducts all pre- and post-calibrations and maintains all sampling equipment.

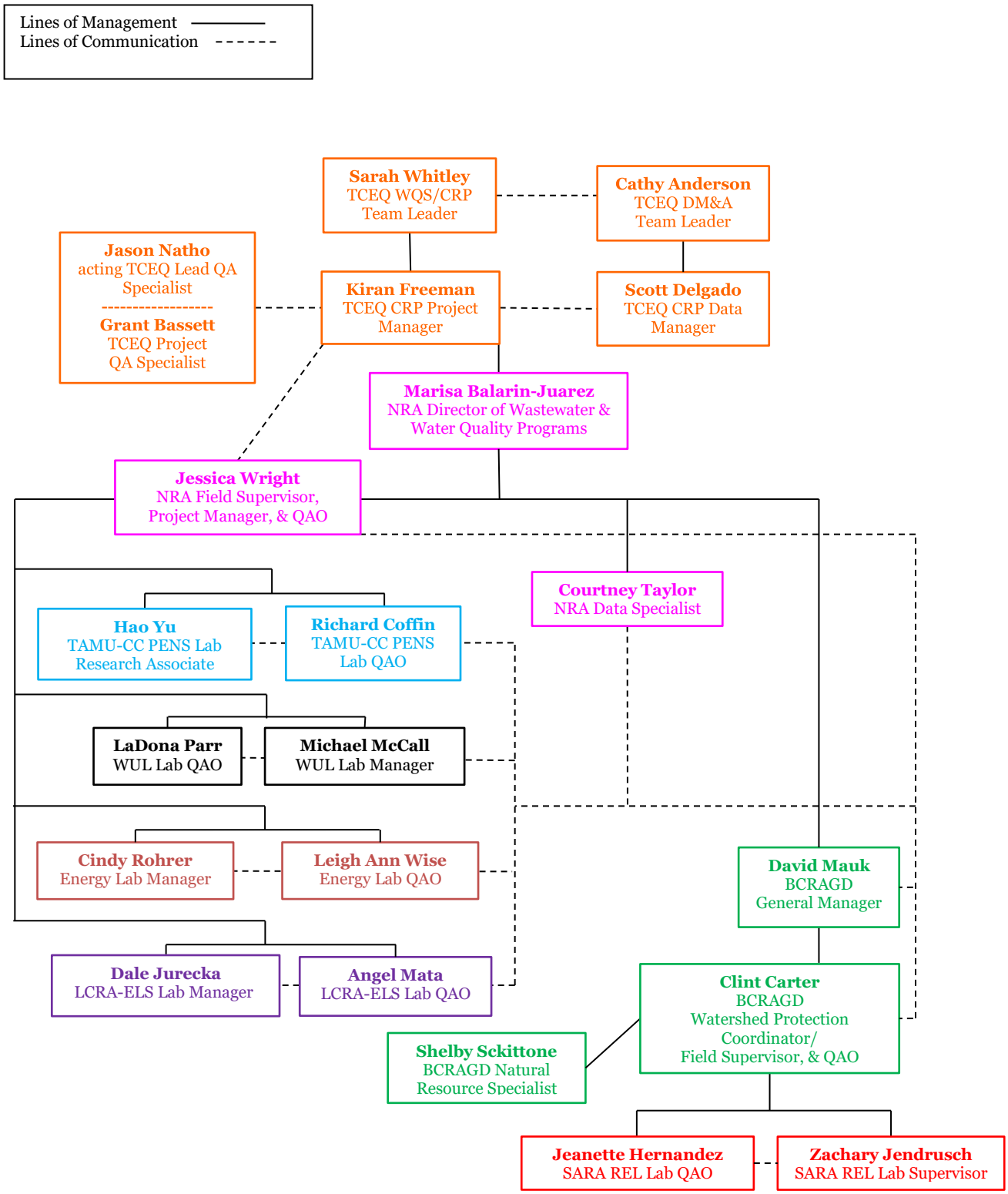
Maintains operating procedures that are in compliance with the QAPP, amendments and appendices. Responsible for the overall quality control and quality assurance of analyses performed by BCRAGD's field staff. Assists with monitoring systems audits for CRP projects. Reviews and verifies all field and 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.

Shelby Sckittone
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



A5 Problem Definition/Background

In 1991, the Texas Legislature passed the Texas Clean River Act (Senate Bill 818) in response to growing concerns that water resource issues were not being pursued in an integrated, systematic manner. The act requires that ongoing water quality assessments be conducted for each river basin in Texas, an approach that integrates water quality issues within the watershed. The CRP legislation mandates that each river authority (or local governing entity) shall submit quality-assured data collected in the river basin to the commission. Quality-assured data in the context of the legislation means data that comply with TCEQ rules for surface water quality monitoring (SWQM) programs, including rules governing the methods under which water samples are collected and analyzed and data from those samples are assessed and maintained. This QAPP addresses the program developed between the NRA and the TCEQ to carry out the activities mandated by the legislation. The QAPP was developed and will be implemented in accordance with provisions of the TCEQ Quality Management Plan, January 2023 or most recent version (QMP).

The purpose of this QAPP is to clearly delineate NRA QA policy, management structure, and procedures which will be used to implement the QA requirements necessary to verify and validate the surface water quality data collected. The QAPP is reviewed by the TCEQ to help ensure that data generated for the purposes described above are of known and documented quality, deemed acceptable for their intended use. This process will ensure that data collected under this QAPP and submitted to SWQMIS have been collected and managed in a way that guarantees its reliability and therefore can be used in water quality assessments, total maximum daily load (TMDL) and water quality standards development, permit decisions, and other program activities deemed appropriate by the TCEQ. Project results will be used to support the achievement of CRP objectives, as contained in the *Clean Rivers Program Guidance and Reference Guide FY 2024-2025*.

This QAPP provides for the continuation of the San Antonio-Nueces Coastal Basin, Nueces River Basin, Nueces-Rio Grande Coastal Basin, and adjoining bays and estuaries baseline monitoring. See Appendix C for station location maps for each basin. The Nueces River Clean Rivers Program monitoring is based on water quality concerns and impairments identified in the Texas Integrated Report, input from steering committee members and local agencies collecting water quality data in the basin.

Steering Committee input provides valuable information and helps establish San Antonio-Nueces Coastal Basin, Nueces River Basin, Nueces-Rio Grande Coastal Basin, and adjoining bays and estuaries community priorities with respect to water quality. Three basin monitoring objectives were established to address the prioritized water quality concerns. The basin monitoring objectives are:

1. To provide data for water quality control programs
2. Generate historical water quality trends
3. Identify potential water quality problems

The monitoring objectives also consider the assessment of the Texas Surface Water Quality Standards (TSWQS) attainment. The remaining sections of this QAPP describe how the objectives will be met.

Water quality is great in the headwaters of the Nueces River Basin, and alright in the San Antonio-Nueces Coastal Basin, lower Nueces River Basin, Nueces-Rio Grande Coastal Basin, and adjoining bays and estuaries. The Clean Rivers Program allows for the continuation of monitoring at most existing water quality stations in order to maintain a continuous record. The 2022 Texas Integrated Report lists the following segments as having one or more impairments: https://www.tceq.texas.gov/waterquality/assessment/22twqi/22txir

The Tables below identify all concerns and impairments for the 4 of the 5 basins. See Appendix B for station descriptions and information.

Table A5.1 San Antonio-Nueces Coastal Basin (#20)

Station ID	AU_ID	Use	Impairment Description	Concern/Impairment
Mission River Tidal	2001_01	General Use	Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	4a
Mission River Above Tidal	2002_01	Aquatic Life Use	Depressed dissolved oxygen in water	Screening Level Concern
		General Use	Chlorophyll-a in water	Screening Level Concern
Aransas River Tidal	2003_01	General Use	Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	4a
Aransas River Above Tidal	2004_02	Aquatic Life Use	Depressed dissolved oxygen in water	Screening Level Concern
		General Use	Total Phosphorus in water	Screening Level Concern
			Nitrate in water	Screening Level Concern
		Recreation Use	Bacteria in water	4a
Aransas Creek	2004A_01	Recreation Use	Bacteria in water	5c
Poesta Creek	2004B_01	General Use	Total Phosphorus in water	Screening Level Concern
			Nitrate in water	Screening Level Concern
		Recreation Use	Bacteria in water	5c
	2004B_02	Aquatic Life Use	Depressed dissolved oxygen in water	Screening Level Concern
		Recreation Use	Bacteria in water	4a

Table A5.2 Nueces River Basin (#21)

Station ID	AU_ID	Use	Impairment Description	Concern/Impairment
Nueces River Tidal	2101_01	General Use	Fish kill in water	Use Concern
			Chlorophyll-a in water	Screening Level Concern
Nueces River Below Lake Corpus Christi	2102_02	General Use	Chlorophyll-a in water	Screening Level Concern
Lake Corpus Christi	2103_01	Aquatic Life Use	Depressed dissolved oxygen in water	Screening Level Concern
Nueces River Above Frio River	2104_01	General Use	Nitrate in water	Screening Level Concern
	2104_02	General Use	Chlorophyll-a in water	Screening Level Concern
	2104_03	Aquatic Life Use	Depressed dissolved oxygen in water	Screening Level Concern
Nueces River Above Holland Dam	2105_01	Aquatic Life Use	Depressed dissolved oxygen in water	Screening Level Concern
			Chlorophyll-a in water	Screening Level Concern
	2105_02	Aquatic Life Use	Depressed dissolved oxygen in water	5c
				Screening Level Concern
		General Use	Chlorophyll-a in water	Screening Level Concern
Nueces/Lower Frio River	2106_01	General Use	Total dissolved solids in water	5b
			Chlorophyll-a in water	Screening Level Concern

Station ID	AU_ID	Use	Impairment Description	Concern/Impairment
	2106_02	General Use	Total dissolved solids in water	5b
			Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	5c
Lower Atascosa River	2107_01	General Use	Total dissolved solids in water	5c
			Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	5b
San Miguel Creek	2108_01	Aquatic Life Use	Depressed dissolved oxygen in water	Screening Level Concern
		Recreation Use	Bacteria in water	5b
Leona River	2109_01	General Use	Nitrate in water	Screening Level Concern
		Recreation Use	Bacteria in water	5c
	2109_02	General Use	Nitrate in water	Screening Level Concern
		Recreation Use	Bacteria in water	5c
	2109_03	Aquatic Life Use	Depressed dissolved oxygen in water	5c
				Screening Level Concern
		General Use	Nitrate in water	Screening Level Concern
		Recreation Use	Bacteria in water	5c
	2109D_01	General Use	Nitrate in water	Screening Level Concern
		Recreation Use	Bacteria in water	Use Concern
Lower Sabinal River	2110_01	Aquatic Life Use	Depressed dissolved oxygen in water	Screening Level Concern
		General Use	Nitrate in water	Screening Level Concern
			Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	Use Concern
Upper Nueces River	2112_01	Aquatic Life Use	Depressed dissolved oxygen in water	Screening Level Concern
Upper Frio River	2113_01	Aquatic Life Use	Impaired fish community in water	5c
	2113_02	Aquatic Life Use	Impaired fish community in water	Use Concern
Hondo Creek	2114_01	General Use	Nitrate in water	Screening Level Concern
Choke Canyon Reservoir	2116_01	General Use	Excessive algal growth in water	5n
	2116_02	General Use	Excessive algal growth in water	5n
	2116_03	General Use	Excessive algal growth in water	5n
	2116_04	General Use	Excessive algal growth in water	5n
	2116_05	General Use	Excessive algal growth in water	5n
	2116_06	Aquatic Life Use	Depressed dissolved oxygen in water	Use Concern
			Depressed dissolved oxygen in water	Screening Level Concern
		General Use	Excessive algal growth in water	5n
	2116_07	General Use	Excessive algal growth in water	5n

Station ID	AU_ID	Use	Impairment Description	Concern/Impairment
Frio River Above Choke Canyon Reservoir	2117_01	Aquatic Life Use	Depressed dissolved oxygen in water	Screening Level Concern
		General Use	Chlorophyll-a in water	Screening Level Concern
	2117_02	Recreation Use	Bacteria in water	5c
		Aquatic Life Use	Depressed dissolved oxygen in water	Screening Level Concern
	2117_03	General Use	Chlorophyll-a in water	Screening Level Concern
			Bacteria in water	5c
		Aquatic Life Use	Depressed dissolved oxygen in water	Use Concern
				Screening Level Concern
	2117_04	General Use	Chlorophyll-a in water	Screening Level Concern
			Nitrate in water	Screening Level Concern
	2117_05	General Use	Nitrate in water	Screening Level Concern
Upper Atascosa River	2118_01	Aquatic Life Use	Depressed dissolved oxygen 24hr average in water	5b
			Depressed dissolved oxygen grab minimum in water	5b
			Impaired fish community in water	5b
			Impaired habitat in water	Screening Level Concern
			Impaired macrobenthic community in water	5b
		General Use	Total Phosphorus in water	Screening Level Concern
		Recreation Use	Bacteria in water	5b
Atascosa River	2118C_01	Aquatic Life Use	Impaired fish community in water	5b
			Impaired habitat in water	Screening Level Concern
			Impaired macrobenthic community in water	5b
		General Use	Total Phosphorus in water	Screening Level Concern
			Chlorophyll-a in water	Screening Level Concern

Table A5.3 Nueces-Rio Grande Coastal Basin (#22)

Station ID	AU_ID	Use	Impairment Description	Concern/Impairment
Arroyo Colorado Tidal	2201_01	General Use	Nitrate in water	Screening Level Concern
			Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	5c
	2201_02	General Use	Chlorophyll-a in water	Screening Level Concern
			Nitrate in water	Screening Level Concern
		Recreation Use	Bacteria in water	5c
		General Use	Nitrate in water	Screening Level Concern
	2201_03	General Use	Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	5c
	2201_04	Aquatic Life Use	Depressed dissolved oxygen in water	5c
		General Use	Nitrate in water	Screening Level Concern
			Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	5c
	2201_05	Aquatic Life Use	Depressed dissolved oxygen in water	Use Concern
				5c
		Fish Consumption Use	Mercury in edible tissue	5c
			PCBs in edible tissue	5a
		General Use	Total Phosphorus in water	Screening Level Concern
			Nitrate in water	Screening Level Concern
			Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	5c
Unnamed Drainage Ditch Tributary (B) in Cameron County Drainage District #3	2201B_01	General Use	Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	5b
Arroyo Colorado Above Tidal	2202_01	Fish Consumption Use	PCBs in edible tissue	5a
			Mercury in edible tissue	5c
		General Use	Chlorophyll-a in water	Screening Level Concern
			Total Phosphorus in water	Screening Level Concern
			Nitrate in water	Screening Level Concern
		Recreation Use	Bacteria in water	5c
	2202_02	Fish Consumption Use	PCBs in edible tissue	5a
			Mercury in edible tissue	5c
		General Use	Total Phosphorus in water	Screening Level Concern
			Nitrate in water	Screening Level Concern

Station ID	AU_ID	Use	Impairment Description	Concern/Impairment
			Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	5c
	2202_03	Fish Consumption Use	PCBs in edible tissue	5a
			Mercury in edible tissue	5c
		General Use	Total Phosphorus in water	Screening Level Concern
			Nitrate in water	Screening Level Concern
			Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	5c
	2202_04	Fish Consumption Use	PCBs in edible tissue	5a
			Mercury in edible tissue	5c
		General Use	Total Phosphorus in water	Screening Level Concern
			Nitrate in water	Screening Level Concern
			Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	5c
Donna Reservoir	2202A_01	Fish Consumption Use	PCBs in edible tissue	4a
Unnamed Drainage Ditch Tributary (B) to S. Arroyo Colorado	2202B_01	General Use	Chlorophyll-a in water	Screening Level Concern
			Ammonia in water	Screening Level Concern
		Recreation Use	Bacteria in water	Use Concern
Unnamed Drainage Ditch Tributary (C) to S. Arroyo Colorado	2202B_01	General Use	Ammonia in water	Screening Level Concern
		Recreation Use	Bacteria in water	Use Concern
Petronila Creek Tidal	2203_01	General Use	Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	5c
Petronila Creek Above Tidal	2204_01	General Use	Total dissolved solids in water	4a
			Sulfate in water	4a
			Chloride in water	4a
			Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	5b
	2204_02	Aquatic Life Use	Depressed dissolved oxygen in water	Screening Level Concern
		General Use	Total dissolved solids in water	4a
			Sulfate in water	4a
			Chloride in water	4a
			Total Phosphorus in water	Screening Level Concern

Station ID	AU_ID	Use	Impairment Description	Concern/Impairment
			Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	5b

Table A5.4 Adjoining Bays and Estuaries (#24)

Station ID	AU_ID	Use	Impairment Description	Concern/Impairment
Conn Brown Harbor	2483A_01	Aquatic Life Use	Copper in water	Use Concern
				Use Concern
		Recreation Use	Bacteria in water	Use Concern
				5c
Oso Bay	2485_01	General Use	Chlorophyll-a in water	Screening Level Concern
	2485_02	Aquatic Life Use	Depressed dissolved oxygen in water	5c
		General Use	Total Phosphorus in water	Screening Level Concern
			Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	4a
			Bacteria in water	4a
	2485_03	General Use	Total Phosphorus in water	Screening Level Concern
			Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	4a
Oso Creek	2485A_01	General Use	Total Phosphorus in water	Screening Level Concern
			Nitrate in water	Screening Level Concern
			Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	4a
Unnamed trib of Oso Creek	2485B_01	General Use	Total Phosphorus in water	Screening Level Concern
West Oso Creek	2485D_01	General Use	Total Phosphorus in water	Screening Level Concern
Drainage ditches flowing into Lower Laguna Madre	2491C_01	General Use	Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	Use Concern
	2491C_03	General Use	Total Phosphorus in water	Screening Level Concern
			Nitrate in water	Screening Level Concern
			Chlorophyll-a in water	Screening Level Concern
	2492_01	General Use	Chlorophyll-a in water	Screening Level Concern
San Fernando Creek	2492A_01	General Use	Total Phosphorus in water	Screening Level Concern
			Nitrate in water	Screening Level Concern
			Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	5b

Station ID	AU_ID	Use	Impairment Description	Concern/Impairment
Los Olmos Creek Tidal	2492B_01	Aquatic Life Use	Depressed dissolved oxygen in water	Use Concern
			Depressed dissolved oxygen in water	Screening Level Concern
		General Use	Chlorophyll-a in water	Screening Level Concern
		Recreation Use	Bacteria in water	Use Concern

A6 Project/Task Description

NRA will monitor a minimum of 10 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 3 sites given sufficient water. NRA will monitor for metals in water at 3 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 5 river stations in Basin 21.

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

Amendments to the QAPP

Amendments 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 NRA Project Manager to the CRP Project Manager electronically. The Basin Planning Agency 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 NRA Project Manager, the NRA 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 NRA Project Manager. If adherence letters are required, the NRA 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 Basin Planning Agency 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 NRA and the TCEQ Project Manager and TCEQ technical staff. Appendices will be written in an abbreviated format and will reference the Basin QAPP where appropriate. Appendices will be approved by the NRA Project Manager, NRA 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 NRA to project participants before data collection activities commence. The Basin Planning Agency 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 Basin Planning Agency will maintain this documentation as part of the project's QA records and ensure that the documentation is available for review.

A7 Quality Objectives and Criteria

The purpose of routine water quality monitoring is to collect surface water quality data that can be used to characterize water quality conditions, identify significant long-term water quality trends, support water quality standards development, support the permitting process, and conduct water quality assessments in accordance with TCEQ's Guidance for Assessing and Reporting Surface Water Quality in Texas, July 2022 or most recent version (https://www.tceq.texas.gov/downloads/water-quality/assessment/integrated-report-2022/2022-guidance.pdf). These water quality data, and data collected by other organizations (e.g., United States Geological Survey (USGS), TCEQ, etc.), will be subsequently reconciled for use and assessed by the TCEQ.

Systematic watershed monitoring is defined as sampling that is planned for a short duration (1 to 2 years), and is designed to screen waters that would not normally be included in the routine monitoring program, investigate areas of potential concern, and investigate possible sources of water quality impairments or concerns. Due to the limitations regarding these data (e.g., not temporally representative, limited number of samples, biological sampling does not meet the specimen vouchering requirements), the data will be used to determine whether any locations have values exceeding the TCEQ's water quality criteria and/or screening levels (or in some cases values elevated above normal). The NRA will use this information to determine future monitoring priorities. These water quality data and data collected by other organizations (e.g., USGS, TCEQ, etc.), will be subsequently reconciled for use and assessed by the TCEQ.

The measurement performance specifications to support the project purpose for a minimum data set are specified in Appendix A.

Ambient Water Reporting Limits (AWRLs)

For surface water to be evaluated for compliance with Texas Surface Water Quality Standards ("TSWQS") and screening levels, data must be reported at or below specified reporting limits. To ensure data are collected at or below these reporting limits, required ambient water reporting limits ("AWRL") have been established. A full listing of AWRLs can be found at https://www.tceq.texas.gov/assets/public/waterquality/crp/QA/awrlmaster.pdf .

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

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

- The laboratory's LOQ for each analyte must be set at or below the AWRL.
- Once the LOQ is established in the QAPP, that is the reporting limit for that parameter until such time as the laboratory amends the QAPP and lists an updated LOQ.
- The laboratory must demonstrate its ability to quantitate at its LOQ for each analyte by running an LOQ check sample for each analytical batch of CRP samples analyzed.
- When reporting data, no results may be reported below the LOQ stated in this QAPP.
- Measurement performance specifications for LOQ check samples are found in Appendix A.

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

Precision

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

Laboratory precision is assessed by comparing replicate analyses of Laboratory Control Samples (LCS) in the sample matrix (e.g. deionized water, sand, commercially available tissue), Matrix Spike/Matrix Spike Duplicate (MS/MSD), or sample/duplicate (DUP) pairs, as applicable. Precision results are compared against measurement performance specifications and used during evaluation of analytical performance. Program-defined measurement performance specifications for precision are defined in Appendix A.

Bias

Bias is the systematic or persistent distortion of a measurement process, which causes errors in one direction (i.e., the expected sample measurement is different from the sample's true value). Bias is a statistical measurement of correctness and includes multiple components of systematic error. Bias is determined through the analysis of LCS and LOQ check samples prepared with verified and known amounts of all target analytes in the sample matrix (e.g. deionized water, sand, commercially available tissue) and by calculating percent recovery. Results are compared against measurement performance specifications and used during evaluation of analytical performance. Program-defined measurement performance specifications for bias are specified in Appendix A.

Representativeness

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

Comparability

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

Completeness

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

A8 Special Training/Certification

Before new field personnel independently conduct field work, NRA's Field Supervisor trains him/her in proper instrument calibration, field sampling techniques, and field analysis procedures. The QA officer (or designee) will document the successful field demonstration. The QA Officer (or designee) will retain documentation of

training and the successful field demonstration in the employee's personnel file (or other designated location) and ensure that the documentation will be available during monitoring systems audits. BCRAGD's Field Supervisor must ensure that new field personnel are trained in accordance with NRA's Special Training/Certification procedures. NRA Field Supervisor will keep record of trainings completed. BCRAGD will forward a record of training as needed.

Contractors and subcontractors must ensure that laboratories analyzing samples under this QAPP meet the requirements contained in The NELAC Institute Standard (2016) Volume 1, Module 2, Section 4.5 (concerning Subcontracting of Environmental Tests).

A9 Documents and Records

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

Table 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, TAMU-CC PENS, LCRA-ELS	5	Paper, electronic
Laboratory SOPs	WUL, SARA REL, TAMU-CC 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
Chain of custody records	NRA, BCRAGD, WUL, SARA REL, TAMU-CC PENS, LCRA-ELS	7*	Paper, Electronic
Laboratory calibration records	WUL, SARA REL, TAMU-CC PENS, LCRA-ELS	5	Paper
Laboratory instrument printouts	WUL, SARA REL, TAMU-CC PENS, LCRA-ELS	5	Paper, electronic
Laboratory data reports/results	WUL, SARA REL, TAMU-CC PENS, LCRA-ELS	5	Paper, electronic
	NRA, BCRAGD	7*	Paper, electronic
Laboratory equipment maintenance logs	WUL, SARA REL, TAMU-CC PENS, LCRA-ELS	5	Paper, electronic
Corrective Action Documentation	WUL, SARA REL, TAMU-CC PENS, LCRA-ELS	5	Paper, electronic
	NRA, BCRAGD	7*	Paper, electronic

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

Laboratory Test Reports

Test/data reports from the laboratory must document the test results clearly and accurately. Routine data reports should be consistent with the TNI Standard (2016), Volume 1, Module 2, Section 5.10 and include the information necessary for the interpretation and validation of data. The requirements for reporting data and the procedures are provided.

- Title of report and unique identifiers on each page
- Name and address of the laboratory
- Name and address of the client
- A clear identification of the sample(s) analyzed
- Date and time of sample receipt
- Identification of method used
- Identification of samples that did not meet QA requirements and why (e.g., holding times exceeded)
- Clearly identified subcontract laboratory results (as applicable)
- A name and title of person accepting responsibility for the report
- Narrative information on QC failures or deviations from requirements that may affect the quality of results or is necessary for verification and validation of data.
- Sample results
- Units of measurement
- Station information
- Date and time of collection
- LOQ and Limit of Detection (LOD) (formerly referred to as the reporting limit and the method detection limit, respectively), and qualification of results outside the working range (if applicable)
- Certification of NELAP compliance for each parameter reported
- Holding time for *E. coli*.

Electronic Data

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

NRA receives data from all laboratories and sub-tier participants over email in ".pdf" format. Upon receiving electronic laboratory results, NRA makes a physical copy and stores the data with the field data sheets. Data is submitted 3 times a year electronically to the TCEQ in the Event/Result file format described in the most current version of the DMRG, which can be found at:
https://www.tceq.texas.gov/waterquality/data-management/dmrg_index.html

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 TAMU-CC PENS for chlorophyll-*a* and pheophytin analysis. BCRAGD uses the SARA-REL for all routine chemical analysis including bacteria.

LCRA-ELS and Energy Lab will ship pre-cleaned bottles with nitric acid preservative to NRA staff shortly before samples are collected. NRA will collect dissolved and total metals 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 shipped to LCRA-ELS for analysis. In order to meet project LOQs, NRA will collect Dissolved Cadmium and Total Mercury during the warmer months and ship samples to Energy Lab.

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

B2 Sampling Methods

Field Sampling Procedures

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

Table B2.1 Sample Storage, Preservation and Handling Requirements

Parameter	Matrix	Container	Preservation	Sample Vol. (mL)	Holding Time
Routine Chemical					
Alkalinity	Water	1 or 8[¤]	cool to <6° C but >0° C *	500	14 days
Chloride	Water	1 or 8[¤]	cool to <6° C but >0° C *	100	28 days
Sulfate	Water	1 or 8[¤]	cool to <6° C but >0° C *	100	28 days
TDS	Water	1 or 8[¤]	cool to <6° C but >0° C *	250	7 days
Turbidity	Water	8[¤]	cool to <6° C but >0° C *	250	48 hours
TKN	Water	2 or 9[¤]	cool to <6° C but >0° C 1-2 ml conc. H_2SO_4 pH<2*	250	28 days
Ammonia-N	Water	2 or 9[¤]	cool to <6° C but >0° C 1-2 ml conc. H_2SO_4 pH<2*	250	28 days
Total Phosphorus	Water	2 or 9[¤]	cool to <6° C but >0° C 1-2 ml conc. H_2SO_4 pH<2*	250	28 days
TOC	Water	4 or 9[¤]	cool to <6° C but >0° C 1-2 ml conc. H_2SO_4 pH<2*	250	28 days
Nitrate	Water	1 and 2 or 8[¤]	cool to <6° C but >0° C 1-2 ml	250	48 hours
Nitrite	Water	1 and 2 or 8[¤]	cool to <6° C but >0° C 1-2 ml	250	48 hours
TSS	Water	1 or 8[¤]	cool to <6° C but >0° C *	1000	7 days
Chlorophyll-a[Δ]	Water	3 or 10[¤]	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[¤]	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					
E. coli IDEXX Colilert	Water	5 or 11[¤]	cool to <6° C but >0° C, Sodium Thiosulfate*	100	8 hours[¢]
Enterococcus	Water	5 or 11[¤]	cool to <6° C but >0° C, Sodium Thiosulfate*	100	8 hours
Metals in Water					
Dissolved Metals	Water	6[£]	Filter at site with 0.45 µm filter, add HNO_3 (in the lab) to pH < 2	250	6 months
Total Metals	Water	6[£]	Add HNO_3 (in the lab) to pH < 2	250	6 months
Total Mercury	Water	7[£]	Add HNO_3 (in the lab) to pH < 2	250	28 Days

[Δ] Samples are kept in a dark brown polyethylene bottle, as specified in the SWQM Procedures Volume I.
* Samples are acid-preserved (if required) and stored on ice immediately upon collection (within 15 minutes)
(¢) *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.
(¤) For the SARA REL only.
(£) For the LCRA-ELS and Energy Lab only.

Sample Containers

Sample containers 1 - 2, and 4 - 7 are supplied by the laboratories conducting the analyses and are shipped to NRA directly. Sample containers 8 - 11 are supplied by SARA REL and are shipped to 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 and Energy Lab; the samples are field filtered by NRA staff. Acidification of metals in water samples will be performed by LCRA-ELS and Energy Lab in the lab. Certificates from sample container manufacturers are maintained in a notebook by the laboratory. NRA purchased Container 3 and maintains all manufacturer certificates in a notebook.

Table B2.2 Sample Containers

NRA Sampling Containers		
Container #	**Bottle Description**	**Lab**
1	1000mL Polyethylene bottle	WUL
2	500mL Polyethylene bottle, preserved in lab	WUL
3	500mL Brown polyethylene bottle	TAMU-CC PENS
4	500mL Glass bottle, preserved in the lab	WUL
5	290mL IDEXX bottle	WUL
6	250mL Polyethylene bottle, HNO_3 pre-cleaned & preserved in lab	LCRA-ELS, Energy Lab
7	250mL Glass or Teflon bottle, HNO_3 pre-cleaned & preserved in lab	LCRA-ELS, Energy Lab
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

Processes to Prevent Contamination

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

Documentation of Field Sampling Activities

Field sampling activities are documented on field data sheets as presented in Appendix D. Flow worksheets, aquatic life use monitoring checklists, habitat assessment forms, field biological assessment forms, and records of bacteriological analyses (if applicable) are part of the field data record. The following will be recorded for all visits:

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

Additional notes containing detailed observational data not captured by field parameters may include:

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

Recording Data

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

- Write legibly, in indelible ink
- Make changes by crossing out original entries with a single line strike-out, entering the changes, and initialing and dating the corrections.
- Close-out incomplete pages with an initialed and dated diagonal line.

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

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

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

B3 Sample Handling and Custody

Sample Tracking

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

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

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

Sample Labeling

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

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

Sample Handling

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 TAMU-CC 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 and Energy Lab. Samples are then shipped to LCRA-ELS and Energy Lab 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 ELS 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.

Sample Tracking Procedure Deficiencies and Corrective Action

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

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

B4 Analytical Methods

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

Laboratories collecting data under this QAPP must be NELAP-accredited in accordance with 30 TAC Chapter 25. Copies of laboratory QMs and SOPs 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 (eg. Chlorophyll-*a* and pheophytin samples run by TAMU-CC PENS using EPA 445.0 which doesn't require TCEQ accreditation).

Standards Traceability

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

Analytical Method Deficiencies and Corrective Actions

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

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

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

necessary.

B5 Quality Control

Sampling Quality Control Requirements and Acceptability Criteria

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

Field blank

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

Laboratory Measurement Quality Control Requirements and Acceptability Criteria

Batch

A batch is defined as environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A preparation batch is composed of one to 20 environmental samples of the same NELAP-defined matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours. An analytical batch is composed of prepared environmental samples (extract, digestates, or concentrates) which are analyzed together

as a group. An analytical batch can include prepared samples originating from various environmental matrices and can exceed 20 samples.

Method Specific QC requirements

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

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

Comparison Counting

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

Limit of Quantitation (LOQ)

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

LOQ Check Sample

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

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

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

$$\%R = {}^{S_R}/_{S_A} \times 100$$

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

Laboratory Control Sample (LCS)

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

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

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

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

$$\%R = {}^{S_R}/_{S_A} \times 100$$

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

Laboratory Duplicates

A laboratory duplicate is an aliquot taken from the same container as an original sample under laboratory conditions and processed and analyzed independently. A laboratory duplicate is achieved by preparing 2 separate aliquots of a sample, LCS, or matrix spike. Both samples are carried through the entire preparation and analytical process. Laboratory duplicates are used to assess precision and are performed at a rate of one per preparation batch.

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

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

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

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

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

$$|\text{Log A} - \text{Log B}| = \text{Log Range}$$

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

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

Laboratory equipment blank

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

Matrix spike

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

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

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

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

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

Matrix spike recoveries are compared to the acceptance criteria published in the mandated test method. If the matrix spike results are outside established criteria, the data for the analyte that failed in the parent sample is not acceptable for use under this project and will not be reported to TCEQ. The result from the parent sample associated with that failed matrix spike will be considered to have excessive analytical variability and will be qualified by the laboratory as not meeting project QC requirements. Depending on the similarities in composition of the samples in the batch, the NRA may consider excluding all of the results in the batch related to the analyte that failed recovery.

Method blank

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

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

Quality Control or Acceptability Requirements Deficiencies and Corrective Actions

Sampling QC excursions are evaluated by the NRA Project Manager/QAO. In that differences in sample results are used to assess the entire sampling process, including environmental variability, the arbitrary rejection of results based on pre-determined limits is not practical. Therefore, the professional judgment of the NRA Project Manager/QAO will be relied upon in evaluating results.

Field blanks for trace elements and trace organics are scrutinized very closely. Field blanks are associated with batches of field samples. In the event of a field blank failure, any target analytes in the ambient sample associated with the field blank should be qualified as not meeting project QC requirements. Notations of blank contamination are noted in the data summaries that accompany data deliverables. Equipment blanks for metals

analysis are also scrutinized very closely.

Laboratory measurement quality control failures are evaluated by the laboratory staff. The disposition of such failures and the nature and disposition of the failure is reported to the Laboratory QAO/PM. If applicable, the NRA PM will include this information in a CAP and submit with the Progress Report to the TCEQ CRP PM.

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

Additionally, in accordance with CRP requirements and the TNI Standard (Volume 1, Module 2, Section 4.5, Subcontracting of Environmental Tests) when a laboratory that is a signatory of this QAPP finds it necessary and/or advantageous to subcontract analyses, the laboratory that is the signatory on this QAPP must ensure that the subcontracting laboratory is NELAP-accredited (when required) and understands and follows the QA/QC requirements included in this QAPP. This includes that the sub-contracting laboratory utilize the same reporting limits as the signatory laboratory and performs all required quality control analysis outlined in this QAPP. The signatory laboratory is also responsible for quality assurance of the data prior to delivering it to the NRA, including review of all applicable QC samples related to CRP data. As stated in section 4.5.5 of the TNI Standard, the laboratory performing the subcontracted work shall be indicated in the final report and the signatory laboratory shall make a copy of the subcontractor's report available to the client (NRA) when requested.

B6 Instrument/Equipment Testing, Inspection, and Maintenance

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

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

B7 Instrument Calibration and Frequency

Field equipment calibration requirements are contained in the SWQM Procedures. Post-calibration check error limits and the disposition resulting from errors are adhered to. Data collected from field instruments that do not meet the post-calibration check error limits specified in the SWQM Procedures will not be submitted for inclusion into SWQMIS.

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

B8 Inspection/Acceptance of Supplies and Consumables

The procurement of supplies, equipment, and services is controlled to ensure that specifications are met for the high quality and reliability required for each field and laboratory function. Specifications for all equipment and material used by NRA personnel are outlined in the SWQM Procedures.

Equipment and materials are purchased by NRA and BCRAGD. Upon arrival of materials or equipment, a designated NRA or BCRAGD employee receives and signs for the materials. The program staff that initiated the order is responsible for inspecting and verifying equipment and supplies upon receipt. Items are reviewed to verify that the shipment is complete, and the items are then delivered to the proper location. All chemicals are dated upon receipt. All supplies are stored appropriately and given appropriate disposal upon expiration date.

Laboratories inspect and accept supplies and consumables according to approved analytical methods and other relevant laboratory standards and procedures.

Detailed acceptance and inspection criteria are contained within the QM(s).

B9 Acquired Data

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

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

Reservoir stage data are collected every day from the USGS, International Boundary and Water Commission (IBWC), and the United States Army Corps of Engineers (USACE) websites. These data are preliminary and subject to revision. The Texas Water Development Board (TWDB) derives reservoir storage (in acre-feet) from these stage data (elevation in feet above mean sea level), by using the latest rating curve datasets available. These data are published at the TWDB website at http://waterdatafortexas.org/reservoirs/statewide. Information about measurement methodology can be found on the TWDB website. These data will be submitted to the TCEQ under parameter code 00052 Reservoir Stage and parameter code 00053 Reservoir Percent Full.

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, Energy Lab, TAMU-CC PENS, and SARA REL is sent to NRA via email following each sampling event.

BCRAGD submits field data and SARA REL 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, Energy Lab and TAMU-CC PENS, routine CRP data analyzed by SARA REL, 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 corrected by NRA QAO and initialed as corrected on database printed sheet. NRA PM consolidates all field, lab results, and finalized database input paperwork, error free.

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.

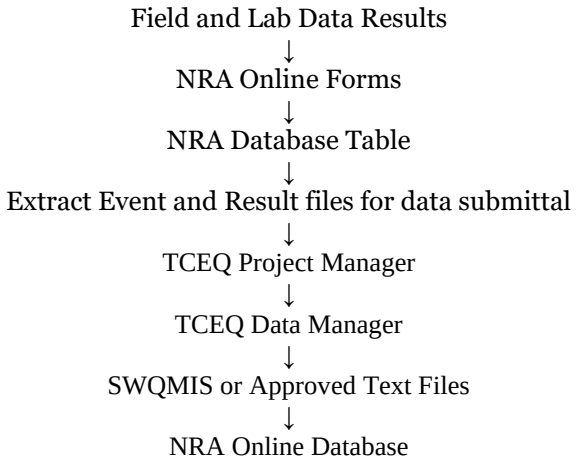
After approval by TCEQ and inclusion in SWQMIS, the data are entered into NRA's CRP database table that is available online. There are two loading procedures:

- 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.

- 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. Notification of discovered errors is provided to TCEQ PM.

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, TAMU-CC PENS, BCRAGD, SARA REL, LCRA-ELS, Energy Lab 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.

Record Keeping and Data Storage

All hardcopy field and lab data sheets are stored in files associated with the quarter in which the sampling occurred. The database is located on a Windows NT server housed at both NRA offices. The CRP database consists of three tables: *parameters*, which contains storet information; *swqm*, which contains information on all sampling stations within NRA's area of responsibility; and *results*, which contains all the sampling event and result information and data.

The NRA Database Manager backs up the CRP database, web pages, and scripts monthly, on or about the first of each month. The database tables are exported to sql and csv files. Listings of the current month's updated records for the individual segments, the web pages and scripts are also copied. These files are copied to a secure cloud server online.

Data Handling, Hardware, and Software Requirements

SERVER HARDWARE #1:	Dell Server
SERVER DATABASE SOFTWARE #1:	Microsoft-IIS/6.0 - MySQL build 5.0.51a
SERVER SOFTWARE #1:	Windows NT SDFMAXVCUS0303 5.2 build 3790
SERVER_PROTOCOL #1:	HTTP/1.1
SERVER HARDWARE #2:	Altec Custom Build
SERVER BACKUPSOFTWARE SOFTWARE #2:	Manual / Norton Ghost 10
SERVER SOFTWARE #2:	Windows XP Professional
SERVER_PROTOCOL #2:	HTTP/1.1
PROGRAMMING LANGUAGE SUPPORT:	PERL, JAVASCRIPT, HTML, XHTML, PHP, SQL, BASH SHELL SCRIPTNG, JAVA, ACTIVE PERL, FLASH and ACTIVEX
DATABASE SUPPLEMENTAL SOFTWARE APPLICATIONS:	SECURE SHELL, SECURE FTP, WS_FTP(LE), Notepad, MS WORD, OUTLOOK Express, WINZIP9.0, Roxio Easy CD Creater 5 and MS OUTLOOK.
DATABASE SUPPLEMENTAL GRAPICS SOFTWARE APPLICATIONS:	FLASH MX, JASC Paint Shop Pro XI and JASC Animation Shop.
MIDDLEWARE	DBI,/DBD, CGI/FastCGI, Active X Controls, Mozilla, MSIE, Netscape, and Opera.
DATABASE PRINTER SUPPLEMENTAL HARDWARE/SOFTWARE:	HP Color Laser Jet 4500DN, HP Office Jet 7410 All-In-One and Xerox Workcentre 7232.

Information Resource Management Requirements

Data will be managed in accordance with the TCEQ DMRG (most recent revision), and applicable Basin Planning Agency information resource management policies.

GPS equipment may be used as a component of the information required by the Station Location (SLOC) request process for creating the certified positional data that will ultimately be entered into SWQMIS database. Positional data obtained by CRP grantees using a GPS will follow the TCEQ's OPP 8.11 policy regarding the collection and management of positional data. Positional data may be acquired with a GPS and verified with photo interpolation using a certified source, such as Google Earth or Google Maps. The verified coordinates and map interface can then be used to develop a new SLOC.

C1 Assessments and Response Actions

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

Table C1.1 Assessments and Response Requirements

Assessment Activity	Approximate Schedule	Responsible Party	Scope	Response Requirements
Status Monitoring Oversight, etc.	Continuous	NRA	Monitoring of the project status and records to ensure requirements are being fulfilled	Report to TCEQ in Quarterly Report
Monitoring Systems Audit of Basin Planning Agency	Dates to be determined by TCEQ CRP	TCEQ	Field sampling, handling and measurement; facility review; and data management as they relate to CRP	30 days to provide corrective actions response to the TCEQ
Monitoring Systems Audit of Program Subparticipants	Once per biennium	NRA	Field sampling, handling and measurement; facility review; and data management as they relate to CRP	30 days to respond in writing to the NRA. PA will report problems to TCEQ in Progress Report.
Laboratory Assessment	Dates to be determined by TCEQ	TCEQ Laboratory Assessor	Analytical and quality control procedures employed at the laboratory and the contract laboratory	30 days to provide corrective actions response to the TCEQ

Corrective Action Process for Deficiencies

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

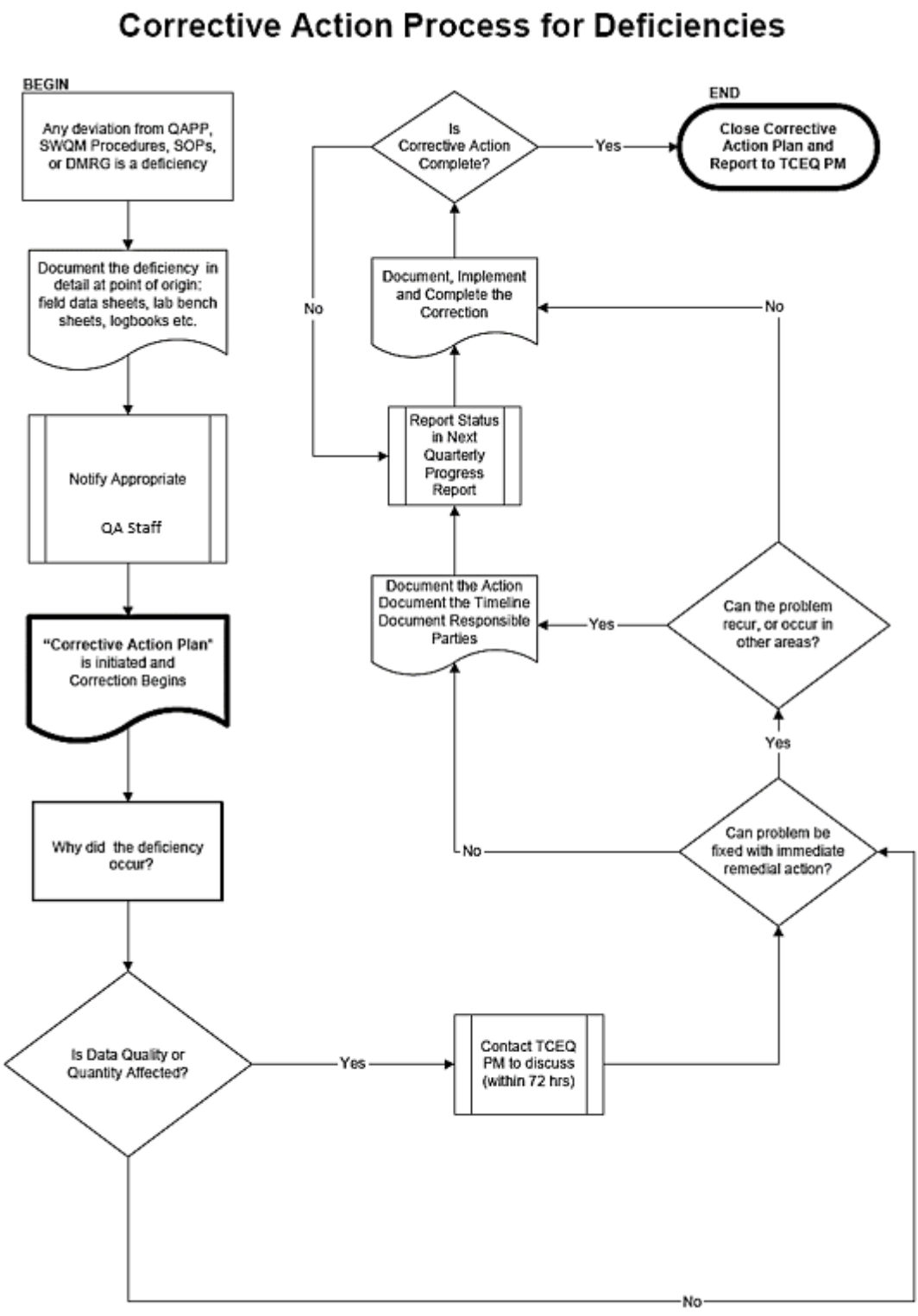
Corrective Action

CAPs should:

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

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

Figure C1.1 Corrective Action Process for Deficiencies



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

The NRA PM is responsible for ensuring that corrective actions have been implemented and tracks deficiencies and corrective actions. Records of audit findings and corrective actions are maintained by the NRA PM. Audit reports and associated corrective action documentation will be submitted to the TCEQ with the quarterly progress reports.

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

C2 Reports to Management

Table C2.1 QA Management Reports

Type of Report	Frequency (daily, weekly, monthly, quarterly, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation	Report Recipients
Non-Conformance Report	As Needed	As Needed	Field Staff Laboratory Staff	NRA QA Staff or Laboratory Management as appropriate
CRP Progress Reports	Quarterly	December 15, 2024 March 15, 2024 June 15, 2024 September 15, 2024 December 15, 2024 March 15, 2025 June 15, 2025 August 15, 2025	NRA PM	TCEQ CRP PM
Monitoring Systems Audit Report and Response	As Needed	As Needed	NRA QAO	TCEQ CRP PM
Data Summary	As Needed	As Needed	NRA Data Specialist	TCEQ CRP PM

Reports to Nueces River Authority Project Management

QA issues will be reported in writing (e-mail) to the NRA Project Manager as issues arise.

The NRA PM is charged with the responsibility to report the status of implementation and application of the quality assurance procedures described in this QAPP and thereby the status of data quality. It is imperative that the NRA PM is properly informed of any quality assurance problems encountered and assists in the development and implementation of corrective actions. This information will be provided to the NRA PM by the NRA Data Specialist and/or Field Personnel. These reports will include laboratory analysis, quality assurance summaries and field QC results. These reports will be provided to the NRA PM/QAO as needed prior to the transfer of the data to the TCEQ. Other reports as needed include, but are not limited to corrective action forms, correspondence, case narratives, etc., describing corrective actions or implementation of new processes to ensure that quality data are produced.

Reports to TCEQ Project Management

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

Progress Report

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

Monitoring Systems Audit Report and Response

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

Data Summary

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

Reports by TCEQ Project Management

Contractor Evaluation

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

D1 Data Review, Verification, and Validation

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

D2 Verification and Validation Methods

All field and laboratory data will be reviewed, verified, and validated to ensure they conform to project specifications.

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

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

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

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

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

Table D2.1: Data Review Tasks

Data to be Verified	Field Task	Laboratory Task	QA Task	NRA Data Specialist 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, TAMU-CC PENS, SARA REL, LCRA-ELS and Energy Lab QAO	NRA, TAMU-CC PENS, BCRAGD, SARA REL, WUL, LCRA-ELS and Energy Lab QAO	
Chain of custody complete/acceptable	NRA/BCRAGD Field Supervisor	WUL, TAMU-CC PENS, SARA REL, LCRA-ELS and Energy Lab QAO	NRA, BCRAGD, SARA REL, WUL, LCRA-ELS and Energy Lab QAO	
NELAP Accreditation is current		WUL, TAMU-CC PENS, SARA REL, LCRA-ELS and Energy Lab QAO	NRA, BCRAGD, SARA REL, WUL, TAMU-CC PENS, LCRA-ELS and Energy Lab QAO	
Sample preservation and handling acceptable	NRA/BCRAGD Field Supervisor	WUL, SARA REL, TAMU-CC PENS, LCRA-ELS and Energy Lab QAO	NRA, BCRAGD, SARA REL, WUL, TAMU-CC PENS, LCRA-ELS and Energy Lab QAO	
Holding times not exceeded		WUL, SARA REL, TAMU-CC PENS, LCRA-ELS and Energy Lab QAO	NRA, BCRAGD, SARA REL, WUL, TAMU-CC PENS, LCRA-ELS and Energy Lab QAO	NRA Data Specialist
Collection, preparation, and analysis consistent with SOPs and QAPP	NRA/BCRAGD Field Supervisor	WUL, SARA REL, TAMU-CC PENS, LCRA-ELS and Energy Lab QAO	NRA, BCRAGD, SARA REL, WUL, TAMU-CC PENS, LCRA-ELS and Energy Lab 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, TAMU-CC PENS, LCRA-ELS and Energy Lab QAO	NRA, BCRAGD, SARA REL, WUL, TAMU-CC PENS, LCRA-ELS and Energy Lab QAO	
QC samples analyzed at required frequency	NRA/BCRAGD Field Supervisor	WUL, TAMU-CC PENS, SARA REL, LCRA-ELS and Energy Lab QAO	NRA, BCRAGD, SARA REL, WUL, TAMU-CC PENS, LCRA-ELS and Energy Lab QAO	
QC results meet performance and program specifications		WUL, SARA REL, TAMU-CC PENS, LCRA-ELS and	NRA, BCRAGD, SARA REL, WUL, TAMU-CC PENS,	

Data to be Verified	Field Task	Laboratory Task	QA Task	NRA Data Specialist Task
		Energy Lab QAO	LCRA-ELS and Energy Lab QAO	
Analytical sensitivity (LOQ/AWRL) consistent with QAPP		WUL, TAMU-CC PENS, SARA REL, LCRA-ELS and Energy Lab QAO	NRA, BCRAGD, SARA REL, WUL, TAMU-CC PENS, LCRA-ELS and Energy Lab QAO	
Results, calculations, transcriptions checked		WUL, TAMU-CC PENS, SARA REL, LCRA-ELS and Energy Lab QAO		
Laboratory bench-level review performed		WUL, TAMU-CC PENS, SARA REL, LCRA-ELS and Energy Lab QAO		
All laboratory samples analyzed for all scheduled parameters		WUL, TAMU-CC PENS, SARA REL, LCRA-ELS and Energy Lab QAO	NRA QAO	
Corollary data agree				NRA QAO
Nonconforming activities documented	NRA/BCRAGD Field Supervisor	NRA and BCRAGD PM & QAO, SARA REL Lab Supervisor, TAMU-CC PENS Lab Research Associate & QAO, WUL, LCRA-ELS and Energy Lab Manager	NRA, BCRAGD, SARA REL, WUL, TAMU-CC PENS, LCRA-ELS and Energy Lab QAO	
Outliers confirmed and documented; reasonableness check performed	NRA Field Supervisor			NRA Data Specialist
Dates formatted correctly				NRA Data Specialist
Depth reported correctly and in correct units			NRA QAO BCRAGD QAO	
TAG IDs correct				NRA Data Specialist
TCEQ Station ID number assigned				NRA Data Specialist
Valid parameter codes			NRA QAO	NRA Data Specialist
Codes for submitting entity(ies), collecting entity(ies), and monitoring type(s) used correctly			NRA QAO	NRA Data Specialist
Time based on 24-hour clock			NRA QAO	NRA Data Specialist
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 Data Specialist
Field instrument pre- and post-	NRA. BCRAGD		NRA QAO	

Data to be Verified	Field Task	Laboratory Task	QA Task	NRA Data Specialist Task
calibration results within limits	Field Supervisor		BCRAGD QAO	
10% of data manually reviewed		TAMU-CC PENS QAO, WUL, LCRA-ELS and Energy Lab Manager	NRA QAO	

D3 Reconciliation with User Requirements

Data produced in this project, and data collected by other organizations (e.g., USGS, TCEQ, etc.), will be analyzed and reconciled with project data quality requirements. Data which do not meet requirements will not be submitted to SWQMIS nor will be considered appropriate for any of the uses noted in Section A5.

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

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 NRA and BCRAGD. 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 Measurement Performance Specifications for NRA

Conventional Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample (% Rec.)	Precision (RPD of LCS/LCS)	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	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	0.05	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	0.05	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 180°C)	mg/L	water	SM2540C	70300	10	2.5	NA	20	80-120	WUL
Chlorophyll-a, fluorometric method	µg/L	water	EPA 445.0	70953	3	2	NA	20	80-120	TAMU-CC PENS
Pheophytin-a, fluorometric method	µg/L	water	EPA 445.0	32213	3	2	NA	NA	NA	TAMU-CC 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, 24th Edition, 2022.

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 A7.2 Measurement Performance Specifications for BCRAGD

Conventional Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample (% Recovery)	Precision (RPD of LCS/LCSD)	Bias (% Recovery of LCS)	Lab
Alkalinity, Total	mg/L	water	SM2320B	00410	20	10	NA	20	NA	SARA REL
Residue, Total Nonfiltrable	mg/L	water	SM2540D	00530	5	1	NA	NA	NA	SARA REL
Nitrogen, **Ammonia**, Total (mg/L as N)	mg/L	water	SM4500-NH3 D	00610	0.1	0.1	70-130	20	80-120	SARA REL
Nitrite Nitrogen, Total (mg/L as N)	mg/L	water	EPA 300.0	00615	0.05	0.1	70-130	20	80-120	SARA REL
Nitrate Nitrogen, Total (mg/L as N)	mg/L	water	EPA 300.0	00620	0.05	0.1	70-130	20	80-120	SARA REL
Nitrogen, Kjeldahl, Total (mg/L as N)	mg/L	water	EPA 351.2	00625	0.2	0.2	70-130	20	80-120	SARA REL
Phosphorus, Total, wet method (mg/L as P)	mg/L	water	EPA365.3	00665	0.06	0	70-130	20	80-120	SARA REL
Carbon, Total Organic, NPOC (TOC) (mg/L)	mg/L	water	SM5310 C	00680	2	1	NA	NA	NA	SARA REL
Chloride (mg/L as Cl)	mg/L	water	EPA 300.0	00940	5	5	70-130	20	80-120	SARA REL
Sulfate (mg/L as SO4)	mg/L	water	EPA 300.0	00945	5	5	70-130	20	80-120	SARA REL
Chlorophyll-a, spectrophotometric acid method	µg/L	water	SM10200-H	32211	3	1	NA	20	80-120	SARA REL
Pheophytin-a, spectrophotometric acid method	µg/L	water	SM10200-H	32218	3	1	NA	NA	NA	SARA REL
Residue, Total Filtrable	mg/L	water	SM2540C	70300	10	10	NA	20	80-120	SARA REL
Turbidity, Lab Nephelometric Turbidity Units	NTU	water	EPA 180.1	82079	0.5	0.5	NA	NA	NA	SARA REL

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, 24th Edition, 2022.

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 NRA & BCRAGD

Field Parameters

Parameter	Units	Matrix	Method	Parameter Code
Temperature, Water	°C	water	SM 2550 B and TCEQ SOP V1	00010
Air Temperature	°C	air	TCEQ SOP	00020
Transparency, Secchi Disc	m	water	TCEQ SOP V1	00078
Specific Conductance, Field (µS/cm @ 25°C)	µs/cm	water	EPA 120.1 and TCEQ SOP, V1	00094
Oxygen, Dissolved	mg/L	water	SM 4500-O G & TCEQ SOP V1	00300
pH (standard units)	s.u.	water	EPA 150.1 and TCEQ SOP V1	00400
Salinity (parts per thousand)	ppth	water	SM 2520 and TCEQ SOP V1	00480
Days since Precipitation Event	day(s)	other	TCEQ SOP V1	72053
Depth of Bottom of Water Body	m	water	TCEQ SOP V2	82903
Reservoir Stage (ft above mean sea level)†	ft	water	TWDB	00052
Reservoir Percent Full†	% Reservoir Capacity	water	TWDB	00053
Reservoir Access Not Possible, Level too Low (Enter 1)	NS	other	TCEQ Drought Guidance	00051
Maximum Pool Width*	m	other	TCEQ SOP V2	89864
Maximum Pool Depth*	m	other	TCEQ SOP V2	89865
Pool Length*	m	other	TCEQ SOP V2	89869
% Pool Coverage in 500m reach*	%	other	TCEQ SOP V2	89870
Wind Intensity (1=Calm, 2=Slight, 3=Moderate, 4=Strong)	NU	other	NA	89965
Present Weather (1=Clear, 2=Partly Cloudy, 3=Cloudy, 4=Rain, 5=Other)	NU	other	NA	89966
Water Surface (1=Calm, 2=Ripple, 3=Wave, 4=Whitecap)	NU	water	NA	89968
Water Color (1=Brown, 2=Reddish, 3=Green, 4=Black, 5=Clear, 6=Other)	NU	water	NA	89969
Water Odor (1=Sewage, 2=Oily/Chemical, 3=Rotten Eggs, 4=Musky, 5=Fishy, 6=None, 7=Other)	NU	water	NA	89971
Tide Stage (1=Low, 2=Falling, 3=Slack, 4=Rising, 5=High)	NU	water	NA	89972
Rainfall in 1 Day	in	other	TCEQ SOP	82553
Rainfall in Past 7 Days	in	other	TCEQ SOP	82554
Turbidity (1=Low, 2=Medium, 3=High)	NU	water	TCEQ SOP	88842
Wind Direction (1=North, 2=South, 3=East, 4=West, 5=Northeast, 6=Southeast, 7=Northwest, 8=Southwest)	NU	other	NA	89010

* 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, 24th Edition, 2022.

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

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

TABLE A7.4 Measurement Performance Specifications for NRA

24-Hour Parameters in Water

Parameter		Units	Matrix	Method	Parameter Code
Water Temperature, 24-hour	Average	°C	water	TCEQ SOP V1	00209
	Maximum				00210
	Minimum				00211
	# of Measurements	NU	water	TCEQ SOP V1	00221
Specific Conductance, 24-hour	Average	µS/cm	water	TCEQ SOP V1	00212
	Maximum				00213
	Minimum				00214
	# of Measurements	NU	water	TCEQ SOP V1	00222
pH, 24-hour	Maximum	s.u.	water	TCEQ SOP V1	00215
	Minimum				00216
	# of Measurements	NU	water	TCEQ SOP V1	00223
Salinity, 24-hour	Maximum	ppth	water	TCEQ SOP V1	00217
	Average				00218
	Minimum				00219
	# of Measurements	NU	water	TCEQ SOP V1	00220
Dissolved Oxygen, 24-hour	Minimum	mg/l	water	TCEQ SOP V1	89855
	Maximum				89856
	Average				89857
	# of Measurements	NU	water	TCEQ SOP V1	89858

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, 24th Edition, 2022.

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

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

TABLE A7.5 Measurement Performance Specifications for NRA

Bacteriological Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	Precision (RPD of LCS/LCSD)	Lab
E. coli, Colilert, IDEXX Method	MPN 100 mL	water	SM 9223-B*	31699	1	1	0.5	WUL
Enterococci, Enterolert, IDEXX	MPN 100 mL	water	Enterolert **	31701	10	1	0.5	WUL
E. coli, Colilert, IDEXX **Holding Time**	hr	water	NA	31704	NA	NA	NA	WUL

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

_Enterococcus*** Samples should be **diluted 1:10** for all waters.

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, 24th Edition, 2022.

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

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

TABLE A7.6 Measurement Performance Specifications for BCRAGD

Bacteriological Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	Precision (RPD of LCS/LCSD)	Lab
E. coli, Colilert, IDEXX Method	MPN 100 mL	water	SM 9223-B*	31699	1	1	0.5	SARA REL
E. coli, Colilert, IDEXX **Holding Time**	hours	water	NA	31704	NA	NA	NA	SARA REL

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

References:

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

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 24th Edition, 2022.

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

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

TABLE A7.7 Measurement Performance Specifications for NRA & BCRAGD

Flow Parameters

Parameter	Units	Matrix	Method	Parameter Code
Stream Flow, Instantaneous	cfs	water	TCEQ SOP V1	00061
Flow Severity (1=No Fow, 2=Low, 3=Normal, 4=Flood, 5=High, 6=Dry)	NU	water	TCEQ SOP V1	01351
Stream Flow Estimate	cfs	water	TCEQ SOP V1	74069
Flow Method (1=Gage, 2=Electric, 3=Mechanical, 4=Weir/Flume, 5=Doppler)	NU	other	TCEQ SOP V1	89835

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, 24th Edition, 2022.

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 NRA

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	µg/L	water	EPA 200.7 Rev 4.4 (1994)	01106	200	50	70-130	20	80-120	LCRA-ELS
Arsenic, Dissolved	µg/L	water	EPA 200.8	01000	5	2	70-130	20	80-120	LCRA-ELS
Barium, Dissolved	µg/L	water	EPA 200.8	01005	1000	1	70-130	20	80-120	LCRA-ELS
Beryllium, Dissolved	µg/L	water	EPA 200.8	01010	2	1	70-130	20	80-120	LCRA-ELS
Calcium, Dissolved	mg/L	water	EPA 200.7	00915	NA	0.2	70-130	20	80-120	LCRA-ELS
Cadmium, Dissolved	µg/L	water	EPA 200.8	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	µg/L	water	EPA 200.8 Rev 5.4 (1998)	01030	10	1	70-130	20	80-120	LCRA-ELS
Cobalt, Dissolved	µg/L	water	EPA 200.8	01035	NA	1	70-130	20	80-120	LCRA-ELS
Copper, Dissolved	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	µg/L	water	EPA 200.7	01046	NA	50	70-130	20	80-120	LCRA-ELS
Mercury, Dissolved	µg/L	water	EPA 245.1	71890	NA	0.2	70-130	20	80-120	LCRA-ELS
Molybdenum, Dissolved	µg/L	water	EPA 200.8	01060	NA	1	70-130	20	80-120	LCRA-ELS
Nickel, Dissolved	µg/L	water	EPA 200.8 Rev 5.4 (1998)	01065	10	1	70-130	20	80-120	LCRA-ELS
Potassium, Dissolved	mg/L	water	EPA 200.7	00935	NA	0.2	70-130	20	80-120	LCRA-ELS
Selenium, Dissolved	µg/L	water	EPA 200.8	01145	NA	2	70-130	20	80-120	LCRA-ELS
Silver, Dissolved	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	water	EPA 200.7	00930	NA	0.2	70-130	20	80-120	LCRA-ELS
Strontium, Dissolved	µg/L	water	EPA 200.7	01080	NA	10	70-130	20	80-120	LCRA-ELS
Thallium, Dissolved	µg/L	water	EPA 200.8	01057	1	1	70-130	20	80-120	LCRA-ELS
Titanium, Dissolved	µg/L	water	EPA 200.8	01150	NA	1	70-130	20	80-120	LCRA-ELS
Vanadium, Dissolved	µg/L	water	EPA 200.8	01085	NA	1	70-130	20	80-120	LCRA-ELS
Zinc, Dissolved	µg/L	water	EPA 200.8 Rev 5.4 (1998)	01090	5	5	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
Hardness, Total*	mg/L	water	SM 2340 B	00900	5	1.32	NA	20	80-120	LCRA-ELS
Antimony, Total	µg/L	water	EPA 200.8	01097	NA	1	70-130	20	80-120	LCRA-ELS
Barium, Total	µg/L	water	EPA 200.8	01007	NA	1	70-130	20	80-120	LCRA-ELS
Beryllium, Total	µg/L	water	EPA 200.8	01012	NA	1	70-130	20	80-120	LCRA-ELS
Calcium, Total	mg/L	water	EPA 200.7	00916	0.5	0.2	70-130	20	80-120	LCRA-ELS
Chromium, Total	µg/L	water	EPA 200.8	01034	NA	2	70-130	20	80-120	LCRA-ELS
Cobalt, Total	µg/L	water	EPA 200.8	01037	NA	1	70-130	20	80-120	LCRA-ELS
Copper, Total	µg/L	water	EPA 200.8	01042	NA	2	70-130	20	80-120	LCRA-ELS
Iron, Total	µg/L	water	EPA 200.7	01045	300	50	70-130	20	80-120	LCRA-ELS
Magnesium, Total	mg/L	water	EPA 200.7	00927	0.5	0.2	70-130	20	80-120	LCRA-ELS
Manganese, Total	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	71960	0.006	0.006	70-130	20	80-120	Energy Lab
Molybdenum, Total	µg/L	water	EPA 200.8	01062	NA	50	70-130	20	80-120	LCRA-ELS
Nickel, Total	µg/L	water	EPA 200.8	01067	NA	2	70-130	20	80-120	LCRA-ELS
Potassium, Total	mg/L	water	EPA 200.7	00937	NA	2	70-130	20	80-120	LCRA-ELS
Selenium, Total	µg/L	water	EPA 200.8 Rev 5.4 (1998)	01147	2	2	70-130	20	80-120	LCRA-ELS
Silver, Total	µg/L	water	EPA 200.8	01077	NA	0.5	70-130	20	80-120	LCRA-ELS
Sodium, Total	mg/L	water	EPA 200.7	00929	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
Thallium, Total	µg/L	water	EPA 200.8	01059	NA	1	70-130	20	80-120	LCRA-ELS
Tin, Total	µg/L	water	EPA 200.7	01102	NA	50	70-130	20	80-120	LCRA-ELS
Titanium, Total	µg/L	water	EPA 200.8	01152	NA	1	70-130	20	80-120	LCRA-ELS
Zinc, Total	µg/L	water	EPA 200.8	01092	NA	10	70-130	20	80-120	LCRA-ELS

*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, 24th Edition, 2022.

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).

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

Task 3: Water Quality Monitoring Work Plan

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 NRA, 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 2024, the Performing Party will monitor a minimum of 10 bay and tidal sites quarterly for conventional, bacteria, and field parameters. The performing party will also monitor 2 bay and tidal locations on a semi-annual basis for conventional, bacteria, and field parameters. One quarterly bay and tidal station will have semi-annual metals monitoring. The performing party will monitor a minimum of 33 river and lake sites quarterly for conventional, bacteria, flow (where applicable), and field parameters. The performing party will also monitor 2 river locations on a quarterly basis for Chlorophyll-*a*, TDS, bacteria, and field parameters. Metals in water monitoring will be performed at 2 river sites on a semi-annual basis. The performing party will also monitor one river site for bacteria and field parameters only and one river site for field parameters only. The Performing Party will also conduct 24-hour dissolved oxygen monitoring at three sites given sufficient water.

In FY 2025, the NRA will monitor at a similar level of effort as in FY 2024. The actual number of sites, location, frequency, and parameters collected for FY 2025 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 NRA 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).*

Coordinated Monitoring Meeting - The NRA will hold an annual coordinated monitoring meeting as described in the FY2024-2025 CRP Guidance. Qualified monitoring organizations will be invited to attend the working meeting in which monitoring needs and purposes will be discussed segment by segment and station by station. Information from participants and stakeholders will be used to select stations and parameters that will enhance overall water quality monitoring coverage, eliminate duplication of effort, and address basin priorities. A summary of the changes to the monitoring schedule will be provided to the participants within two weeks of the meeting. Changes to the monitoring schedule will be entered into the statewide Coordinated Monitoring Schedule (http://cms.lcra.org) and communicated to meeting attendees. Changes to monitoring schedules that occur during the year will be entered into the Coordinated Monitoring Schedule and communicated to meeting attendees. All requirements related to meetings will be followed and required meetings will be conducted in-person or via TCEQ approved virtual format.

Monitoring Activities Report - Each Progress Report will include all types of monitoring and indicate the number of sampling events and the types of monitoring conducted in the month.

Deliverables and Dues Dates:

September 1, 2023 through August 31, 2024

A. Conduct water quality monitoring, summarize activities, and submit with Progress Report-– October 15, 2023; November 15, 2023; December 15, 2023; January 15, 2024; February 15, 2024; March 15, 2024; June 15,2024; July 15,2024
B. Coordinated Monitoring Meeting - between March 15 and April 30,2024
C. Coordinated Monitoring Meeting Summary of Changes - within 2 weeks of the meeting
D. Email notification that Coordinated Monitoring Schedule updates are complete - May 31, 2024

September 1, 2024 through August 31, 2025

A. Conduct water quality monitoring, summarize activities, and submit with Progress Report – September 15 and December 15, 2024; March 15, June 15, and August 15, 2025
B. Coordinated Monitoring Meeting - between March 15 and April 30,2025
C. Coordinated Monitoring Meeting Summary of Changes – within 2 weeks of the meeting
D. Email notification that Coordinated Monitoring Schedule updates are complete - May 31, 2025

Sample Design Rationale FY 2024

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.

BASIN 20

- **Segment 2001 - Mission River Tidal** – No monitoring changes
- **Segment 2002 - Mission River Above Tidal** – No monitoring changes
- **Segment 2003 - Aransas River Tidal** – No monitoring changes
- **Segment 2003B - Chiltipin Creek Above Tidal** – No monitoring changes
- **Segment 2004 - Aransas River Above Tidal** – No monitoring changes
- **Segment 2004A - Aransas Creek** – NRA will continue monitoring quarterly at Aransas Creek (Station 12941) for flow, field, and bacteria only. High bacteria possibly due to bat feces or leaking septic systems.
- **Segment 2004B - Poesta Creek** – No monitoring changes. High nitrate due to wastewater treatment plant effluent.

BASIN 21

- **Segment 2101 - Nueces River Tidal** – Proposed redirecting outfall from river to delta. Quarterly routine monitoring is completed by TCEQ Field Office Region 14.
- **Segment 2102 - Nueces River Above Tidal** – No monitoring changes
- **Segment 2103 - Lake Corpus Christi** – No monitoring changes
- **Segment 2104 - Nueces River Above Frio River** – 2x metals resumed at Station 12972
- **Segment 2105 - Nueces River Above Holland Dam** – No monitoring changes. TCEQ Field Office Region 16 monitor Station 12976 quarterly including bacteria and flow.
- **Segment 2106 - Nueces River/Lower Frio River** – No monitoring changes. Illegal dumping downstream of Choke Canyon wastewater outfall.
- **Segment 2107 - Lower Atascosa River** – No monitoring changes. Keep monitoring 2x for metals in water at Station 12980.

- **Segment 2108 - San Miguel Creek** – 2x metals resumed at Station 12983.
- **Segment 2109 - Leona River –** NRA will be sampling both stations (18418 and 12985) on a quarterly basis. Water comes out of the ground with low oxygen levels.
- **Segment 2110 - Lower Sabinal River** – No monitoring changes.
- **Segment 2111 - Upper Sabinal River** – No monitoring changes. Feral hog issues.
- **Segment 2112 - Upper Nueces River –** No monitoring changes.
- **Segment 2113 - Upper Frio River** – No monitoring changes. Quarterly routine monitoring along with flow and bacteria is completed by TCEQ Field Office Region 13.
- **Segment 2114A -Commissioners Creek** – No monitoring changes
- **Segment 2115 - Seco Creek** – No monitoring changes
- **Segment 2116 - Choke Canyon Reservoir** – 4 stations total 13019, 13020, 17389, and 22328 stations monitored on a monthly basis, 12x/year. 22328 has 24-hour D.O. monitored quarterly and the other three stations monitor 24-hour D.O. on a monthly basis, 12x/year.
- **Segment 2117 - Frio River Above Choke Canyon** – 2x metals resumed at Station 13023.
- **Segment 2118 – Upper Atascosa River** – No monitoring changes. Keep monitoring 24-hour D.O. quarterly.

BASIN 22

- **Segment 2201 - Arroyo Colorado Tidal** – No monitoring changes. Quarterly routine monitoring is completed by TCEQ Field Office Region 15.
- **Segment 2202 - Arroyo Colorado Above Tidal** – No monitoring changes
- **Segment 2203 - Petronila Creek Tidal** – No monitoring changes. Quarterly routine monitoring along with bacteria is completed by TCEQ Field Office Region 14.
- **Segment 2204 - Petronila Creek above Tidal –** No monitoring changes. Illegal dumping site.

BASIN 24

- **Segment 2462 - San Antonio/Hynes Bay** – No monitoring changes. Quarterly routine monitoring (including bacteria) along with two metals in sediment samples is completed by TCEQ Field Office Region 14.
- **Segment 2463 - Mesquite Bay** – No monitoring changes. Quarterly routine monitoring along with bacteria is completed by TCEQ Field Office Region 14.
- **Segment 2471 - Aransas Bay** – No monitoring changes. Quarterly routine monitoring along with bacteria is completed by TCEQ Field Office Region 14.
- **Segment 2471A - Little Bay** - No monitoring changes. Quarterly routine monitoring along with bacteria is completed by TCEQ Field Office Region 14.
- **Segment 2472 - Copano/Port/Mission Bay –** 2x metals resumed at Station 13405.
- **Segment 2473 - St. Charles Bay** – No monitoring changes. Quarterly routine monitoring along with bacteria is completed by TCEQ Field Office Region 14.
- **Segment 2481 - Corpus Christi Bay** – No monitoring changes. Quarterly routine monitoring along with bacteria is completed by TCEQ Field Office Region 14. Additionally, metals in water and sediment along with organic sediment is collected for Station 13409 by TCEQ Field Office Region 14 twice a year.
- **Segment 2482 - Nueces Bay** – No monitoring changes. Quarterly routine monitoring along with bacteria is completed by TCEQ Field Office Region 14. Additionally, metals in water and sediment along with organic sediment is collected for Station 13422 by TCEQ Field Office Region 14 twice a year.
- **Segment 2483 - Redfish Bay** – No monitoring changes
- **Segment 2483A - Conn Brown Harbor** – 2x metals resumed at Station 18848.

- **Segment 2484 - Corpus Christi Inner Harbor** - No changes. Quarterly routine monitoring (including bacteria) along with two metals in water samples is completed by TCEQ Field Office Region 14.
- **Segment 2485 - Oso Bay** – No monitoring changes
- **Segment 2485A - Oso Creek** – No monitoring changes
- **Segment 2491 - Laguna Madre** – No monitoring changes
- **Segment 2491B - North Floodway** – No monitoring changes. Quarterly routine monitoring is completed by TCEQ Field Office Region 15.
- **Segment 2491C - Hidalgo and Raymondville Drains –** No monitoring changes
- **Segment 2492 - Baffin Bay/Alazan Bay/Cayo del Grullo/Laguna Salado** – No monitoring changes
- **Segment 2492A - San Fernando Creek** – No monitoring changes
- **Segment 2492B – Los Olmos Creek Tidal –** Recommend dissolved and total metals sampling.
- **Segment 2493 - South Bay** - No monitoring changes. Quarterly routine monitoring is completed by TCEQ Field Office Region 15.
- **Segment 2494 - Brownsville Ship Channel -** No monitoring changes. Quarterly routine monitoring is completed by TCEQ Field Office Region 15.
- **Segment 2494A - Port Isabel Fishing Harbor –** No monitoring changes. Quarterly routine monitoring is completed by TCEQ Field Office Region 15.
- **Segment 2494C - San Martin Lake System –** No monitoring changes

Site Selection Criteria

This data collection effort involves monitoring routine water quality using procedures that are consistent with the TCEQ SWQM program. Some general guidelines are followed when selecting sampling sites, as outlined below, and discussed thoroughly in SWQM Procedures, Volumes I and II. Overall consideration is given to accessibility and safety. All monitoring activities have been developed in coordination with the CRP Steering Committee and with the TCEQ. The site selection criteria specified are those the TCEQ would like considered to produce data which is complementary to that collected by the state and which may be used in assessments, etc.

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

Monitoring Sites for FY 2024

Table B1.1 Sample Design and Schedule, FY 2024

Site Description	Station ID	Waterbody ID	Region	SE	CE	MT	24 hr DO	AqHab	Benthics	Nekton	Metal	Organic	Metal Sed	Organic	Conv	Amb Tox Water	Amb Tox Sed	Bacteria	Flow	Fish Tissue	Field	Comments
Basin 20																						
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	
CHILTIPIN CREEK MID CHANNEL AT UNNAMED BRIDGE POSSIBLY AKA PLYMOUTH ROAD 2.11 KM DOWNSTREAM OF N END FM 631 NE OF SINTON	12930	2003B	14	NR	NR	RT					2				4			4	4		4	
ARANSAS RIVER AT COUNTY ROAD EAST OF SKIDMORE	12952	2004	14	NR	NR	RT									4			4	4		4	
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	

Site Description	Station ID	Waterbody ID	Region	SE	CE	MT	24 hr DO	AqHab	Benthics	Nekton	Metal	Organic	Metal Sed	Organic	Conv	Amb Tox Water	Amb Tox Sed	Bacteria	Flow	Fish Tissue	Field	Comments
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
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	

Site Description	Station ID	Waterbody ID	Region	SE	CE	MT	24 hr DO	AqHab	Benthics	Nekton	Metal	Organic	Metal Sed	Organic	Conv	Amb Tox Water	Amb Tox Sed	Bacteria	Flow	Fish Tissue	Field	Comments
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	
NUECES RIVER BRIDGE ON FM 190 NORTH OF ASHERTON	12976	2105	16	NR	NR	RT	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	
SAN MIGUEL CREEK AT SH 16 NORTH OF TILDEN	12983	2108	16	NR	NR	RT					2				4			4	4		4	
LEONA RIVER AT FM 1581 SOUTHWEST OF PEARSALL	12985	2109	13	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		4	
SABINAL RIVER BRIDGE AT US 90 WEST OF SABINAL	12993	2110	13	NR	NR	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	

Site Description	Station ID	Waterbody ID	Region	SE	CE	MT	24 hr DO	AqHab	Benthics	Nekton	Metal	Organic	Metal Sed	Organic	Conv	Amb Tox Water	Amb Tox Sed	Bacteria	Flow	Fish Tissue	Field	Comments
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	
UPPER SABINAL RIVER IMMEDIATELY UPSTREAM OF FM 187 APPROXIMATELY 140 METERS NORTHEAST OF THE ENTRANCE TO LOST MAPLES STATE NATURAL AREA	22306	2111	13	NR	BA	RT									4			4	4		4	
NUECES RIVER AT SH 55 SOUTH OF BARKSDALE	13005	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 NEAR CHALK BLUFF CAMPGROUND APPOX 14.5 MILES NORTH OF UVALDE TX OFF OF HIGHWAY 55	22330	2112	13	NR	NR	RT									4			4	4		4	
NUECES RIVER NEAR CR 414 BRIDGE CROSSING APPROX 1 MILE SOUTH OF MONTELL TX	22331	2112	13	NR	NR	RT									4			4	4		4	

Site Description	Station ID	Waterbody ID	Region	SE	CE	MT	24 hr DO	AqHab	Benthics	Nekton	Metal	Organic	Metal Sed	Organic	Conv	Amb Tox Water	Amb Tox Sed	Bacteria	Flow	Fish Tissue	Field	Comments
HONDO CREEK MID CHANNEL IMMEDIATELY DOWNSTREAM OF SH 173 SOUTHEAST OF HONDO	18408	2114	13	NR	NR	RT									4			4			4	
COMMISSIONERS CREEK 5.7 KILOMETERS UPSTREAM OF HONDO CREEK AND 4 KILOMETERS EAST OF TARPLEY TEXAS AND SOUTH OF FM 470	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	
CHOKE 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	
CHOKE 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	
CHOKE 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	
CHOKE CANYON RESERVOIR APPROX 553 METERS UPSTREAM FROM THE FRIO RIVER &	22328	2116	16	NR	NR	RT	4								12			12			12	

Site Description	Station ID	Waterbody ID	Region	SE	CE	MT	24 hr DO	AqHab	Benthics	Nekton	Metal	Organic	Metal Sed	Organic	Conv	Amb Tox Water	Amb Tox Sed	Bacteria	Flow	Fish Tissue	Field	Comments
SAN MIGUEL CREEK CONFLUENCE																						
FRIO RIVER AT SH 16 IN TILDEN	13023	2117	16	NR	NR	RT					2				4			4	4		4	
FRIO RIVER AT IH 35 NORTHBOUND BRIDGE NORTH OF DILLEY	13024	2117	13	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	
ATASCOSA RIVER AT FM 541 4.75 KM UPSTREAM OF THE CONFLUENCE WITH LIVEOAK CREEK IN ATASCOSA COUNTY	20764	2118	13	NR	NR	RT	4								4			4	4		4	
Basin 22																						
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																						
PORT BAY AT MIDDLE OF SH 188 WEST OF ROCKPORT	13405	2472	14	NR	NR	RT					2				2			2			2	

Site Description	Station ID	Waterbody ID	Region	SE	CE	MT	24 hr DO	AqHab	Benthics	Nekton	Metal	Organic	Metal Sed	Organic	Conv	Amb Tox Water	Amb Tox Sed	Bacteria	Flow	Fish Tissue	Field	Comments
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 OFFSHHORE 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	
OSO CREEK IMMEDIATELY DOWNSTREAM OF FM 763 SOUTHWEST OF CORPUS CHRISTI	13029	2485A	14	NR	NR	RT									4			4			4	

Site Description	Station ID	Waterbody ID	Region	SE	CE	MT	24 hr DO	AqHab	Benthics	Nekton	Metal	Organic	Metal Sed	Organic	Conv	Amb Tox Water	Amb Tox Sed	Bacteria	Flow	Fish Tissue	Field	Comments
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									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

Station Location Maps

Maps of stations monitored by the NRA are provided below. The maps were generated by the NRA. This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. For more information concerning this map, contact the Jessica Wright, at (361)653-2110.

Figure C1.1 San Antonio-Nueces Coastal Basin

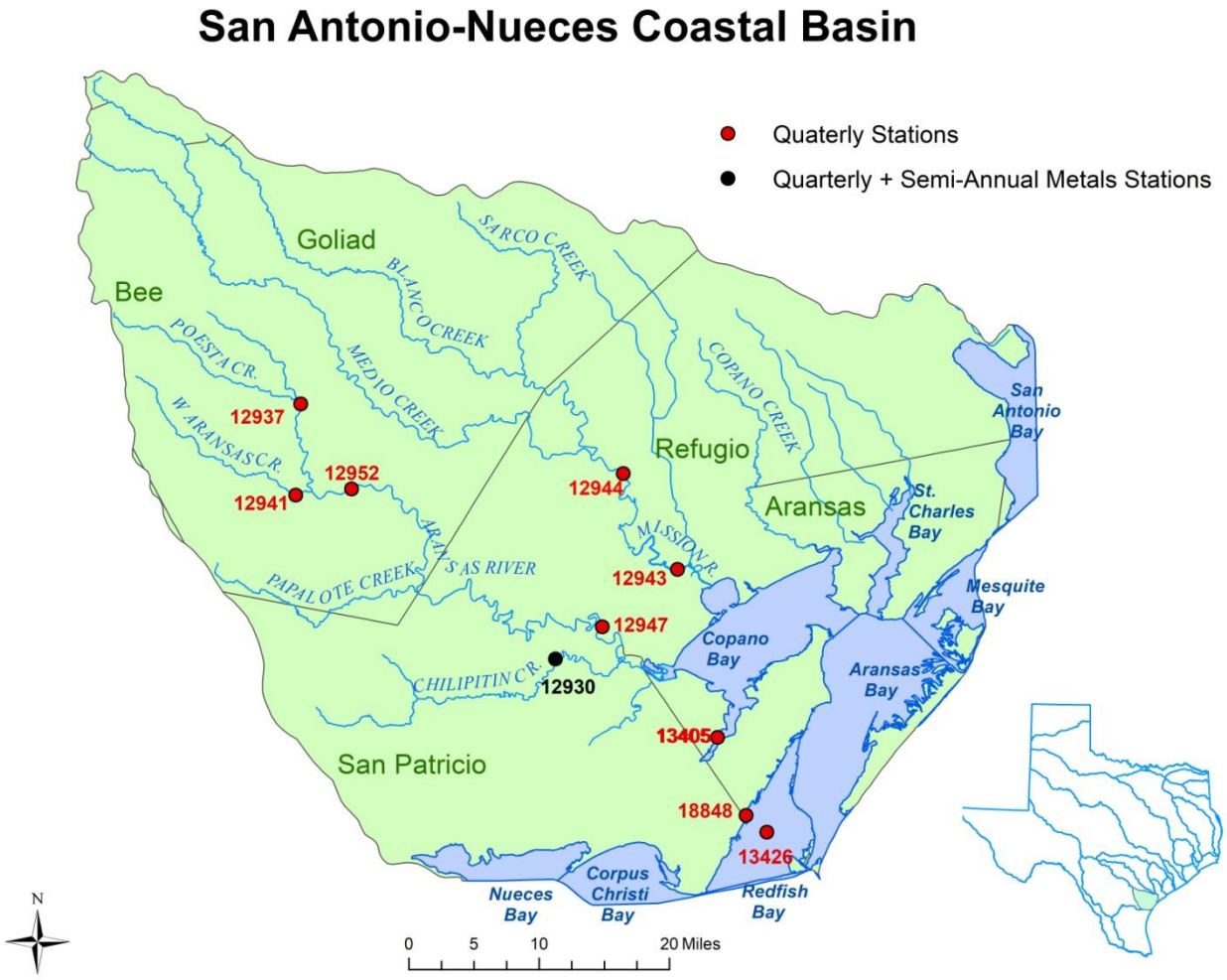


Figure C1.2 Nueces River Basin

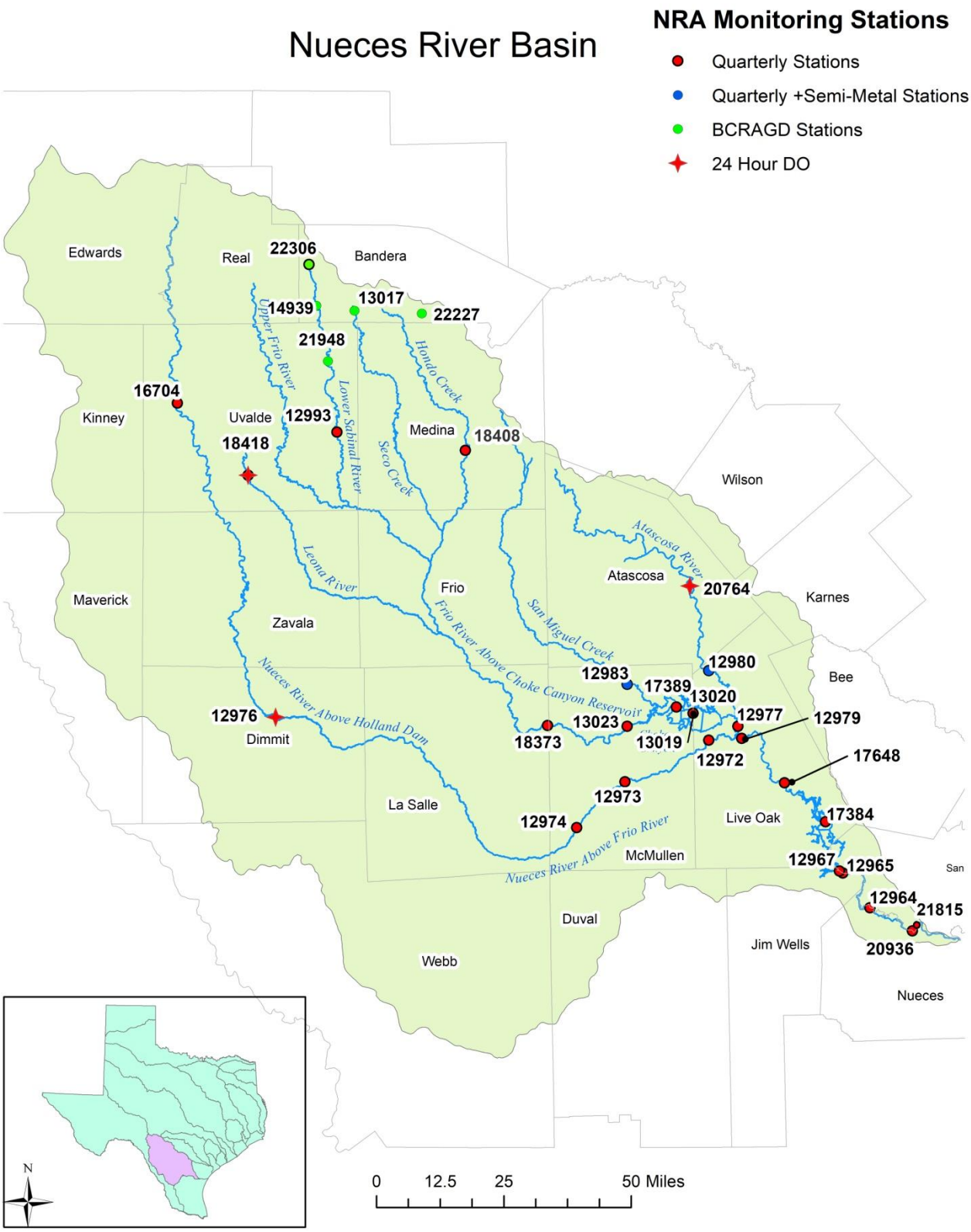


Figure C1.3 Nueces-Rio Grande Coastal Basin

Appendix D: Field Data Sheets

Nueces River Authority
Field Data Sheet
Reservoir Profile

Date: _____ Sonde S/N #: _____

Sampling Location: _____ Station ID: _____

_____

Time Collected: _____

Sample Collectors: _____

Storet Code	Value	Parameter
00020		Air Temp (°C)
00078		Secchi Disk (meters)
89969		Water Color 1=Brown 4=Black 2=Reddish 5=Clear 3=Green 6=Other
89971		Water Odor 1=Sewage 5=Fishy 2=Oily/Chemical 6=None 3=Rotten Eggs 7=Other 4=Musky
89968		Water Surface 1=Calm 3=Waves 2=Ripples 4=White Caps
00052		Reservoir Stage (Feet above mean sea level)
00053		Reservoir Percent Full (% Reservoir Capacity)

Storet Code	Value	Parameter
72053		Days since Last Precipitation
82553		Rainfall (Inches past 1 day)
82554		Rainfall (Inches past 7 day)
89966		Present Weather 1=Clear 3=Overcast 2=Cloudy 4=Rain
89965		Wind Intensity _____mph 1=Calm (0) 3=Moderate (8-18) 2=Slight (1-7) 4=Strong (19+)
89010		Wind Direction 1=North 5=Northeast 2=South 6=Southeast 3=East 7=Northwest 4=West 8=Southwest
88842		Turbidity 1=Low 3=High 2=Medium
82903		Total Depth (m)
		Picture

Storet	Parameter	Value	Value	Value	Value	Value	Value	Value
	Depth							
00010	Water Temp (°C)							
00400	pH							
00300	DO (mg/L)							
	DO (% Saturation)							
00094	SpC (µS/cm)							

Storet	Parameter	Value	Value	Value	Value	Value	Value	Value
	Depth							
00010	Water Temp (°C)							
00400	pH							
00300	DO (mg/L)							
	DO (% Saturation)							
00094	SpC (µS/cm)							

Comments:_____

Nueces River Authority
Field Data Sheet

Date: _____ Sonde S/N #: _____

Sampling Location: _____ Station ID: _____

_____

Time Collected: _____

Sample Collectors: _____

Storet Code	Value	Parameter
00020		Air Temp (°C)
00078		Secchi Disk (meters)
89969		Water Color 1=Brown 4=Black 2=Reddish 5=Clear 3=Green 6=Other
89971		Water Odor 1=Sewage 5=Fishy 2=Oily/Chemical 6=None 3=Rotten Eggs 7=Other 4=Musky
89968		Water Surface 1=Calm 3=Waves 2=Ripples 4=White Caps
89864		Maximum Pool Width (m)
89865		Maximum Pool Depth (m)
89869		Maximum Pool Length (m)
89870		% Pool Coverage in 500m
82903		Total Depth (m)

Storet Code	Value	Parameter
00061		Flow (cfs)
74069		Flow Estimate (cfs)
01351		Flow Severity 1=No flow 3=Normal 5=High 2=Low 4=Flood 6=Dry
89835 (Leave blank if 01351 is a 1 or 6)		Flow Measurement Method 1-Gage 2-Electric 3-Mechanical 4-Weir/Flume 5-Doppler
89966		Present Weather 1=Clear 3=Overcast 2=Cloudy 4=Rain
89965		Wind Intensity _____mph 1=Calm (0) 3=Moderate (8-18) 2=Slight (1-7) 4=Strong (19+)
89972		Tide Stage 1=Low 3=Slack 5=High 2=Falling 4=Rising
89010		Wind Direction 1=North 5=Northeast 2=South 6=Southeast 3=East 7=Northwest 4=West 8=Southwest
88842		Turbidity 1=Low 3=High 2=Medium
72053		Days since Last Precipitation
82553		Rainfall (Inches past 1 day)
82554		Rainfall (Inches past 7 day)

Storet	Parameter	Value	Value	Value	Value	Value	Value	Value
	Depth							
00010	Water Temp (°C)							
00400	pH							
00300	DO (mg/L)							
	DO (% Saturation)							
00094	SpC (µS/cm)							
00480	Salinity							

Comments:_____

Appendix E: Chain of Custody Forms

CUSTOMER RECORD & ANALYSIS

Send Results to:	Jessica Wright Nueces River Authority
Address:	500 IH69, Suite 805 Robstown, TX 78380

NUECES RIVER AUTHORITY

Lab Analysis Request

Phone:	Fax:	Project Name:	Project No.:
361-653-2110	361-653-2115	Clean Rivers Program Monitoring	CRP NRA/WUL

Sampling by:			Matrix		Preservation		Sampling		Alkalinity SM 2320 B	Chloride EPA 300.0	Sulfate EPA 300.0	TDS SM 2540 C	Nitrate EPA 300.0	Nitrite EPA 300.0		TKN EPA 351.4	Ammonia-N EPA 350.1	Phosphorus EPA 365.1		TOC SM 5310 C		TSS SM 2540 D			E. coli SM 9223-B	Enterococcus - ~~Enterolert~~
Site Identification	Lab Only	No. Containers	Liquid	Conductivity	H_2SO_4	Ice	Date	Time																		

Relinquished by:	Date:	Time:	Received By:	Date:	Time:	Remarks: X = laboratory measurement
						Customer No.: 53884 **Run Lab Duplicates Separate**
						Receiving Temp (°C):

CUSTOMER RECORD & ANALYSIS

Send Results to: Jessica Wright, Nueces River Authority

Address: 500 IH69, Suite 805, Robstown, TX 78380

NUECES RIVER AUTHORITY

Lab Analysis Request

Phone:	Fax:	Project Name:	Project No.:
361-653-2110	361-653-2115	Clean Rivers Program Monitoring	NRA/CRP PENS

Sampling by:			Matrix		Preservation	Sampling		Chlorophyll-a EPA 445.0	Pheophytin-a EPA 445.0																	
Site Identification	Lab Only	No. Containers	Liquid	Conductivity	Ice	Date	Time																			

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

CUSTOMER RECORD & ANALYSIS

NUECES RIVER AUTHORITY

Lab Analysis Request

Send Results to:	Jessica Wright Nueces River Authority
Address:	500 IH69, Suite 805 Robstown, TX 78380

Phone:	Fax:	Project Name:	Project No.:
361-653-2110	361-653-2115	Clean Rivers Program Monitoring	NRA/CRP LCRA-ELS

Sampling by:			Matrix		Preservation		Sampling		Metals in Water (Dissolved)	Metals in Water (Total)																				
Site Identification	Lab Only	No. Containers	Liquid	Conductivity	H_2SO_4	Ice	Date	Time																						

Relinquished by:	Date:	Time:	Received By:	Date:	Time:	Remarks: X = laboratory measurement
						Receiving Temp (°C):

Appendix F: Data Review Checklist and Summary Shells

Data Review Checklist

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

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

Data Summary

Data Set Information

Data Source: _____

Date Submitted: _____

Tag_id Range: _____

Date Range: _____

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

Planning Agency Data Specialist: _____ Date: _____

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

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

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

Discrepancies or missing data for the listed tag ID:

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

Data Loss

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

ATTACHMENT 1 Example Letter to Document Adherence to the QAPP

TO: Kiran Freeman
TCEQ CRP

FROM: Jessica Wright
Nueces River Authority

RE: Nueces River Authority Fiscal Year 2024-25 CRP QAPP

Please sign and return this form by (date) to:

(address)

I acknowledge receipt of the "Nueces River Authority Fiscal Year 2024-25 CRP QAPP, 6/6/2023". I understand the document(s) describe quality assurance, quality control, data management and reporting, and other technical activities that must be implemented to ensure the results of work performed will satisfy stated performance criteria. My signature on this document signifies that I have read and approved the document contents pertaining to my program. Furthermore, I will ensure that all staff members participating in CRP activities will be required to familiarize themselves with the document contents and adhere to them as well.

_____

Jessica Wright Date

Copies of the signed forms should be sent by the Nueces River Authority to the TCEQ CRP Project Manager within 60 days of TCEQ approval of the QAPP.