Amendment # 2
Update to the Angelina & Neches River Authority Clean Rivers Program FY 2020/2021 QAPP

Prepared by the Angelina & Neches River Authority in Cooperation with the Texas Commission on Environmental Quality (TCEQ)

Effective: Immediately upon approval by all parties

Questions concerning this QAPP should be directed to:

Melissa Garcia
Quality Manager
Angelina & Neches River Authority
2901 N John Redditt Dr.
Lufkin, Texas 75904
936-633-7552
mgarcia@anra.org

or

Carla Ethridge
CRP Project Manager
Angelina & Neches River Authority
2901 N John Redditt Dr.
Lufkin, Texas 75904
936-633-7527
cethridge@anra.org

Justification

This document details the changes made to the basin-wide Quality Assurance Project Plan to update the QAPP for fiscal year 2021. This document updates laboratory analysis changes, and TCEQ and ANRA staffing changes since the last amendment.

Summary of Changes

Section/Figure/Table	Page	Change	Justification
A1	5	Replaced Kyle Girten as Acting Work Lead with Rebecca DuPont as Work Lead. Replaced Kelly Rodibaugh with Rebecca DuPont as Acting Project Quality Assurance Specialist.	TCEQ staffing changes
A1	7	Added Jason Woods as the Project Manager	LCRA staffing updates
A1	8	Replaced Will Boyd as Laboratory Manager with Bill Peery as Technical Director	Ana-Lab staffing changes
A4	9 10	Replaced Kyle Girten as Acting Work Lead with Rebecca DuPont as Work Leader. Replaced Kelly Rodibaugh with Rebecca DuPont as Acting Project Quality Assurance Specialist.	TCEQ staffing changes
A4	10	Replaced Allison McElroy, Wildlife Biologist with Kimberly Wagner, Communications Director. Added education and outreach tasks to role responsibilities of Kimberly Wagner, Communications Director.	ANRA staffing changes Updated role responsibilities
A4	11	Added Jason Woods as the Project Manager	LCRA staffing updates
A4	11	Replaced Will Boyd as Laboratory Manager with Bill Peery as Technical Director.	Ana-Lab staffing changes
A4.1	12	Replaced Kyle Girten as Acting Work Lead with Rebecca DuPont as Work Lead. Replaced Kelly Rodibaugh with Rebecca DuPont as Acting Project Quality Assurance Specialist. Changed line between Dana Squires TCEQ Lead QA Specialist and Rebecca DuPont Acting TCEQ Project QA Specialist from a solid line (management) to a dashed line (communication).	TCEQ staffing changes
A4.1	12	Replaced Allison McElroy, Wildlife Biologist with Kimberly Wagner, Communications Director.	ANRA staffing changes

A4.1	12	Replaced Will Boyd as Laboratory Manager with Bill Peery as Technical Director.	Ana-Lab staffing changes
A4.1	12	Added Jason Woods as Project Manager	LCRA staffing updates
A6	13	Removed chlorophyll *a* and pheophytin *a* from the list of parameters that ANRA Environmental Laboratory will *not* perform analyses on. Removed chlorophyll *a* and pheophytin *a* from the list of parameters that will be analyzed only by Ana-Lab or LCRA.	ANRA's Laboratory has added these parameters to their scope of work
Table B2.1	15	Updated preservation temperature from <6°C (but not frozen) to ≤6°C (but not frozen). Replaced 200mL sample containers with 500mL sample containers	Updated preservation temperatures, and sample container size for Chlorophyll a / Pheophytin a
B2	16	Replaced 290 mL preferred bacteriological sample containers with 250 mL sample containers. Updated total chlorine concentration removed by sodium thiosulfate from 10 mg/L to 5 mg/L (for 120 mL bottles).	Updated sample containers size and chlorine concentration removed by sodium thiosulfate in 120 mL bottles
B3	18	Removed Number of containers, Was the sample filtered, and Bill of lading from the list of items to record on the COC. Removed chlorophyll *a* and pheophytin *a* from the list of parameters where Ana-Lab is the primary lab. Updated the Sample Handling steps for Ana-Lab and LCRA ELS to remove the chlorophyll filters procedure from Ana-Lab, and make the processes uniform between the labs.	The ANRA COC form has been updated and these items are no longer included. ANRA's Laboratory has added these parameters to their scope of work and will be the primary lab for chlorophyll *a* and pheophytin *a*. Ana-Lab will remain a secondary lab for these parameters. ANRA's Laboratory has added these parameters to their scope of work and will be the primary lab for chlorophyll *a* and pheophytin *a*.
Appendix A Table A7.2	20	Added PHEOPHYTIN-A UG/L FLUOROMETRIC METHOD and CHLOROPHYLL-A, FLUOROMETRIC METHOD, UG/L.	ANRA's Laboratory has added these parameters to their scope of work and will be the primary lab for chlorophyll *a* and pheophytin *a*. Ana-Lab and LCRA ELS will remain secondary labs for these parameters.

A6	13	Removed chlorophyll *a* and pheophytin *a* from the list of parameters that ANRA Environmental Laboratory will *not* perform analyses on. Removed chlorophyll *a* and pheophytin *a* from the list of parameters that will be analyzed only by Ana-Lab or LCRA.	ANRA's Laboratory has added these parameters to their scope of work

Detail of Changes

A1 Approval Page

Texas Commission on Environmental Quality

Water Quality Planning Division

Rebecca DuPont, Work Leader — Date
Clean Rivers Program

Rebecca DuPont, — Date
Acting Project Quality Assurance Specialist
Clean Rivers Program

Rebecca DuPont, Project Manager — Date
Clean Rivers Program

Cathy Anderson, Team Leader — Date
Data Management and Analysis

Monitoring Division

Dana Squires — Date
Lead CRP Quality Assurance Specialist

Angelina & Neches River Authority (ANRA)

Environmental Division – Clean Rivers Program

Carla Ethridge	Date
CRP Project Manager	
Melissa Garcia	Date
Quality Manager	
Jeremiah Poling	Date
Information Resources Manager	

Environmental Division – Environmental Laboratory

Sheri Smith	Date
Laboratory Manager	
Melissa Garcia	Date
Quality Manager	

Lower Colorado River Authority (LCRA)

Environmental Laboratory Services (ELS)

Dale Jurecka Date
Laboratory Manager

Angel Mata Date
Quality Manager

Jason Woods Date
Project Manager

Ana-Lab Corporation (Kilgore)

Bill Peery Technical Director	Date	Tracey Varvel Quality Manager	Date

Sub-tier participants (e.g., subcontractors, subparticipants, or other units of government) will sign the QAPP, indicating the organization's awareness of, and commitment to requirements contained in this quality assurance project plan and any amendments or added appendices of this plan. Signatures in section A1 will eliminate the need for adherence letters to be maintained.

A4 Project Task/Organization

Description of Responsibilities

TCEQ

Rebecca DuPont
CRP Work Leader
Responsible for Texas Commission on Environmental Quality (TCEQ) activities supporting the development and implementation of the Texas Clean Rivers Program (CRP). Responsible for verifying that CRP staff follow the TCEQ Quality Management Plan (QMP). Supervises TCEQ CRP staff. Reviews and responds to any deficiencies, corrective actions, or findings related to the area of responsibility. Oversees the development of Quality Assurance (QA) guidance for the CRP. Reviews and approves all QA audits, corrective actions, reports, work plans, contracts, QAPPs, and TCEQ Quality Management Plan. Enforces corrective action, as required, where QA protocols are not met. Ensures CRP personnel are fully trained.

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

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

Cathy Anderson
Team Leader, Data Management and Analysis (DM&A) Team
Participates in the development, approval, implementation, and maintenance of written QA standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Ensures DM&A staff perform data management-related tasks.

Sarah Kirkland
CRP Data Manager, DM&A Team
Responsible for coordination and tracking of CRP data sets from initial submittal through CRP Project Manager review and approval. Ensures that data are reported following instructions in the Data Management Reference Guide, December 2018 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).

Rebecca DuPont
Acting CRP Project Quality Assurance Specialist

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

ANRA

Carla Ethridge
CRP Project Manager

Responsible for implementing and monitoring CRP requirements in contracts, QAPPs, and QAPP amendments and appendices. Coordinates basin planning activities and work of basin partners. Ensures monitoring systems audits are conducted to ensure QAPPs are followed by ANRA 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.

Melissa Garcia
Quality Manager

Responsible for coordinating the implementation of the QA program. Responsible for writing and maintaining the QAPP and monitoring implementation of the QAPP. Responsible for maintaining records of QAPP distribution, including appendices and amendments. Responsible for maintaining written records of sub-tier commitment to requirements specified in this QAPP. Responsible for identifying, receiving, and maintaining project QA records. Responsible for coordinating with the TCEQ QAS to resolve QA-related issues. Notifies ANRA Project Manager of particular circumstances that 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.

Sheri Smith
Laboratory Manager

Responsible for overall performance, administration, and reporting of analyses performed by ANRA's Environmental Laboratory. 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 this 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.

Kimberly Wagner
Communications Director

Responsible for coordinating and conducting CRP sample collection in accordance with the basin coordinated monitoring schedule and the QAPP.

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

LCRA ELS

Dale Jurecka
Laboratory Manager
Responsible for overall performance, administration, and reporting of analyses performed by LCRA's Environmental Laboratory Services. Responsible for supervision of laboratory personnel involved in generating analytical data for the project. Ensures that laboratory personnel have adequate training and a thorough knowledge of this 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.

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

Jason Woods
Project Manager
Responsible for analyses performed by LCRA ELS for this project. Responsible for project setup in LIMS. Responsible for LCRA ELS laboratory and field staff correction action communication with the LCRA ELS Quality Officer. Makes LCRA ELS data available to the ANRA Data Manager. Notifies the LCRA ELS Quality Officer, ANRA Quality Officer and ANRA Project Manager of laboratory analysis issues that may invalidate data.

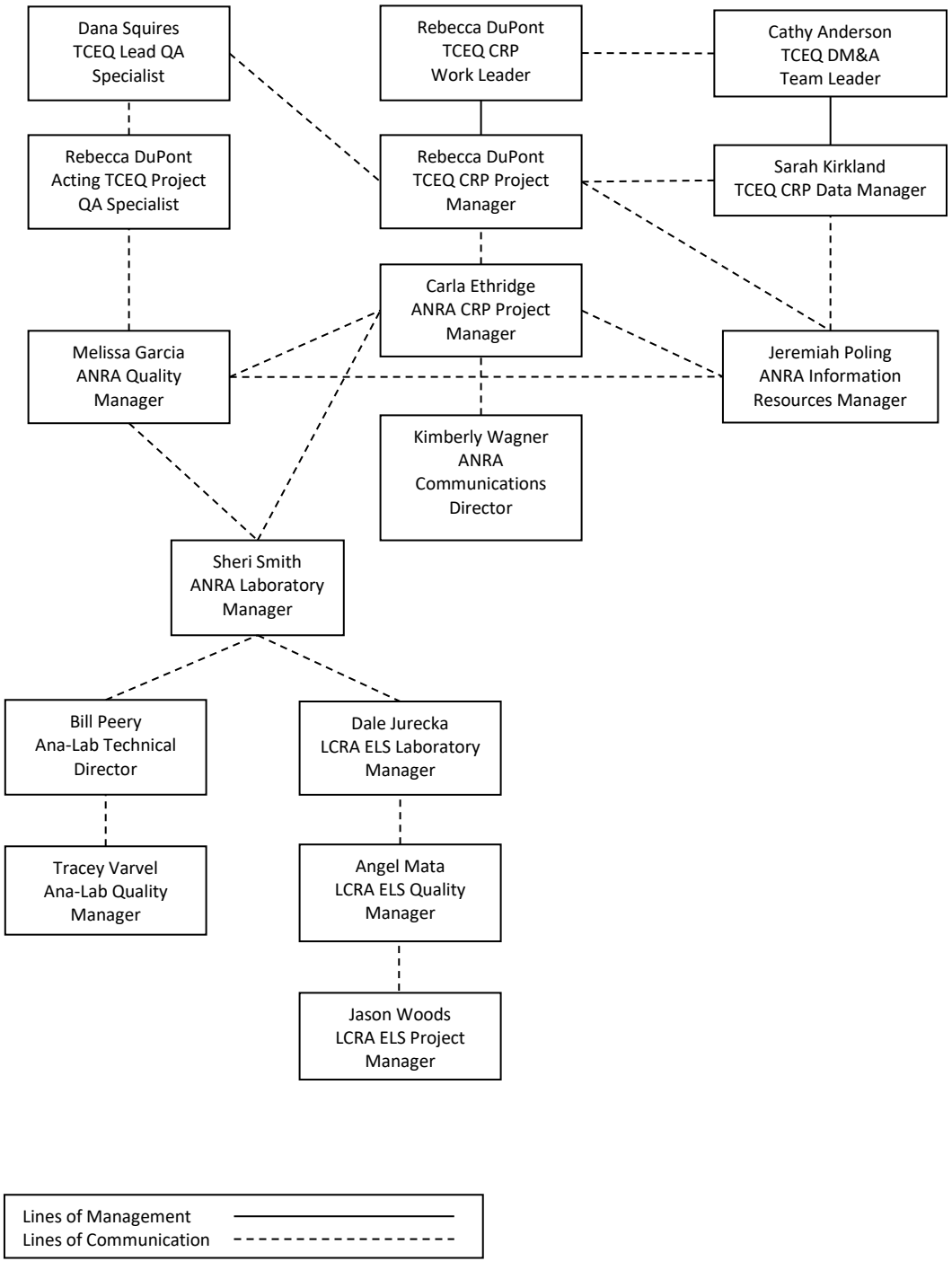
Ana-Lab

Bill Peery
Technical Director
Responsible for overall performance, administration, and reporting of analyses performed by Ana-Lab. 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 this 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.

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

Project Organization Chart

Figure A4.1. Organization Chart – Lines of Communication



A6 Project/Task Description

During the FY 2020-2021 biennium, ANRA's monitoring program will include routine (RT) monitoring across the basin.

This routine monitoring includes the following field parameters: pH, water temperature, dissolved oxygen, specific conductance, secchi depth (disc or tube measuring transparency), total water depth (at reservoir sites), instantaneous stream flow (at stream or river sites), flow severity, flow measurement method, days since last significant rainfall, present weather, and stream flow estimate (when instantaneous flow is not available).

This routine monitoring also includes the following bacteriological and conventional parameters analyzed in the laboratory:

- *Escherichia coli* (*E. coli)*
- Ammonia, as N
- Nitrate, as N (or combined Nitrate + Nitrite, as N when separate analyses cannot be completed)
- Nitrite, as N (or combined Nitrate + Nitrite, as N when separate analyses cannot be completed)
- Total Kjeldahl Nitrogen (TKN)
- Total Phosphorus
- Sulfate
- Chloride
- Total Suspended Solids
- Chlorophyll *a*
- Pheophytin *a*

ANRA Environmental Laboratory will perform the sample analyses for bacteriological and conventional parameters with the exceptions of Nitrate + Nitrite, as N and TKN.

Either Ana-Lab or LCRA ELS analyze all TKN and Nitrate + Nitrite samples. Ana-Lab and LCRA ELS will serve as alternate laboratories for the analysis of conventional parameters in their respective A7 tables in the event that sample analysis cannot be conducted at ANRA Environmental Laboratory (i.e. instrument failure, service or maintenance required, etc.).

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

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

Amendments to the QAPP

Revisions to the QAPP may be necessary to address incorrectly documented information or to reflect changes in project organization, tasks, schedules, objectives, and methods. The ANRA Project Manager will electronically direct requests for amendments will be directed from ANRA Project Manager to the CRP Project Manager electronically. ANRA 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 ANRA Project Manager, ANRA Quality Manager, CRP Project Manager, CRP Lead QA Specialist, TCEQ QA Manager or designee, 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.

The ANRA Project Manager will incorporate amendments into the QAPP by way of attachment, and distribute to personnel on the distribution list. If adherence letters are required, ANRA 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. ANRA 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 ANRA 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 ANRA Project Manager, ANRA Quality Manager, 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 ANRA to project participants before data collection activities commence. ANRA 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. ANRA will maintain this documentation as part of the project's QA records, and ensure that the documentation is available for review.

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 ANRA'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 Volume	Holding Time
TSS	Water	Plastic	≤6°C (but not frozen)	1000mL	7 days
Ammonia-N	Water	Plastic	Acidify with H_2SO_4 to pH<2, ≤6°C (but not frozen)	500mL	28 days
Nitrate + Nitrite-N	Water	Plastic	Acidify with H_2SO_4 to pH<2, ≤6°C (but not frozen)	500mL	28 days
Nitrate-N	Water	Plastic	≤6°C (but not frozen)	500mL	48 hours
Nitrite-N					48 hours
Chloride					28 days
Sulfate					28 days
Phosphorus, Total	Water	Plastic	Acidify with H_2SO_4 to pH<2, ≤6°C (but not frozen)	500mL	28 days
TKN	Water	Plastic	Acidify with H_2SO_4 to pH<2, ≤6°C (but not frozen)	500mL	28 days
Chlorophyll *a* / Pheophytin *a*	Water	Amber Plastic	≤6°C (but not frozen), keep in dark	500mL	Filter within 48 hours, and store frozen up to 24 days
E. coli	Water	Sterile Plastic	≤6°C (but not frozen); with sodium thiosulfate	100mL (minimum) 250mL (for duplicates)	8 hours (can be extended up to 30 hours when necessary *)

**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. Samples must be processed as soon as possible and within 30 hours from time of collection.

Sample Containers

ANRA maintains certificates from sample container manufacturers. The sample container types used for sampling are as follows:

- The preferred bacteriological sample containers are the sterile polyethylene 120 mL and 250 mL bottles with sodium thiosulfate. The bottles contain sufficient sodium thiosulfate to remove 5 mg/L (for 120 mL bottles) or 15 mg/L (for 250 mL bottles) of total chlorine.
- Amber containers are required for chlorophyll *a* sampling.
- Sample containers used for conventional parameters are purchased pre-cleaned and are disposable. Sample containers are either HDPE or LDPE.
- Sample containers are purchased from QEC, Environmental Express, IDEXX, or equivalent, provided QC requirements are met.

Processes to Prevent Contamination

SWQM Procedures outline the necessary steps to prevent contamination of samples, including adhering to the following criteria: direct collection into sample containers, when possible; use of certified containers for organics; and clean sampling techniques for metals.

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

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

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

Recording Data

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

- Write legibly, in indelible ink.
- 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 ANRA CRP Project Manager, in consultation with the ANRA Quality Manager, 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 TCEQ CRP Project Manager both verbally and in writing in the project progress reports, and by completion of a CAP.

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

B3 Sample Handling and Custody

Sample Tracking

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

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

- Site identification
- Analyses required
- Sample matrix
- Date and time of collection
- Preservative used
- Name of collector
- Custody transfer signatures, and dates and time of transfer

Sample Labeling

Label samples in the field with indelible ink. Label information must include:

- 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

ANRA field data sheets are supplied to all field personnel prior to initiation of collection procedures. The field data sheets have spaces dedicated to recording of all pertinent field observations and water quality parameters. The field staff has the prime responsibility to ensure that all pertinent information is recorded correctly and in the proper units.

The ANRA Sample Custodian examines all samples brought to the ANRA Environmental Laboratory for proper documentation, holding times, sample temperature, and preservation. The Sample Custodian accepts delivery by signing the final portion of the official COC submitted with the samples. The accepted samples are immediately logged into the laboratory LIMS and assigned a unique laboratory sample identification (ID) number. It is the responsibility of the sample custodian to login samples in the proper format, and to apply the unique laboratory sample ID number to the sample container. The sample custodian places the sample container in the proper laboratory refrigerator.

Ana-Lab will serve as the primary lab for TKN samples and as a backup for all other parameters in their A7 table in the event that the primary lab is unable to perform the required analysis. The sample custodian relinquishes samples to Ana-Lab for analysis, after first receiving, documenting, logging in, and labeling the sample containers. The sample custodian packs the samples on ice in a cooler to maintain a temperature between freezing and 6°C, seals the cooler containing the samples ad appropriate COC forms, and then schedules a pickup with the Ana-Lab courier. ANRA relinquishes the sealed cooler to the Ana-Lab courier, who receives it, transports it to Ana-Lab, and relinquishes it. Ana-Lab verifies the condition of the samples, receives the samples, and logs them into the LIMS.

LCRA ELS will serve as the primary lab for Nitrate Plus Nitrite analysis, and as a backup for all other parameters in their A7 table in the event that the primary lab is unable to perform the required analysis. The sample custodian relinquishes samples to LCRA ELS for analysis, after first receiving, documenting, logging in, and labeling the sample containers. The sample custodian packs the samples on ice in a cooler to maintain a temperature between freezing and 6°C, seals the cooler containing the samples and appropriate COC forms, then schedules a pickup with FedEx, UPS, or other appropriate shipping service/courier. ANRA relinquishes the sealed cooler to the courier, who receives it, transports it to LCRA ELS,

and relinquishes it. LCRA ELS verifies the condition of the samples, receives the samples, and logs them into the LIMS.

Proper sample custody is a joint effort of the field sampling staff, the sample transporter, and the laboratory staff. The main documentation of proper sample custody for all events up to the arrival of the sample at the laboratory is the chain-of-custody (COC) form (see Appendix B). If any information or signatures on the COC form are not completely filled out, there is a gap in the documentation of sample custody. In such an event, the laboratory sample custodian will question whether the sample should be accepted. Refer all data acceptance questions to the Laboratory Manager or Quality Manager.

The following procedures outline sample handling from collection to receipt of analytical results:

1. After transferring a sample into the proper sample container, tightly cap the container as quickly as possible to prevent the loss of volatile components and to exclude possible oxidation. Where appropriate, preserve samples in the field. Following field measurements, pack the samples on ice in a cooler to maintain a temperature between freezing and 6°C, and then transport to the laboratory as soon as possible.
2. Label the container with the proper laboratory sample identification number (a unique designation) on a label securely affixed to the container. Use a pen with waterproof ink when labeling the sample container and filling out the appropriate COC form.
3. Fill out the COC form completely and accurately.
4. Deliver samples requiring subcontractor lab analysis to Ana-Lab via courier service. Include the Ana-Lab COC form. The ANRA Laboratory relinquishes the COC gives it to the Ana-Lab courier (personnel authorized to receive samples). Fill in the date and time the ANRA Laboratory received the sample, along with the ANRA sample custodian relinquishment signature, before the Ana-Lab courier will accept the sample. The Ana-Lab analysis report includes copies of the complete COC forms.
5. Retain a copy of the COC forms for ANRA records, and store with the laboratory analysis reports and associated field sheet(s).

Appendix A: Measurement Performance Specifications

Table A7.2 Measurement Performance Specifications for the Angelina & Neches River Authority

Conventional Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD)	Bias %Rec. of LCS	Lab
RESIDUE, TOTAL NONFILTRABLE (MG/L)	mg/L	water	SM 2540D	00530	5	2.5	N/A	N/A	N/A	ANRA
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	SM 4500-NH3 D	00610	0.1	0.1	70-130	20	80-120	ANRA
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	ANRA
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	ANRA
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	EPA 365.1 (1993)	00665	0.06	0.02	70-130	20	80-120	ANRA
CHLORIDE (MG/L AS CL)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00940	5	5	70-130	20	80-120	ANRA
SULFATE (MG/L AS SO4)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00945	5	5	70-130	20	80-120	ANRA
PHEOPHYTIN-A UG/L FLUOROMETRIC METHOD	µg/L	water	EPA 445.0	32213	3	2	N/A	N/A	N/A	ANRA
CHLOROPHYLL-A, FLUOROMETRIC METHOD, UG/L	µg/L	water	EPA 445.0	70953	3	2	N/A	20	80-120	ANRA

Appendix B: ANRA Chain-of-Custody Form

ANRA
Angelina & Neches River Authority

2901 N. John Redditt Dr.
Lufkin, TX 75904
Phone: 936-632-7795
Website: www.anra.org

CHAIN-OF-CUSTODY RECORD

NELAP ACCREDITED TNI LABORATORY

SECTION A – CLIENT & SAMPLER INFORMATION		SECTION B – SAMPLE RECEIPT INFORMATION (LAB USE ONLY)		
Client Name		Temperature, °C:	Observed: / Corrected:	Receipt #:
Project Name		Thermometer ID / Correction Factor:	THERM- / CF:	Client Notification:
Phone #		Preservative & pH paper Standard ID #s:		Comments:
Sampler Name		Subcontract Lab / PO #:	Sub Lab: PO #:	

SECTION C – SAMPLE CONTAINERS AND PRESERVATION		SECTION D – INSTRUCTIONS/KEYS	
Container Letter		Label each individual sample container with a letter (A, B, C, etc.). If multiple analyses come from the same container, assign them the same letter, or write them in the same column.	Matrix Codes: DW = Drinking Water, NP = Non-Potable Water, S = Soil, SL = Sludge
Container Type		Container Type Codes: A = Amber, AG = Amber Glass, G = Glass, P = Plastic, S = Sterile, V = Vial	
Preservative		Preservative Codes: 1 = None, 2 = Sulfuric Acid (H_2SO_4), 3 = Sodium Thiosulfate ($Na_2S_2O_3$), 4 = Nitric Acid (HNO_3), 5 = Sodium Hydroxide (NaOH), 6 = Hydrochloric Acid (HCl)	Sample Type Codes: C = Composite, G = Grab, SP = Special (DW matrix only)

SECTION E – SAMPLE INFORMATION AND ANALYSES REQUESTED												SECTION F – FIELD ANALYSES/INFORMATION				SECTION G – SAMPLE ID	
												Enter the applicable parameters in the fields below.				LAB USE ONLY	
Item #	Sample Description	Analyses						Matrix (see Section D)	Sample Type (see Section D)	Collection Date	Collection Time					pH of preserved containers (e.g. A <2)	Work Order #: / Sample ID #s
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

SECTION H – COMPOSITE DATA (if Composite marked above)				SECTION I – TRANSFER OF SAMPLE CUSTODY					
	Date	Time	Totalizer	Relinquished by (Signature)	Date	Time	Transported on ice	Received by (Signature)	Date	Time
Start							☐ Yes ☐ No			
End							☐ Yes ☐ No			
Total Flow (MGD)							☐ Yes ☐ No			

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NOTE: Section I – Transfer of Sample Custody must reflect all transfers from sample collection to receipt at the ANRA Environmental Laboratory.
NOTE: Chain-of-Custody must be completed by the customer (or corrected, if needed, at the time of sample drop-off) before ANRA staff will accept samples and sign the COC as received.

Clear Form