Trinity River Authority of Texas
Clean Rivers Program
Quality Assurance Project Plan

Trinity River Authority
5300 South Collins
Arlington, TX 76018
P.O. Box 60
Arlington, TX 76004

Clean Rivers Program
Monitoring Operations Division
Texas Commission on Environmental Quality
P.O. Box 13087, MC 165
Austin, Texas 78711-3087

Effective Period: FY 2008 to FY 2009

Questions concerning this quality assurance project plan should be directed to:

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Trinity River Authority
Clean Rivers Program Coordinator
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A1 APPROVAL PAGE

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Monitoring Operations Division

Patrick Roques, Manager Date
Water Quality Monitoring & Assessment Section

Laurie Curra, Manager Date
Clean Rivers Program

Jennifer Delk Date
Project QA Specialist
Clean Rivers Program

Eric Reese Date
Project Manager, Clean Rivers Program

Compliance Support Division

Stephen Stubbs Date
TCEQ Quality Assurance Manager

Daniel R. Burke Date
Lead CRP Quality Assurance Specialist
Quality Assurance Section

TRINITY RIVER AUTHORITY

Dr. Richard Browning Date
TRA Senior Project Manager

Angela Kilpatrick Date
TRA Project Manager

Webster Mangham Date
TRA Quality Assurance Officer

Cynthia Makowsky Date
TRA Data Manager

LABORATORIES

Craig Harvey Date
TRA CRWS Lab Manager

Cathy Henderson-Sieger Date
TRA CRWS Quality Assurance Officer

Mike Knight Date
TRA LLP Lab Manager

Thresa Aguayo Date
TRA LLP Lab Quality Assurance Officer

Thomas Venables Date
TRAC Lab Manager

Katie Mustonen Date
TRAC Lab Quality Assurance Officer

Erik Irwin Date
City of Arlington Lab Manager
and Quality Assurance Officer

Vicki Stokes Date
City of Fort Worth Lab Manager and Quality
Assurance Officer

The Trinity River Authority will secure written documentation from each sub-tier project participant (e.g., subcontractors, other units of government) stating the organization's awareness of and commitment to requirements contained in this quality assurance project plan and any amendments or added appendices of this plan. The Trinity River Authority will maintain this documentation as part of the project's quality assurance records, and will be available for review. (See sample letter in Attachment 1 of this document.)

A2 TABLE OF CONTENTS

LIST OF ACRONYMS

AWRL	**Ambient Water Reporting Limit**
BMP	**Best Management Practices**
CAR	**Corrective Action Report**
COC	**Chain of Custody**
CRP	**Clean Rivers Program**
DOC	**Demonstration of Capability**
DQO	**Data Quality Objective**
EPA	**United States Environmental Protection Agency**
FY	**Fiscal Year**
LCS	**Laboratory Control Sample (formerly Laboratory Control Standard)**
LCSD	**Laboratory Control Sample Duplicate (formerly Laboratory Control Standard Duplicate)**
LOD	**Limit of Detection (formerly Method Detection Limit or MDL)**
LOQ	**Limit of Quantitation (formerly Reporting Limit)**
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**
RBP	**Rapid Bioassessment Protocol**
RWA	**Receiving Water Assessment**
SOP	**Standard Operating Procedure**
SWQM	**Surface Water Quality Monitoring**
SWQMIS	**Surface Water Quality Monitoring Information System (formerly TRACS)**
TMDL	**Total Maximum Daily Load**
TCEQ	**Texas Commission on Environmental Quality**
TSWQS	**Texas Surface Water Quality Standards**
VOA	**Volatile Organic Analytes**
WMT	**Watershed Management Team**

A3 DISTRIBUTION LIST

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

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Clean Rivers Program
MC-165
(512) 239-2611

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Dr. Richard Browning, Senior Project Manager
817-493-5176

Angela Kilpatrick, Project Manager
817-493-5179

Webster Mangham, Quality Assurance Officer
817-493-5139

Cynthia Makowsky, Data Manager
817-493-5127

The Trinity River Authority 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, other units of government. The Trinity River Authority will document distribution of the plan and any amendments and appendices, maintain this documentation as part of the project's quality assurance records, and will be available for review.

A4 PROJECT/TASK ORGANIZATION

Description of Responsibilities

TCEQ

Laurie Curra
CRP Manager

Responsible for TCEQ activities supporting the development and implementation of the Texas Clean Rivers Program. Responsible for verifying that the QMP is followed by CRP staff. Supervises TCEQ CRP staff. Reviews and responds to any deficiencies, nonconformances, or findings related to the area of responsibility. Oversees the development of QA guidance for the CRP. Reviews and approves all QA audits, corrective actions, reviews, reports, work plans, contracts, QAPPs, and program QMP. Enforces corrective action, as required, where QA protocols are not met. Ensures CRP personnel are fully trained.

Daniel R. Burke
CRP Lead Quality Assurance Specialist

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

Eric Reese
CRP Project Manager

Responsible for the development, implementation, and maintenance of CRP contracts. Tracks deliverables. Participates in the development, approval, implementation, and maintenance of written quality assurance standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Assists CRP Lead QA Specialist in conducting Basin Planning Agency audits. Verifies QAPPs are being followed by 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.

Eric Reese
CRP Data Manager

Responsible for coordination and tracking of CRP data sets from initial submittal through CRP Project Manager review and approval. Performs automated data validation routines and coordinates error correction. Provides quality assured data sets to TCEQ Information Resources in compatible formats for uploading to the statewide database. Generates reports to assist CRP Project Managers= data review. Provides training and guidance to CRP and Planning Agencies on technical data issues. Reviews and approves data-related portions of program QMP and project-specific QAPPs. Develops and maintains Standard Operating Procedures for CRP data management.

Jennifer Delk
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 quality assurance standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Serves on planning team for CRP special projects. Coordinates documentation and implementation of corrective action for the CRP.

TRINITY RIVER AUTHORITY

Dr. Richard Browning
TRA Senior Project Manager

Responsible for implementing CRP requirements in the contract.

Angela Kilpatrick
TRA 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 TRA CRP participants and that projects are producing data of known quality. Ensures that subcontractors are qualified to perform contracted work. Ensures CRP project managers and/or QA Specialists are notified of deficiencies and nonconformances, and that issues are resolved. Responsible for validating that data collected are acceptable for reporting to the TCEQ.

Webster Mangham
TRA Quality Assurance Officer

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 quality assurance records. Responsible for coordinating with the TCEQ QAS to resolve QA-related issues. Notifies the TRA Project Manager of particular circumstances which may adversely affect the quality of data. Coordinates and monitors deficiencies, nonconformances 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 are properly trained and that training records are maintained.

Cynthia Makowsky
TRA Data Manager

Responsible for ensuring that field data are properly reviewed and verified. Responsible for the transfer of basin quality-assured water quality data to the TCEQ in a format compatible with SWQMIS (formerly the SWQM portion of the TRACS database). Maintains quality-assured data on the TRA internet site.

WITHIN BASIN PARTICIPATING AGENCIES

Field Team Leaders
(To Remain Unnamed)

Field team leaders are responsible for ensuring that field samples and measurements are collected and recorded according to methodologies detailed in this QAPP. Field team leaders will be instructed on appropriate sampling techniques, and will ensure that such techniques are utilized. They will have primary responsibility for initiating corrective actions in the field in support of data completeness goals of 90%. Field team leaders will ensure proper use of field notebooks, proper calibration of equipment, and that chain of custody forms are correctly completed and received by the laboratory.

Field Team Members
(To Remain Unnamed)

Will work under the direction of field team leaders as necessary to ensure integrity of samples and field measurements. Will be responsible for following sampling and field measurement methodologies detailed in this QAPP.

Project Managers
Mike Knight, TRA Lake Livingston (LLP)
Mark Ernst, Tarrant Regional Water District (TRWD) Western Division
Darrel Andrews, TRWD Eastern Division
Bob Webber, City of Arlington
Terry Hodgins, City of Dallas
Vicki Stokes, City of Fort Worth
T. Sury, City of Grand Prairie
Dan McMahon, City of Irving

The project managers are responsible for all CRP related activities conducted by their respective agencies. The project managers will oversee field teams, assuring that all are properly trained and that CRP related sampling activities are conducted in manners consistent with procedures detailed in this QAPP. The project managers will also oversee submittal of water quality samples to the contract laboratory as appropriate and will be responsible for confirming that requested analyses are carried out. Ensures that field staff are properly trained and that training records are maintained.

Laboratory Managers
Craig Harvey, TRA Central Regional Wastewater System (CRWS) Laboratory
Mike Knight, TRA LLP
Thomas Venables, TRAC Laboratory (contract laboratory for TRWD)
Erik Irwin, City of Arlington Laboratory
Vicki Stokes, City of Fort Worth

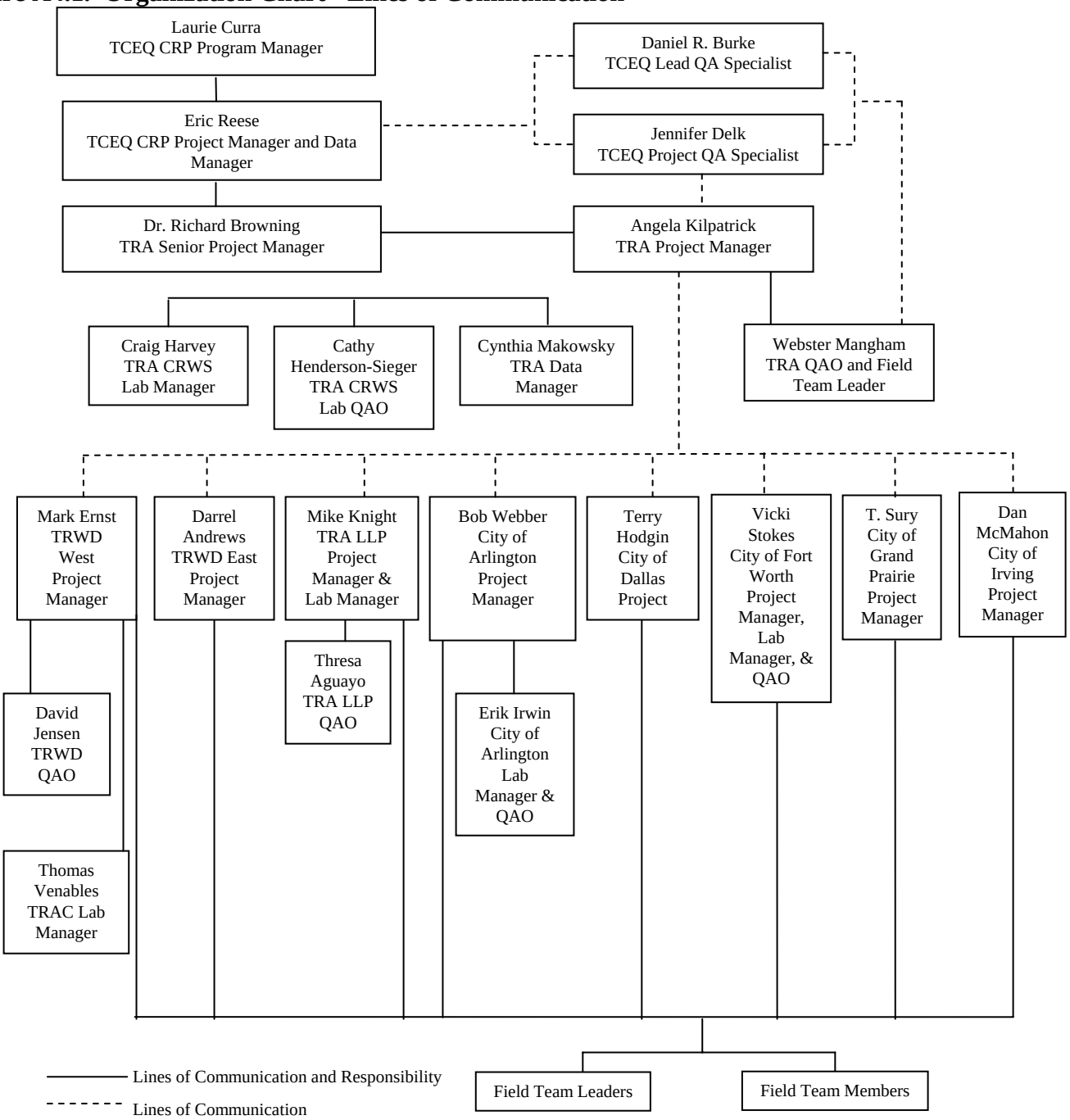
The laboratory managers will oversee all analytical work performed at their respective laboratories to assure that proper and appropriate clean analytical techniques are utilized. When quality assurance issues arise in the laboratory, the laboratory managers will be responsible for initiating corrective actions and for notifying the QAO of any such issues. The laboratory managers will also maintain the laboratory's QA records and analysts' training records.

Sub-Tier Quality Assurance Officers
Cathy Henderson-Sieger, TRA CRWS Laboratory
Thresa Aguayo, TRA LLP
David Jensen, TRWD
Erik Irwin, City of Arlington Laboratory
Katie Mustonen, TRAC Laboratory
Vicki Stokes, City of Fort Worth

The quality assurance officers are responsible for ensuring the quality of data submitted to the TRA by their respective agencies. The quality assurance officers are also responsible for validation of data prior to submission to the TRA and will coordinate with TRA QAO to resolve QA related issues.

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 commission rules for surface water quality monitoring 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 Trinity River Authority 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 *Quality Management Plan for the Clean Rivers Program* (most recent version).

The purpose of this QAPP is to clearly delineate TRA CRP QA policy, management structure, and procedures which will be used to implement the QA requirements necessary to verify and validate the surface water quality data collected. The QAPP is reviewed by the TCEQ to help ensure that data generated for the purposes described above are scientifically valid and legally defensible. This process will ensure that data collected under this QAPP and submitted to the statewide database have been collected and managed in a way that guarantees its reliability and therefore can be used in water quality assessments and other programs deemed appropriate by the TCEQ. Project results will be used to support the achievement of Clean Rivers Program objectives as contained in the Clean Rivers *Program Guidance and Reference Guide* FY 2008 -2009.

The Trinity River Authority recognizes that there exists, within the Trinity River basin, a great number of agencies performing routine water quality sampling for their own objectives outside of the Clean Rivers Program. Basin maps can be found in Appendix B. These agencies generate a wealth of data concerning Trinity River water quality. It is therefore the objective of this agency to seek to obtain data from existing programs in lieu of establishing a basin-wide CRP water quality sampling program. This avoids duplication of effort and fosters communication and sharing of data between basin water agencies. Towards this end, the TRA CRP will coordinate closely with local agencies conducting water quality sampling programs. Although the sampling conducted by the Within-Basin Participating Agencies (WBPAs) is quite comprehensive, the Main Stem of the Trinity River from Fort Worth to Oakwood was left relatively unsampled. TRA began monitoring this stretch of the river in-house in order to more completely monitor the basin. The participation of the Within-Basin Participating Agencies is strictly voluntary, and it is recognized by both the Trinity River Authority of Texas and the Texas Commission on Environmental Quality that the programs conducted by WBPAs exist for purposes independent of the Clean Rivers Program. At the same time, it is recognized that the CRP must generate data of a known quality in order for such data to be used by the TCEQ in a regulatory capacity. This QAPP details the standards which will be maintained in order to ensure quality data is being generated for and by this program. Procedures not directly specified as varying between sampling entities will hold true for all WBPAs and subcontractors. It is not the desire of the TRA CRP to dictate policy, only establish minimum criteria for acceptability of data under the Clean Rivers Program. Should WBPAs or the TRA Project Manager or the TCEQ CRP Project Manager determine that minimum criteria established by this QAPP are not being met for specific parameters, data generated concerning those parameters will not be submitted to TCEQ. WBPAs are under no obligation whatsoever to modify their current practices in order to comply with criteria herein set forth

although failure to do so may result in data not being submitted to TCEQ. This QAPP will initially address the routine water quality monitoring practices of the Tarrant Regional Water District, the Lake Livingston Project, the City of Arlington, the City of Dallas, the City of Fort Worth, the City of Grand Prairie, the City of Irving, and TRA's In-House Monitoring; other WBPAs may be added at a later date in the form of amendments to this QAPP.

It shall be the responsibility of the Project Manager of WBPAs or subcontractors employed by the Trinity River Authority to ensure that laboratories used maintain adequate quality controls as specified in this document. Towards the end of assuring that guidelines set forth in this QAPP are being met, the TRA CRP QAO shall conduct monitoring system audits on subcontractors and WBPAs. Such audits will be limited to activities generating data covered by this QAPP. Any non-compliance issues will be presented in writing to appropriate personnel. WBPAs are under no obligations to adopt suggested changes resulting from an audit. Failure to address compliance issues could however, invalidate some or all data being generated for the CRP. Such data, at the discretion of the TRA Project Manager, may be withheld from the TCEQ's state-wide database.

A6 PROJECT/TASK DESCRIPTION

Entities which will be collecting routine data include Tarrant Regional Water District, TRA's Lake Livingston Project, the City of Arlington, the City of Dallas, the City of Fort Worth, the City of Irving and TRA's Main Stem Monitoring. In all, this QAPP covers sampling activities at approximately 200 sites with a total of more than 70 different parameters. These parameters are sampled at various locations and frequencies (see Appendix B for a detailed list of routine monitoring stations and parameter groups to be monitored this fiscal year).

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

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

Amendments to the QAPP

Revisions to the QAPP may be necessary to address incorrectly documented information or to reflect changes in project organization, tasks, schedules, objectives, and methods. Requests for amendments will be directed from the TRA Project Manager to the CRP Project Manager electronically. Amendments are effective immediately upon approval by the TRA Project Manager, the TRA QAO, the TRA Data Manager, the CRP Project Manager, the CRP Lead QA Specialist, and the CRP Project QA Specialist. They will be incorporated into the QAPP by way of attachment and distributed to personnel on the distribution list by the TRA Project Manager.

Special Project Appendices

Projects requiring QAPP appendices will be planned in consultation with the Trinity River Authority 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 TRA Project Manager, the TRA QAO, the TRA Data Manager, and the CRP Project Manager, the CRP Project QA Specialist, the CRP Lead QA Specialist and other TCEQ personnel as appropriate. Copies of approved QAPPs appendices will be distributed by the Trinity River Authority to project participants before data collection activities commence.

A7 QUALITY OBJECTIVES AND CRITERIA

The purpose of routine water quality monitoring is to collect surface water quality data needed for conducting water quality assessments in accordance with TCEQ's *Guidance for Assessing Texas Surface and Finished Drinking Water Quality Data*. 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. Parameters other than those needed for assessments (metals, diel monitoring, other nutrients and conventionals) will be collected by WBPAs and submitted to TCEQ under this QAPP. These parameters are collected due to the fact that the WBPAs have monitoring objectives outside of the Clean Rivers Program, such as watershed protection and permitting.

Systematic watershed monitoring is defined by 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, monitor at sites to check the water quality situation, and investigate areas of potential concern. 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 TRA 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 Tables A7.1 to A7.8 and in the text following.

Ambient Water Reporting Limits (AWRLs)
The AWRL establishes the reporting specification at **or below** which data for a parameter must be reported to be compared with freshwater screening criteria. The AWRLs specified in Tables A7.1 to A7.8 are the program-defined reporting specifications for each analyte and yield data acceptable for the TCEQ's water quality assessment. The limit of quantitation (formerly known as the reporting limit) is the minimum level, concentration, or quantity of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The following requirements must be met in order to report results to the CRP:

- **The laboratory's LOQ for each analyte must be at or below the AWRL as a matter of routine practice**
- **The laboratory must demonstrate its ability to quantitate at its LOQ for each analyte by running an LOQ check standard for each batch of CRP Samples are analyzed.**

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.

Field splits are used to assess the variability of sample handling, preservation, and storage, as well as the analytical process, and are prepared by splitting samples in the field. Control limits for field splits are defined in Section B5.

Laboratory precision is assessed by comparing replicate analyses of laboratory control samples in the sample matrix (e.g. deioinized water, sand, commercially available tissue)or sample/duplicate pairs in the case of bacterial analysis. Precision results are compared against measurement performance specifications and used during evaluation of analytical performance. Program-defined measurement performance specifications for precision are defined in Tables A7.1 to A7.8.

Bias

Bias is a statistical measurement of correctness and includes multiple components of systematic error. A measurement is considered unbiased when the value reported does not differ from the true value. Bias is determined through the analysis of laboratory control samples and LOQ Check Standards prepared with verified and known amounts of all target analytes in the sample matrix (e.g. deioinized 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 Tables A7.1 to A7.8.

Representativeness

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

Comparability

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

Completeness

The completeness of the data is basically a relationship of how much of the data is 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.

Table A7.1 - Measurement Performance Specifications for Tarrant Regional Water District

PARAMETER	UNITS	MATRIX	METHOD	STORET	AWRL	Limit of Quantification (LOQ)	PRECISION (RPD of LCS/LCSD)	BIAS %Rec. of LCS	LOQ CHECK STANDARD % Rec	LAB	PC
FIELD											
Temperature, Water	° C	water	EPA 170.1 and TCEQ SOP, V1	00010	NA*	NA	NA	NA	NA	Field	RT
Flow	χϕσ	water	TCEQ SOP, V1	00061	NA*	NA	NA	NA	NA	Field	RT
Stream Stage	feet	water	TCEQ SOP, V1	00065	NA*	NA	NA	NA	NA	Field	RT
Secchi Depth	meters	water	TCEQ SOP, V1	00078	NA*	NA	NA	NA	NA	Field	RT
Conductivity	uS/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA*	NA	NA	NA	NA	Field	RT
DO	mg/L	water	EPA 360.1 and TCEQ SOP, V1	00300	NA*	NA	NA	NA	NA	Field	RT
pH	pH/ units	water	EPA 150.1 and TCEQ SOP, V1	00400	NA*	NA	NA	NA	NA	Field	RT
Flow severity	1-no flow, 2-low, 3-normal, 4-flood, 5-high, 6-dry	water	TCEQ SOP, V1	01351	NA*	NA	NA	NA	NA	Field	RT
Flow Measurement Method	1-gage, 2-electric, 3-mechanical, 4-weir/flume, 5-doppler	water	TCEQ SOP, V1	89835	NA*	NA	NA	NA	NA	Field	RT
Days since last significant rainfall	days	NA	TCEQ SOP, V1	72053	NA*	NA	NA	NA	NA	Field	RT, IS
CONVENTIONALS/NUTRIENTS											
Alkalinity, Total	mg/L	water	EPA 310.1	00410	20	5	20	NA	NA	TRAC	RT
TSS	mg/L	water	EPA 160.2	00530	4	4	20	80-120	NA	TRAC	RT
Ammonia-N, total	mg/L	water	EPA 350.1	00610	0.1	0.02	20	80-120	70-130	TRAC	RT
Total Kjeldahl Nitrogen	mg/L	water	EPA 351.2	00625	0.2	0.2	20	80-120	70-130	TRAC	RT
Nitrate/nitrite-N, total	mg/L	water	EPA 353.3	00630	0.05	0.005	20	80-120	70-130	TRAC	RT
Total Phosphorous-P	mg/L	water	EPA 365.2	00665	0.06	0.01	20	80-120	70-130	TRAC	RT
Total Dissolved Phosphorus	mg/L	water	EPA 365.2	00666	0.06	0.01	20	80-120	70-130	TRAC	RT
Dissolved O-phosphate-P	mg/L	water	EPA 365.2	70507	0.04	0.005	20	80-120	70-130	TRAC	RT
TOC	mg/L	water	EPA 415.1	00680	2	1	NA	NA	NA	TRAC	RT
DOC	mg/L	water	EPA 415.2	00681	1	1	20	80-120	70-130	TRAC	RT
Chloride	mg/L	water	EPA 325.2	00940	5	5	20	80-120	70-130	TRAC	RT
Sulfate	mg/L	water	EPA 375.4	00945	5	1	20	80-120	70-130	TRAC	RT
Chlorophyll-a, spectrophotometric method	ug/L	water	SM 10200 H	32211	3	0.5	20	80-120	NA	TRAC	RT
TDS	mg/L	water	EPA 160.1	70300	10	10	20	80-120	NA	TRAC	RT
CBOD5	mg/L	water	EPA 405.1	80082	2	1	20	NA	NA	TRAC	RT
Algal Enumeration	#/mL	water	SM 10200 F	95999	NA	1	NA	NA	NA	TRAC	RT
BACTERIOLOGICAL											
E. coli, IDEXX Colilert	MPN/100ml	water	SM 9223-B	31699	1	1	0.5****	NA	NA	TRAC	RT

METALS											
Calcium, Total	mg/L	water	EPA 215.1	00916	0.5	0.31	20	80-120	70-130	TRAC	RT
Magnesium, Total	mg/L	water	EPA 242.1	00927	0.5	0.5	20	80-120	70-130	TRAC	RT
Sodium, Total	mg/L	water	EPA 273.1	00929	NA	0.10	20	80-120	70-130	TRAC	RT
Potassium, Total	mg/L	water	EPA 258.1	00937	NA	0.50	20	80-120	70-130	TRAC	RT
Arsenic, Total	ug/L	water	EPA 206.2	01002	5	1	20	80-120	70-130	TRAC	RT
Iron, Total	ug/L	water	EPA 236.1	01045	300	125	20	80-120	70-130	TRAC	RT
Manganese, Total	ug/L	water	EPA 243.1	01055	50	10	20	80-120	70-130	TRAC	RT
Lead, Dissolved	ug/L	water	EPA 239.2	01049	1	1.0	20	80-120	70-130	TRAC	RT
Cadmium, Dissolved	ug/L	water	EPA 213.2	01025	0.3	0.1	20	80-120	70-130	TRAC	RT
Chromium, Dissolved	ug/L	water	EPA 218.2	01030	10	1.0	20	80-120	70-130	TRAC	RT
Arsenic, Dissolved	ug/L	water	EPA 206.2	01000	5	1	20	80-120	70-130	TRAC	RT

* Reporting to be consistent with SWQM guidance and based on measurement capability.

**** Based on a range statistic as described in Standard Methods, 20th Edition, Section 9020-B, AQuality Assurance/Quality Control - Intralaboratory Quality Control Guidelines. This criterion applies to bacteriological duplicates with concentrations >10 MPN/100mL or >10 organisms/100mL.

References for Table A7.1:

United States Environmental Protection Agency (USEPA) AMethods 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), AStandard Methods for the Examination of Water and Wastewater,@ 20th Edition, 1998.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2003 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data, 2005 (RG-416)

American Society for Testing and Materials (ASTM) Annual Book of Standards, Vol. 11.02

Table A7.2 - Measurement Performance Specifications for Lake Livingston Project

PARAMETER	UNITS	MATRIX	METHOD	STORET	AWRL	Limit of Quantification (LOQ)	PRECISION (RPD of LCS/LCSD)	BIAS %Rec. of LCS	LOQ CHECK STANDARD % Rec	LAB	PC
FIELD											
Temperature, Water	° C	water	EPA 170.1 and TCEQ SOP, V1	00010	NA*	NA	NA	NA	NA	Field	RT
Temperature, Air	° C	air	EPA 170.1 and TCEQ SOP, V1	00020	NA*	NA	NA	NA	NA	Field	RT
Flow	cfs	water	TCEQ SOP, V1	00061	NA*	NA	NA	NA	NA	Field	RT
Secchi Depth	meters	water	TCEQ SOP, V1	00078	NA*	NA	NA	NA	NA	Field	RT
Conductivity	uS/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA*	NA	NA	NA	NA	Field	RT
DO	mg/L	water	EPA 360.1 and TCEQ SOP, V1	00300	NA*	NA	NA	NA	NA	Field	RT
pH	pH/ units	water	EPA 150.1 and TCEQ SOP, V1	00400	NA*	NA	NA	NA	NA	Field	RT
Flow severity	1-no flow, 2-low, 3-normal, 4-flood, 5-high, 6-dry	water	TCEQ SOP, V1	01351	NA*	NA	NA	NA	NA	Field	RT
Days since last significant rainfall	days	NA	TCEQ SOP, V1	72053	NA*	NA	NA	NA	NA	Field	RT
Flow Measurement Method	1-gage, 2-electric, 3-mechanical, 4-weir/flume, 5-doppler	water	TCEQ SOP, V1	89835	NA*	NA	NA	NA	NA	Field	RT
DISSOLVED OXYGEN, 24-HOUR MIN. (MG/L) MIN. 4 MEA	mg/L min	water	TCEQ SOP, V1	89855	NA	NA	NA	NA	NA	Field	BS
DISSOLVED OXYGEN, 24-HOUR MAX. (MG/L) MIN. 4 MEA	mg/L max	water	TCEQ SOP, V1	89856	NA	NA	NA	NA	NA	Field	BS
DISSOLVED OXYGEN, 24-HOUR AVG. (MG/L) MIN. 4 MEA	mg/L avg	water	TCEQ SOP, V1	89857	NA	NA	NA	NA	NA	Field	BS
DISSOLVED OXYGEN, NUMBER MEASUREMENTS DURING 24-	count	water	TCEQ SOP, V1	89858	NA	NA	NA	NA	NA	Field	BS
TEMPERATURE, WATER (DEGREES CENTIGRADE) 24HR MIN	° C min	water	TCEQ SOP, V1	00211	NA	NA	NA	NA	NA	Field	BS
WATER TEMPERATURE, DEGREES CENTIGRADE, 24HR MAX	° Cmax	water	TCEQ SOP, V1	00210	NA	NA	NA	NA	NA	Field	BS
TEMPERATURE, WATER (DEGREES CENTIGRADE, 24HR AVG	° C avg	water	TCEQ SOP, V1	00209	NA	NA	NA	NA	NA	Field	BS

WATER TEMPERATURE, # OF MEASUREMENTS IN 24-HRS	count	water	TCEQ SOP, V1	00221	NA	NA	NA	NA	NA	Field	BS
SPECIFIC CONDUCTANCE, UMHOS/CM, FIELD, 24HR MIN	umhos/cm min	water	TCEQ SOP, V1	00214	NA	NA	NA	NA	NA	Field	BS
SPECIFIC CONDUCTANCE, UMHOS/CM, FIELD, 24HR MAX	umhos/cm max	water	TCEQ SOP, V1	00213	NA	NA	NA	NA	NA	Field	BS
SPECIFIC CONDUCTANCE, UMHOS/CM, FIELD, 24HR AVG	umhos/cm avg	water	TCEQ SOP, V1	00212	NA	NA	NA	NA	NA	Field	BS
SPECIFIC CONDUCTANCE, # OF MEASUREMENTS IN 24-HR	count	water	TCEQ SOP, V1	00222	NA	NA	NA	NA	NA	Field	BS
PH, S.U., 24HR, MINIMUM VALUE	SU min	water	TCEQ SOP, V1	00216	NA	NA	NA	NA	NA	Field	BS
PH, S.U., 24HR MAXIMUM VALUE	SU max	water	TCEQ SOP, V1	00215	NA	NA	NA	NA	NA	Field	BS
pH, NUMBER OF MEASUREMENTS IN 24-HRS	count	water	TCEQ SOP, V1	00223	NA	NA	NA	NA	NA	Field	BS
CONVENTIONALS/NUTRIENTS											
Alkalinity, total	mg/L	water	SM 2320 B	00410	20	20	20	NA	NA	LLP	RT
TSS	mg/L	water	SM 2540 D	00530	4	4	20	80-120	NA	LLP	RT
Ammonia-N, total	mg/L	water	SM 4500 NH3 D/ SM 4500 NH3 H	00610	0.1	0.1 / 0.02	20	80-120	70-130	LLP/ TRA	RT
Nitrite-N	mg/L	water	EPA 300.0/ SM 4500 NO3 F	00615	0.05	0.05 / 0.02	20	80-120	70-130	LLP/ TRA	RT
Nitrate-N, total	mg/L	water	EPA 300.0/ SM 4500-NO3 E	00620	0.05	0.05 / 0.04	20	80-120	70-130	LLP/ TRA	RT
Nitrate/nitrite-N, total	mg/L	water	SM 4500 NO3 H	00630	0.05	0.05 / 0.04	20	80-120	70-130	LLP/ TRA	RT
Total Kjeldahl Nitrogen	mg/L	water	SM 4500 NH3 C	00625	0.2	0.2	20	80-120	70-130	TRA	RT
Total Phosphorous	mg/L	water	SM 4500 P E	00665	0.06	0.06	20	80-120	70-130	LLP	RT
Dissolved O-phosphate-P	mg/L	water	SM 4500 P E and EPA 300.0	00671	0.04	0.04	20	80-120	70-130	LLP	RT
Hardness, total (as CaC03)	mg/L	water	SM 2340 C	00900	5	5	20	80-120	NA	LLP	RT
Chloride	mg/L	water	EPA 300.0	00940	5	5	20	80-120	70-130	LLP	RT
Sulfate	mg/L	water	EPA 300.0	00945	5	5	20	80-120	70-130	LLP	RT
Chlorophyll-a, spectrophotometric method	ug/L	water	SM 10200-H	32211	3	3	20	80-120	NA	LLP	RT
TDS	mg/L	water	SM 2540 C	70300	10	10	20	80-120	NA	LLP	RT
BACTERIOLOGICAL											
Total Coliform	org/100mL	water	Colilert®	31501	1	1	0.5****	NA	NA	LLP	RT
Fecal coliform	org/100mL	water	SM 9222-D	31616	1	1	0.5****	NA	NA	LLP	RT
E. coli, IDEXX Colilert	MPN/100ml	water	Colilert®	31699	1	1	0.5****	NA	NA	LLP	RT

METALS											
Arsenic, Dissolved	ug/L	water	SM 3113 B	01000	5	5	20	80-120	70-130	LLP	RT
Arsenic, Total	ug/L	water	SM 3113 B	01002	5	5	20	80-120	70-130	LLP	RT
Cadmium, Dissolved	ug/L	water	SM 3113 B	01025	0.3	0.3	20	80-120	70-130	LLP	RT
Cadmium, Total	ug/L	water	SM 3113 B	01027	0.3	0.3	20	80-120	70-130	LLP	RT
Chromium, Dissolved	ug/L	water	SM 3113 B	01030	10	10	20	80-120	70-130	LLP	RT
Chromium, Total	ug/L	water	SM 3113 B	01034	10	10	20	80-120	70-130	LLP	RT
Copper, Dissolved	ug/L	water	SM 3113 B	01040	3	3	20	80-120	70-130	LLP	RT
Copper, Total	ug/L	water	SM 3113 B	01042	3	3	20	80-120	70-130	LLP	RT
Iron, Total	ug/L	water	SM 3111 B	01045	300	50	20	80-120	70-130	LLP	RT
Iron, Dissolved	ug/L	water	SM 3111 B	01046	300	50	20	80-120	70-130	LLP	RT
Lead, Dissolved	ug/L	water	SM 3113 B	01049	1	1	20	80-120	70-130	LLP	RT
Lead, Total	ug/L	water	SM 3113 B	01051	1	1	20	80-120	70-130	LLP	RT
Manganese, Total	ug/L	water	SM 3111 B	01055	50	30	20	80-120	70-130	LLP	RT
Manganese, Dissolved	ug/L	water	SM 3111 B	01056	50	30	20	80-120	70-130	LLP	RT
Nickel, Dissolved	ug/L	water	SM 3111 B	01065	10	10	20	80-120	70-130	LLP	RT
Nickel, Total	ug/L	water	SM 3111 B	01067	10	10	20	80-120	70-130	LLP	RT
Silver, Dissolved	ug/L	water	SM 3113 B	01075	0.5	0.5	20	80-120	70-130	LLP	RT
Silver, Total	ug/L	water	SM 3113 B	01077	0.5	0.5	20	80-120	70-130	LLP	RT
Zinc, Dissolved	ug/L	water	SM 3111 B	01090	5	5	20	80-120	70-130	LLP	RT
Zinc, Total	ug/L	water	SM 3111 B	01092	5	5	20	80-120	70-130	LLP	RT
Aluminum, Total	ug/L	water	SM 3111 D	01105	200	200	20	80-120	70-130	LLP	RT
Aluminum, Dissolved	ug/L	water	SM 3111 D	01106	200	200	20	80-120	70-130	LLP	RT
Selenium, Total	ug/L	water	SM 3113 B	01147	2	2	20	80-120	70-130	LLP	RT

* Reporting to be consistent with SWQM guidance and based on measurement capability.

**** Based on a range statistic as described in Standard Methods, 20th Edition, Section 9020-B, AQuality Assurance/Quality Control - Intralaboratory Quality Control Guidelines. This criterion applies to bacteriological duplicates with concentrations >10 MPN/100mL or >10 organisms/100mL.

References for Table A7.2:

United States Environmental Protection Agency (USEPA) AMethods 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), AStandard Methods for the Examination of Water and Wastewater,@ 20th Edition, 1998.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2003 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data, 2005 (RG-416)

American Society for Testing and Materials (ASTM) Annual Book of Standards, Vol. 11.02

Table A7.3 - Measurement Performance Specifications for the City of Arlington

PARAMETER	UNITS	MATRIX	METHOD	STORET	AWRL	Limit of Quantification (LOQ)	PRECISION (RPD of LCS/LCSD)	BIAS %Rec. of LCS	LOQ CHECK STANDARD % Rec	LAB	PC
FIELD											
Temperature, Water	° C	water	EPA 170.1 and TCEQ SOP, V1	00010	NA*	NA	NA	NA	NA	Field	RT
Temperature, Air	° C	air	EPA 170.1 and TCEQ SOP, V1	00020	NA*	NA	NA	NA	NA	Field	RT
Secchi Depth	meters	water	TCEQ SOP, V1	00078	NA*	NA	NA	NA	NA	Field	RT
Conductivity	uS/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA*	NA	NA	NA	NA	Field	RT
DO	mg/L	water	EPA 360.1 and TCEQ SOP, V1	00300	NA*	NA	NA	NA	NA	Field	RT
pH	pH/ units	water	EPA 150.1 and TCEQ SOP, V1	00400	NA*	NA	NA	NA	NA	Field	RT
Flow severity	1-no flow, 2-low, 3-normal, 4-flood, 5-high, 6-dry	water	TCEQ SOP, V1	01351	NA*	NA	NA	NA	NA	Field	RT
Days since last significant rainfall	days	NA	TCEQ SOP, V1	72053	NA*	NA	NA	NA	NA	Field	RT
Stream Flow Estimate	cfs	NA	TCEQ SOP, V1	74069	NA*	NA	NA	NA	NA	Field	RT
CONVENTIONALS/NUTRIENTS											
Nitrite-N	mg/L	water	SM 4500 NO3 F	00615	0.05	0.02	20	80-120	70-130	TRA	RT
Total Kjeldahl Nitrogen	mg/L	water	SM 4500 NH3 C	00625	0.2	0.2	20	80-120	70-130	TRA	RT
Nitrate/nitrite-N, total	mg/L	water	SM 4500 NO3 H	00630	0.05	0.04	20	80-120	70-130	TRA	RT
Total Phosphorous	mg/L	water	SM 4500 P E	00665	0.06	0.06	20	80-120	70-130	TRA	RT
Dissolved O-phosphate-P	mg/L	water	EPA 365.1	70507	0.04	0.04	20	80-120	70-130	TRA	RT
Hardness, total (as CaC03)	mg/L	water	SM 2340 C	00900	5	5	20	80-120	NA	TRA	RT
Chlorophyll-a, spectrophotometric method	ug/L	water	SM 10200-H	32211	3	3	20	80-120	NA	TRA	RT
BACTERIOLOGICAL											
E. coli, IDEXX Colilert	MPN/100ml	water	SM 9223-B	31699	1	1	0.5****	NA	NA	TRA	RT
METALS											
Cadmium, Dissolved	ug/L	water	EPA 200.9	01025	0.3	0.3	20	80-120	70-130	AR	RT
Chromium, Dissolved	ug/L	water	EPA 200.9	01030	10	2	20	80-120	70-130	AR	RT
Copper, Dissolved	ug/L	water	EPA 200.9	01040	3	2	20	80-120	70-130	AR	RT
Iron, Dissolved	ug/L	water	SM 3111 B	01046	300	100	20	80-120	70-130	AR	RT
Lead, Dissolved	ug/L	water	EPA 200.9	01049	1	1	20	80-120	70-130	AR	RT
Manganese, Dissolved	ug/L	water	SM 3111 B	01056	50	50	20	80-120	70-130	AR	RT
Nickel, Dissolved	ug/L	water	EPA 200.9	01065	10	5	20	80-120	70-130	AR	RT
Zinc, Dissolved	ug/L	water	SM 3111 B	01090	5^	50^	20	80-120	70-130	AR	RT

* Reporting to be consistent with SWQM guidance and based on measurement capability.

**** Based on a range statistic as described in Standard Methods, 20th Edition, Section 9020-B, AQuality Assurance/Quality Control - Intralaboratory Quality Control Guidelines. This criterion applies to bacteriological duplicates with concentrations >10 MPN/100mL or >10 organisms/100mL.

^Zinc will be reported at 50 ug/L. Although this level is above the AWRL for this parameter, the reporting limits for the Arlington laboratory are below stream standards for them as determined using the 15th percentile hardness value for the Trinity River basin.

References for Table A7.3:

United States Environmental Protection Agency (USEPA) AMethods 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), AStandard Methods for the Examination of Water and Wastewater,@ 20th Edition, 1998.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2003 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data, 2005 (RG-416)

American Society for Testing and Materials (ASTM) Annual Book of Standards, Vol. 11.02

Table A7.4 - Measurement Performance Specifications for the City of Dallas

PARAMETER	UNITS	MATRIX	METHOD	STORET	AWRL	Limit of Quantification (LOQ)	PRECISION (RPD of LCS/LCSD)	BIAS %Rec. of LCS	LOQ CHECK STANDARD % Rec	LAB	PC
FIELD											
Temperature, Water	° C	water	EPA 170.1 and TCEQ SOP, V1	00010	NA*	NA	NA	NA	NA	Field	RT
Temperature, Air	° C	air	EPA 170.1 and TCEQ SOP, V1	00020	NA*	NA	NA	NA	NA	Field	RT
Secchi Depth	meters	water	TCEQ SOP, V1	00078	NA*	NA	NA	NA	NA	Field	RT
Conductivity	uS/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA*	NA	NA	NA	NA	Field	RT
DO	mg/L	water	EPA 360.1 and TCEQ SOP, V1	00300	NA*	NA	NA	NA	NA	Field	RT
pH	pH/ units	water	EPA 150.1 and TCEQ SOP, V1	00400	NA*	NA	NA	NA	NA	Field	RT
Flow severity	1-no flow, 2-low, 3-normal, 4-flood, 5-high, 6-dry	water	TCEQ SOP, V1	01351	NA*	NA	NA	NA	NA	Field	RT
Days since last significant rainfall	days	NA	TCEQ SOP, V1	72053	NA*	NA	NA	NA	NA	Field	RT
METALS											
Arsenic, Dissolved	ug/L	water	EPA 200.8	01000	5	5	20	80-120	70-130	TRA	RT
Barium, Dissolved	ug/L	water	EPA 200.8	01005	1000	1	20	80-120	70-130	TRA	RT
Cadmium, Dissolved	ug/L	water	EPA 200.8	01025	0.3	0.3	20	80-120	70-130	TRA	RT
Chromium, Dissolved	ug/L	water	EPA 200.8	01030	10	5	20	80-120	70-130	TRA	RT
Copper, Dissolved	ug/L	water	EPA 200.8	01040	3	1	20	80-120	70-130	TRA	RT
Lead, Dissolved	ug/L	water	EPA 200.8	01049	1	1	20	80-120	70-130	TRA	RT
Nickel, Dissolved	ug/L	water	EPA 200.8	01065	10	1	20	80-120	70-130	TRA	RT
Silver, Dissolved	Ug/L	Water	EPA 200.8	01075	0.5	0.3	20	80-120	70-130	TRA	RT
Zinc, Dissolved	ug/L	water	EPA 200.8	01090	5	5	20	80-120	70-130	TRA	RT
Aluminum, Dissolved	ug/L	water	EPA 200.8	01106	200	50	20	80-120	70-130	TRA	RT
Selenium, Dissolved	ug/L	water	EPA 200.8	01145	5	5	20	80-120	70-130	TRA	RT

* Reporting to be consistent with SWQM guidance and based on measurement capability.

**** Based on a range statistic as described in Standard Methods, 20th Edition, Section 9020-B, AQuality Assurance/Quality Control - Intralaboratory Quality Control Guidelines. This criterion applies to bacteriological duplicates with concentrations >10 MPN/100mL or >10 organisms/100mL.

References for Table A7.4:

United States Environmental Protection Agency (USEPA) AMethods 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), AStandard Methods for the Examination of Water and Wastewater,@ 20th Edition, 1998.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2003 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data, 2005 (RG-416)

American Society for Testing and Materials (ASTM) Annual Book of Standards, Vol. 11.02

Table A7.5 - Measurement Performance Specifications for TRA Main Stem Monitoring

PARAMETER	UNITS	MATRIX	METHOD	STORET	AWRL	Limit of Quantification (LOQ)	PRECISION (RPD of LCS/LCSD)	BIAS %Rec. of LCS	LOQ CHECK STANDARD % Rec	LAB	PC
FIELD											
Temperature, Water	° C	water	EPA 170.1 and TCEQ SOP, V1	00010	NA*	NA	NA	NA	NA	Field	RT
Temperature, Air	° C	air	EPA 170.1 and TCEQ SOP, V1	00020	NA*	NA	NA	NA	NA	Field	RT
Flow	cfs	water	TCEQ SOP, V1	00061	NA*	NA	NA	NA	NA	Field	RT
Secchi Depth	meters	water	TCEQ SOP, V1	00078	NA*	NA	NA	NA	NA	Field	RT
Conductivity	uS/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA*	NA	NA	NA	NA	Field	RT
DO	mg/L	water	EPA 360.1 and TCEQ SOP, V1	00300	NA*	NA	NA	NA	NA	Field	RT
pH	pH/ units	water	EPA 150.1 and TCEQ SOP, V1	00400	NA*	NA	NA	NA	NA	Field	RT
Flow severity	1-no flow, 2-low, 3-normal, 4-flood, 5-high, 6-dry	water	TCEQ SOP, V1	01351	NA*	NA	NA	NA	NA	Field	RT
Days since last significant rainfall	days	NA	TCEQ SOP, V1	72053	NA*	NA	NA	NA	NA	Field	RT
Flow measurement method	1-gage, 2-electric, 3-mechanical, 4-weir/flume, 5-doppler	water	TCEQ SOP, V1	89835	NA*	NA	NA	NA	NA	Field	RT
CONVENTIONALS/NUTRIENTS											
Ammonia-N, total	mg/L	water	SM 4500 NH3 H	00610	0.1	0.02	20	80-120	70-130	TRA	RT
Nitrite-N	mg/L	water	SM 4500 NO3 F	00615	0.05	0.02	20	80-120	70-130	TRA	RT
Total Kjeldahl Nitrogen	mg/L	water	SM 4500 NH3 C	00625	0.2	0.2	20	80-120	70-130	TRA	RT
Nitrate/nitrite-N, total	mg/L	water	SM 4500 NO3 H	00630	0.05	0.04	20	80-120	70-130	TRA	RT
Total Phosphorous	mg/L	water	SM 4500 P E	00665	0.06	0.06	20	80-120	70-130	TRA	RT
Dissolved O-phosphate-P	mg/L	water	EPA 365.1	70507	0.04	0.04	20	80-120	70-130	TRA	RT
Hardness, total (as CaC03)	mg/L	water	SM 2340 C	00900	5	5	20	80-120	NA	TRA	RT
Chlorophyll-a, spectrophotometric method	ug/L	water	SM 10200-H	32211	3	3	20	80-120	NA	TRA	RT
BACTERIOLOGICAL											
E. coli, IDEXX Colilert	MPN/100ml	water	SM 9223-B	31699	1	1	0.5****	NA	NA	TRA	RT
METALS											
Cadmium, dis.	ug/L	water	EPA 200.8	01025	0.3	0.3	20	80-120	70-130	TRA	RT
Lead, Dissolved	ug/L	water	EPA 200.8	01049	1	1	20	80-120	70-130	TRA	RT
Iron, Dissolved	ug/L	water	EPA 200.8	01046	300	100	20	80-120	70-130	TRA	RT
Zinc, Dissolved	ug/L	water	EPA 200.8	01090	5	5	20	80-120	70-130	TRA	RT
Arsenic, Dissolved	ug/L	water	EPA 200.8	01000	5	5	20	80-120	70-130	TRA	RT
Copper, Dissolved	ug/L	water	EPA 200.8	01040	3	1	20	80-120	70-130	TRA	RT

Chromium, Dissolved	ug/L	water	EPA 200.8	01030	10	5	20	80-120	70-130	TRA	RT
Aluminum, Dissolved	ug/L	water	EPA 200.8	01106	200	50	20	80-120	70-130	TRA	RT
Nickel, Dissolved	ug/L	water	EPA 200.8	01065	10	1	20	80-120	70-130	TRA	RT

* Reporting to be consistent with SWQM guidance and based on measurement capability.

**** Based on a range statistic as described in Standard Methods, 20th Edition, Section 9020-B, AQuality Assurance/Quality Control - Intralaboratory Quality Control Guidelines. This criterion applies to bacteriological duplicates with concentrations >10 MPN/100mL or >10 organisms/100mL.

References for Table A7.5:

United States Environmental Protection Agency (USEPA) AMethods 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), AStandard Methods for the Examination of Water and Wastewater,@ 20th Edition, 1998.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2003 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data, 2005 (RG-416)

American Society for Testing and Materials (ASTM) Annual Book of Standards, Vol. 11.02

Table A7.6 - Measurement Performance Specifications for the City of Grand Prairie

PARAMETER	UNITS	MATRIX	METHOD	STORET	AWRL	Limit of Quantification (LOQ)	PRECISION (RPD of LCS/LCSD)	BIAS %Rec. of LCS	LOQ CHECK STANDARD % Rec	LAB	PC
FIELD											
Temperature, Water	° C	water	EPA 170.1 and TCEQ SOP, V1	00010	NA*	NA	NA	NA	NA	Field	RT
Temperature, Air	° C	air	EPA 170.1 and TCEQ SOP, V1	00020	NA*	NA	NA	NA	NA	Field	RT
Secchi Depth	meters	water	TCEQ SOP, V1	00078	NA*	NA	NA	NA	NA	Field	RT
Conductivity	uS/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA*	NA	NA	NA	NA	Field	RT
DO	mg/L	water	EPA 360.1 and TCEQ SOP, V1	00300	NA*	NA	NA	NA	NA	Field	RT
pH	pH/ units	water	EPA 150.1 and TCEQ SOP, V1	00400	NA*	NA	NA	NA	NA	Field	RT
Flow severity	1-no flow, 2-low, 3-normal, 4-flood, 5-high, 6-dry	water	TCEQ SOP, V1	01351	NA*	NA	NA	NA	NA	Field	RT
Days since last significant rainfall	days	NA	TCEQ SOP, V1	72053	NA*	NA	NA	NA	NA	Field	RT
Turbidity	NTU	water	TCEQ SOP, V1	82078	NA*	NA	NA	NA	NA	Field	RT
CONVENTIONALS/NUTRIENTS											
BOD5	mg/L	water	SM 5210	00310	2	2	NA	NA	NA	TRA	RT
Ammonia-N, total	mg/L	water	SM 4500 NH3 H	00610	0.1	0.02	20	80-120	70-130	TRA	RT
Nitrite-N	mg/L	water	SM 4500 NO3 F	00615	0.05	0.02	20	80-120	70-130	TRA	RT
Total Kjeldahl Nitrogen	mg/L	water	SM 4500 NH3 C	00625	0.2	0.2	20	80-120	70-130	TRA	RT
Nitrate/nitrite-N, total	mg/L	water	SM 4500 NO3 H	00630	0.05	0.04	20	80-120	70-130	TRA	RT
Total Phosphorous	mg/L	water	SO 4500 P E	00665	0.06	0.06	20	80-120	70-130	TRA	RT
Dissolved O-phosphate-P	mg/L	water	EPA 365.1	70507	0.04	0.04	20	80-120	70-130	TRA	RT
Hardness, total (as CaC03)	mg/L	water	SM 2340 C	00900	5	5	20	80-120	70-130	TRA	RT
Chloride	mg/L	water	SM 4500-Cl-C	00940	5	5	20	80-120	70-130	TRA	RT
Sulfate	mg/L	water	SM 4500 SO4	00945	5	5	20	80-120	70-130	TRA	RT
Chlorophyll-a, spectrophotometric method	ug/L	water	SM 10200-H	32211	3	3	20	80-120	NA	TRA	RT
TDS	mg/L	water	SM 2540 C	70300	10	10	20	80-120	NA	TRA	RT
BACTERIOLOGICAL											
Fecal coliform, membrane filtration	org/100mL	water	SM 9222-D	31616	1	1	0.5****	NA	NA	TRA	RT
Fecal streptococcus	org/100mL	water	EPA 600/8-78-017	31673	1	1	0.5****	NA		TRA	RT
E. coli, IDEXX Colilert	MPN/100ml	water	SM 9223-B	31699	1	1	0.5****	NA	NA	TRA	RT
METALS											
Cadmium, Dissolved	ug/L	water	EPA 200.8	01025	0.3	0.3	20	80-120	70-130	TRA	RT

Cadmium, Total	ug/L	water	EPA 200.8	01027	5	5	20	80-120	70-130	TRA	RT
Chromium, Dissolved	ug/L	water	EPA 200.8	01030	10	5	20	80-120	70-130	TRA	RT
Chromium, Total	ug/L	water	EPA 200.8	01034	5	5	20	80-120	70-130	TRA	RT
Copper, Dissolved	ug/L	water	EPA 200.8	01040	3	1	20	80-120	70-130	TRA	RT
Copper, Total	ug/L	water	EPA 200.8	01042	5	5	20	80-120	70-130	TRA	RT
Lead, Dissolved	ug/L	water	EPA 200.8	01049	1	1	20	80-120	70-130	TRA	RT
Lead, Total	ug/L	water	EPA 200.8	01051	5	5	20	80-120	70-130	TRA	RT
Zinc, Dissolved	ug/L	water	EPA 200.8	01090	5	5	20	80-120	70-130	TRA	RT
Zinc, Total	ug/L	water	EPA 200.8	01092	20	20	20	80-120	70-130	TRA	RT
Selenium, Total	ug/L	water	EPA 200.8	01147	2	1.5	20	80-120	70-130	TRA	RT

* Reporting to be consistent with SWQM guidance and based on measurement capability.

**** Based on a range statistic as described in Standard Methods, 20th Edition, Section 9020-B, AQuality Assurance/Quality Control - Intralaboratory Quality Control Guidelines. This criterion applies to bacteriological duplicates with concentrations >10 MPN/100mL or >10 organisms/100mL.

References for Table A7.6:

United States Environmental Protection Agency (USEPA) AMethods 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), AStandard Methods for the Examination of Water and Wastewater,@ 20th Edition, 1998.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2003 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data, 2005 (RG-416)

American Society for Testing and Materials (ASTM) Annual Book of Standards, Vol. 11.02

Table A7.7 - Measurement Performance Specifications for the City of Fort Worth

PARAMETER	UNITS	MATRIX	METHOD	STORET	AWRL	Limit of Quantification (LOQ)	PRECISION (RPD of LCS/LCSD)	BIAS %Rec. of LCS	LOQ CHECK STANDARD % Rec	LAB	PC
FIELD											
Temperature, Water	° C	water	EPA 170.1 and TCEQ SOP, V1	00010	NA*	NA	NA	NA	NA	Field	RT
Temperature, Air	° C	air	EPA 170.1 and TCEQ SOP, V1	00020	NA*	NA	NA	NA	NA	Field	RT
Flow	cfs	water	TCEQ SOP, V1	00061	NA*	NA	NA	NA	NA	Field	RT
Conductivity	uS/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA*	NA	NA	NA	NA	Field	RT
DO	mg/L	water	EPA 360.1 and TCEQ SOP, V1	00300	NA*	NA	NA	NA	NA	Field	RT
pH	pH/ units	water	EPA 150.1 and TCEQ SOP, V1	00400	NA*	NA	NA	NA	NA	Field	RT
Flow severity	1-no flow, 2-low, 3-normal, 4-flood, 5-high, 6-dry	water	TCEQ SOP, V1	01351	NA*	NA	NA	NA	NA	Field	RT
Days since last significant rainfall	days	NA	TCEQ SOP, V1	72053	NA*	NA	NA	NA	NA	Field	RT
Turbidity	NTU	water	TCEQ SOP, V1	82078	NA*	NA	NA	NA	NA	Field	RT
Flow measurement method	1-gage, 2-electric, 3-mechanical, 4-weir/flume, 5-doppler	water	TCEQ SOP, V1	89835	NA*	NA	NA	NA	NA	Field	RT

* Reporting to be consistent with SWQM guidance and based on measurement capability.

References for Table A7.7:

United States Environmental Protection Agency (USEPA) AMethods 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), AStandard Methods for the Examination of Water and Wastewater,@ 20th Edition, 1998.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2003 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data, 2005 (RG-416)

American Society for Testing and Materials (ASTM) Annual Book of Standards, Vol. 11.02

Table A7.8 - Measurement Performance Specifications for the City of Irving

PARAMETER	UNITS	MATRIX	METHOD	STORET	AWRL	Limit of Quantification (LOQ)	PRECISION (RPD of LCS/LCS dup)	BIAS (%Rec. of LCS)	LOQ CHECK STANDARD % Rec	LAB	PC
FIELD											
Temperature, Water	° C	water	EPA 170.1 and TCEQ SOP, V1	00010	NA*	NA	NA	NA	NA	Field	RT
Temperature, Air	° C	air	EPA 170.1 and TCEQ SOP, V1	00020	NA*	NA	NA	NA	NA	Field	RT
Secchi Depth	meters	water	TCEQ SOP, V1	00078	NA*	NA	NA	NA	NA	Field	RT
Conductivity	uS/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA*	NA	NA	NA	NA	Field	RT
DO	mg/L	water	EPA 360.1 and TCEQ SOP, V1	00300	NA*	NA	NA	NA	NA	Field	RT
pH	pH/ units	water	EPA 150.1 and TCEQ SOP, V1	00400	NA*	NA	NA	NA	NA	Field	RT
Flow severity	1-no flow, 2-low, 3-normal, 4-flood, 5-high, 6-dry	water	TCEQ SOP, V1	01351	NA*	NA	NA	NA	NA	Field	RT
Days since last significant rainfall	days	NA	TCEQ SOP, V1	72053	NA*	NA	NA	NA	NA	Field	RT
CONVENTIONALS/NUTRIENTS											
Ammonia-N, total	mg/L	water	SM 4500 NH3 H	00610	**0.1**	**0.02**	20	80-120	70-130	TRA	RT
Total Kjeldahl Nitrogen	mg/L	water	SM 4500 NH3 C	00625	0.2	0.2	20	80-120	70-130	TRA	RT
Nitrate/nitrite-N, total	mg/L	water	SM 4500 NO3 H	00630	0.05	0.04	20	80-120	70-130	TRA	RT
Total Phosphorous	mg/L	water	SM 4500 P E	00665	0.06	0.06	20	80-120	70-130	TRA	RT
Dissolved O-phosphate-P	mg/L	water	EPA 365.1	70507	0.04	0.04	20	80-120	70-130	TRA	RT
Hardness, total (as CaC03)	mg/L	water	SM 2340 C	00900	5	5	20	80-120	NA	TRA	RT
Chlorophyll-a, spectrophotometric method	ug/L	water	SM 10200-H	32211	3	3	20	80-120	NA	TRA	RT
BACTERIOLOGICAL											
E. coli, IDEXX Colilert	MPN/100ml	water	SM 9223-B	31699	1	1	0.5****	NA	NA	TRA	RT
METALS											
Cadmium, Dissolved	ug/L	water	EPA 200.8	01025	0.3	0.3	20	80-120	70-130	TRA	RT
Chromium, Dissolved	ug/L	water	EPA 200.8	01030	10	5	20	80-120	70-130	TRA	RT
Copper, Dissolved	ug/L	water	EPA 200.8	01040	3	1	20	80-120	70-130	TRA	RT
Lead, Dissolved	ug/L	water	EPA 200.8	01049	1	1	20	80-120	70-130	TRA	RT
Zinc, Dissolved	ug/L	water	EPA 200.8	01090	5	5	20	80-120	70-130	TRA	RT

* Reporting to be consistent with SWQM guidance and based on measurement capability.

**** Based on a range statistic as described in Standard Methods, 20th Edition, Section 9020-B, AQuality Assurance/Quality Control - Intralaboratory Quality Control Guidelines. This criterion applies to bacteriological duplicates with concentrations >10 MPN/100mL or >10 organisms/100mL.

References for Table A7.8:

United States Environmental Protection Agency (USEPA) AMethods 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), AStandard Methods for the Examination of Water and Wastewater,@ 20th Edition, 1998.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2003 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data, 2005 (RG-416)

American Society for Testing and Materials (ASTM) Annual Book of Standards, Vol. 11.02

A8 SPECIAL TRAINING/CERTIFICATION

New field personnel receive training in proper sampling and field analysis. Before actual sampling or field analysis occurs, they will demonstrate to the QA Officer (or designee) their ability to properly calibrate field equipment and perform field sampling and analysis procedures. Field personnel training is documented and retained in the personnel file and will be available during a monitoring systems audit.

Contractors and subcontractors must ensure that laboratories analyzing samples under this QAPP meet the requirements contained in section 5.4.4 of the NELAC standards (concerning Review of Requests, Tenders and Contracts).

A9 DOCUMENTS AND RECORDS

The documents and records that describe, specify, report, or certify activities are listed.

Table A9.1 Project Documents and Records

Document/Record	Location	Retention (yrs)	Format
QAPPs, amendments and appendices	TCEQ/TRA	min 7 years	Paper/Electronic
Field SOPs	TRA, Subcontractor, or WBPA	min 7 years	Paper
Laboratory Quality Manuals	TRA, Laboratories	min 7 years	Paper/Electronic
Laboratory SOPs	TRA, Laboratories	min 7 years	Paper/Electronic
QAPP distribution documentation	TRA	min 7 years	Paper/Electronic
QAPP sib-participation agreements	TRA	min 7 years	Paper
Field staff training records	TRA, Subcontractor, or WBPA	min 7 years	Paper
Field equipment calibration/maintenance logs	TRA, Subcontractor, or WBPA	min 7 years	Paper
Field instrument printouts	TRA, Subcontractor, or WBPA	min 7 years	Paper (TRA will also maintain electronic copies)
Field notebooks or data sheets	TRA, Subcontractor, or WBPA	min 7 years	Paper (TRA will convert paper field data sheets to electronic media for all hardcopy field data sheets submitted to TRA by WBPAs)
Chain of custody records	TRA, Subcontractor, or WBPA	min 7 years	Paper (TRA will also maintain electronic copies)
Laboratory calibration records	Laboratories	min 7 years	Paper/Electronic
Laboratory instrument printouts	Laboratories	min 7 years	Paper/Electronic
Laboratory data reports/results	Laboratories and/or WBPA, TRA	min 7 years	Paper (TRA will also maintain electronic copies)
Laboratory equipment maintenance logs	Laboratories	min 7 years	Paper/Electronic
Corrective Action Documentation	TRA, Laboratories, Subcontractors, WBPA	min 7 years	Paper
Laboratory Staff Training Records	Laboratories	min 7 years	Paper

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 NELAC standards (Section 5.5.10) and include the information necessary for the interpretation and validation of data. The requirements for reporting data and the procedures are provided.

- Sample results
- Units of measurement
- Sample matrix
- Dry weight or wet weight (as applicable)
- Station information
- Date and time of collection
- Sample depth
- LOQ and LOD (formerly referred to as the reporting limit and the method detection limit, respectively), and qualification of results outside the working range (if applicable)
- Certification of NELAC compliance on a result by result basis
- Title of report and unique identifiers on each page
- Name/address of the laboratory
- Name/address of the client
- A clear indication 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)
- Cleary identified subcontract laboratory results (as applicable)
- Name/title of person accepting responsibility for the report
- Project-specific quality control results to include field split results (as applicable); equipment, trip, and field blank results (as applicable); and precision, bias, and LOQ check standard results
- Narrative information on QC failures or derivations from requirements that may affect the quality of results or is necessary for verification and validation of data

Electronic Data

Data will be submitted electronically to the TCEQ in the Event/Result file format described in the CRP Guidance. A completed Data Summary (see example in Appendix E) will be submitted with each data submittal.

Data from WBPAs will be received in a variety of formats and layouts (hardcopy, Excel, Text, Access) which will then be converted to the Event/Result file format.

B1 SAMPLING PROCESS DESIGN

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

B2 SAMPLING METHODS

Field Sampling Procedures

Field sampling will be conducted according to procedures documented in the *TCEQ Surface Water Quality Monitoring Procedures Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2003.(RG-415) and Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data* (*RG-416).* Additional aspects outlined in Section B below reflect specific requirements for sampling under the Clean Rivers Program and/or provide additional clarification.

Sample Containers

Sample containers (cubitainers) are purchased pre-cleaned for conventional parameters and are disposable. TRWD reuses all containers except bacteria sample bottles -- rigid plastic containers, nalgene, and glass containers are acid rinsed at the lab with the appropriate acid solution, rinsed with DI water, and air dried. Whirl-pak bags or sterile 100 mL plastic bacteria bottles are used for bacteriological samples and may have 1% sodium thiosulfate tablets added. Amber glass bottles or foil wrapped cubitainers are used routinely for chlorophyll samples. The sample containers for metals are new, certified glass or plastic bottles, or glass or plastic bottles cleaned and documented according to EPA method 1669. Sample containers for organics are purchased pre-cleaned and certified. Certificates are maintained in a notebook by the laboratory.

Processes to Prevent Contamination

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

Sample volume, container types, minimum sample volume, preservation requirements, and holding time requirements.

Table B2.1 Sample Storage, Preservation, and Handling Requirements

Parameter	Container	Minimum Sample Volume (mL)	Preservation	Maximum Storage
Dissolved Metals	New or 1:1 HNO3 rinsed Plastic or Glass	250	Filter immediately, add HNO3 (either in field or at lab) to pH <2, place on ice to cool to 4C	6 months
Total Metals	New or 1:1 HNO3 rinsed Plastic or Glass	250	Add HNO3 to pH <2, place on ice to cool to 4C	6 months
Chlorophyll-a and Pheophytin	Amber or opaque Plastic or Glass	1000	Unfiltered, dark, 4C or Filtered with glass fiber filter or 0.45micron membrane filter, dark, -20C (Do not store in frost-free freezer)	Filter <48 hr; Frozen filters may be stored up to 30 d
Ammonia-N	Plastic or Glass	100	Add H2SO4 to pH <2, place on ice to cool to 4C	28 d
Nitrate/nitrite-N	Plastic or Glass	100	Add H2SO4 to pH <2, place on ice to cool to 4C	28 d
Nitrate-N (NO3)	Plastic or Glass	100	Place on ice to cool to 4C	48 h
Nitrite-N (NO2)	Plastic or Glass	100	Place on ice to cool to 4C	48 h
Total Kjeldahl Nitrogen	Plastic or Glass	500	Add H2SO4 to pH <2, place on ice to cool to 4C	28 d
Dissolved O-phosphate-P (70507-Lab Filtered)	Plastic	100	Place on ice to cool to 4C	48 h
Total Phosphorous (00665)	Plastic	100	Add H2SO4 to pH <2, place on ice to cool to 4C	28 d
Total Dissolved Phosphorous (00666)	Plastic	100	Filter immediately, add H2SO4 to pH <2, place on ice to cool to 4C	28 d
TDS	Plastic or Glass	500	Place on ice to cool to 4C	2-7 d
TSS	Plastic or Glass	1000 (Turbidity Dependent)	Place on ice to cool to 4C	2-7 d
VSS	Plastic or Glass	1000 (Turbidity Dependent)	Place on ice to cool to 4C	2-7 d
Sulfate	Plastic or Glass	250	Place on ice to cool to 4C	28 d
Turbidity	Plastic or Glass	100	Place on ice to cool to 4C, analyze same day or store in dark up to 24 h and refrigerate	48 h
Hardness, total (as CaC03)	Plastic or Glass	500	Add HNO3 or H2SO4 to ph <2, place on ice to cool to 4C	6 months
E. coli, IDEXX Colilert	Sterile Plastic	100	Place on ice to cool to 4C	6 h
Fecal coliform	Sterile Plastic	100	Place on ice to cool to 4C	6 h
Fecal streptococcus	Sterile Plastic	100	Place on ice to cool to 4C	6 h
Total Coliform	Sterile Plastic	100	Place on ice to cool to 4C	30 h
BOD5	Plastic or Glass	1000	Place on ice to cool to 4C	48 h
CBOD5	Plastic or Glass	500	Place on ice to cool to 4C	48 h
COD	Plastic or Glass	250	Add H2SO4 to pH <2, place on ice to cool to 4C	28 d
DOC	Glass	100	Filter immediately, add H2SO4 to pH <2, place on ice to cool to 4C	28 d
TOC	Glass, Borosilicate	100	Add H2SO4 to pH <2, place on ice to cool to 4C	28 d
Chloride	Plastic or Glass	50	Place on ice to cool to 4C	28 d
Color	Plastic or Glass	500	Place on ice to cool to 4C	48 h
Fluoride, Dissolved	Plastic	500	Place on ice to cool to 4C	28 d
Alkalinity, Total	Plastic or Glass	200	Place on ice to cool to 4C	14 d
Conductivity	Plastic or Glass	500	Place on ice to cool to 4C	28 d
Algal Enumeration	Plastic or Glass	500	Formalin-Lugol's Solution and place on ice to cool to 4C	3 months

Matrix is water unless otherwise specified.

All filtration is 0.45um unless otherwise specified.
Preservation is performed in the field within 15 minutes of sample collection.

Documentation of Field Sampling Activities

Field sampling activities are documented on field data sheets as presented in Appendix C. The following will be recorded for all visits as negotiated with each WBPA:

1. Station ID
2. Sampling Date
3. Location
4. Sampling depth
5. Sampling time
6. Sample collector's name/signature
7. Values for all field parameters
8. Detailed observational data, including:
    - water appearance
    - weather
    - biological activity
    - unusual odors
    - days since last significant rainfall
    - flow severity
    - flow estimation calculation or instantaneous flow from gage, flow meter, or weir
    - pertinent observations related to water quality or stream uses (e.g., exceptionally poor water quality conditions/standards not met; stream uses such as swimming, boating, fishing, irrigation pumps, etc.)
    - watershed or instream activities (events impacting water quality, e.g., bridge construction, livestock watering upstream, etc.)
    - specific sample information (number of sediments grabs, type/number of fish in a tissue sample, etc.)
    - missing parameters (i.e., when a scheduled parameter or group of parameters is not collected)

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:

1. Write legibly in indelible ink
2. Changes should be made by crossing out original entries with a single line, entering the changes, and initialing and dating the corrections.
3. Close-out incomplete pages with an initialed and dated diagonal line.

Deficiencies, Nonconformances and Corrective Action Related to Sampling Requirements

Deficiencies are defined as unauthorized deviations from procedures documented in the QAPP or other applicable documents. Nonconformances are deficiencies which affect data quantity and/or quality and render the data unacceptable or indeterminate. Deficiencies related to sampling methods requirements include, but are not limited to, such things as sample container, volume, and preservation variations, improper/inadequate storage temperature, holding-time exceedances, and sample site adjustments.

Deficiencies are documented in logbooks, field data sheets, etc. by field or laboratory staff and reported to the cognizant field or laboratory supervisor who will notify the WBPA Project Manager who will then notify the TRA Project Manager. The TRA Project Manager will notify the TRA QAO of the potential nonconformance. The TRA QAO will initiate a Nonconformance Report (NCR) to document the deficiency.

The TRA Project Manager, in consultation with the TRA QAO (and other affected individuals/ organizations), will determine if the deficiency constitutes a nonconformance. If it is determined the activity or item in question does not affect data quality and therefore is not a valid nonconformance, the NCR will be completed accordingly and the NCR closed. If it is determined a nonconformance does exist, the TRA Project Manager in consultation with TRA QAO will determine the disposition of the nonconforming activity or item and necessary corrective action(s); results will be documented by the contractor QAO by completion of a Corrective Action Report.

Corrective Action Reports (CARs) document: root cause(s); impact(s); specific corrective action(s) to address the deficiency; action(s) to prevent recurrence; individual(s) responsible for each action; the timetable for completion of each action; and the means by which completion of each corrective action will be documented. CARs will be included with quarterly progress reports. In addition, significant conditions (i.e., situations 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 both verbally and in writing.

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 D). The following list of items matches the COC forms in Appendix D as negotiated with each WBPA.

1. Date and time of collection
2. Site identification
3. Sample matrix
4. Number of containers
5. Preservative used
6. Was the sample was filtered
7. Analyses required
8. Name of collector
9. Custody transfer signatures and dates and time of transfer
10. Bill of lading (if applicable)

Sample Labeling

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

1. Site identification
2. Date and time of collection
3. Preservative added, if applicable
4. Designation of “field-filtered” as applicable
5. Sample type (i.e., analysis(es)) to be performed

Sample Handling

Field data sheets will be used by all participants to document field conditions and sample collection. Electronic data loggers may also be used for this purpose. Examples of field data sheets used by all WBPAs and subcontractors can be found in Appendix C. All samples are handled and transported under chain of custody forms from the sampling location to the laboratory. Chain of custody forms from all sampling entities can also be found in Appendix D. In some cases, a combined field data sheet and chain of custody form is used. These are found in both Appendix C and D.

Samples are collected by field crews using appropriate sampling methodologies, preserved with acidification or other appropriate preservatives if necessary (preservation requirements are documented on field data sheets and labels), placed in coolers packed with ice and delivered to laboratories within holding times. This basic methodology is followed by all sampling personnel. Except for the instances

listed below, all samples are delivered to laboratories the same day they are collected.

Exceptions include:

1) TRWD Eastern Division non-*E. coli* samples which are driven to the lab the day after collection (*E. coli* is collected during specific sampling events and delivered to the lab on the same day within the 6 hour holding time);
2) City of Dallas metals which are delivered to the lab at the end of the month of sampling; and
3) On rare occasions when shipment of samples is required (LLP personnel ship samples to TRA Central for analysis), samples will be packed in ice and shipped in coolers using express delivery.

Upon arrival at the laboratory, transfer of custody is documented on chain of custody forms, samples are placed in coolers and logged into the laboratories' LIM Systems. Laboratory personnel accepting samples will confirm that samples were placed on ice, and that there is still ice remaining around sample containers, indicating that an attempt was made to maintain the temperature of the samples at 4^{o}C. Samples which are required to be cooled but are not received on ice will not be analyzed.

B3.7 Additional Information from the City of Fort Worth

Personnel from the City of Fort Worth will collect and analyze all samples for E. coli, which is the only non-field parameter analyzed by Fort Worth covered under this QAPP. Consequently there will be no transfer of custody and therefore no chain of custody form will be employed by them.

Deficiencies, Nonconformances and Corrective Action Related to Chain-of-Custody

Deficiencies are defined as unauthorized deviations from procedures documented in the QAPP or other applicable documents. Nonconformances are deficiencies which affect data quantity and/or quality and render the data unacceptable or indeterminate. Deficiencies related to chain-of-custody include but are not limited to delays in transfer, resulting in holding time violations; incomplete documentation, including signatures; possible tampering of samples; broken or spilled samples, etc.

Deficiencies are documented in logbooks, field data sheets, etc. by field or laboratory staff and reported to the cognizant field or laboratory supervisor who will notify the WBPA Project Manager who will then notify the TRA Project Manager. The TRA Project Manager will notify the TRA QAO of the potential nonconformance. The TRA QAO will initiate a Nonconformance Report (NCR) to document the deficiency.

The TRA Project Manager, in consultation with TRA QAO (and other affected individuals/ organizations), will determine if the deficiency constitutes a nonconformance. If it is determined the activity or item in question does not affect data quality and therefore is not a valid nonconformance, the NCR will be completed accordingly and the NCR closed. If it is determined a nonconformance does exist, the TRA Project Manager in consultation with the TRA QAO will determine the disposition of the nonconforming activity or item and necessary corrective action(s); results will be documented by the TRA QAO by completion of a Corrective Action Report.

Corrective Action Reports (CARs) document: root cause(s); impact(s); specific corrective action(s) to address the deficiency; action(s) to prevent recurrence; individual(s) responsible for each action; the timetable for completion of each action; and the means by which completion of each corrective action will be documented. CARs will be included with quarterly progress reports. In addition, significant conditions (i.e., situations 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 both verbally and in writing.

B4 ANALYTICAL METHODS

The analytical methods, associated matrices, and performing laboratories are listed in Tables A7.1 to A7.8 of Section A7. The authority for analysis methodologies under the Clean Rivers Program is derived from the TSWQS (§§307.1 - 307.10) in that data generally are generated for comparison to those standards and/or criteria. The Standards state that "Procedures for laboratory analysis will be in accordance with the most recently published edition of *Standard Methods for the Examination of Water and Wastewater*, the latest version of the *TCEQ Surface Water Quality Monitoring Procedures*, 40 CFR 136, or other reliable procedures acceptable to the Executive Director."

Laboratories collecting data under this QAPP are compliant with the NELAC standards. Copies of laboratory QMs and SOPs are available for review by the TCEQ.

Standards Traceability

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

Deficiencies, Nonconformances and Corrective Action Related to Analytical Methods

Deficiencies are defined as unauthorized deviations from procedures documented in the QAPP or other applicable documents. Nonconformances are deficiencies which affect quantity and/or quality and render the data unacceptable or indeterminate. Deficiencies related to field and laboratory measurement systems include but are not limited to instrument malfunctions, blank contamination, quality control sample failures, etc.

Deficiencies are documented in logbooks, field data sheets, etc. by field or laboratory staff and reported to the cognizant field or laboratory supervisor who will notify the WBPA Project Manager who will then notify the TRA Project Manager. The TRA Project Manager will notify the TRA QAO of the potential nonconformance. The TRA QAO will initiate a Nonconformance Report (NCR) to document the deficiency.

The TRA Project Manager, in consultation with TRA QAO (and other affected individuals/ organizations), will determine if the deficiency constitutes a nonconformance. If it is determined the activity or item in question does not affect data quality and therefore is not a valid nonconformance, the NCR will be completed accordingly and the NCR closed. If it is determined a nonconformance does exist, the TRA Project Manager in consultation with the TRA QAO will determine the disposition of the nonconforming activity or item and necessary corrective action(s); results will be documented by the TRA QAO by completion of a Corrective Action Report.

Corrective Action Reports (CARs) document: root cause(s); impact(s); specific corrective action(s) to address the deficiency; action(s) to prevent recurrence; individual(s) responsible for each action; the timetable for completion of each action; and, the means by which completion of each corrective action will be documented. CARs will be included with quarterly progress reports. In addition, significant

conditions (i.e., situations 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 both verbally and in writing.

The TCEQ has determined that analyses associated with the remark codes “holding time exceedance,” “sample received unpreserved,” “estimated value,” etc. 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.

B5 QUALITY CONTROL

Sampling Quality Control Requirements and Acceptability Criteria

The minimum Field QC Requirements are outlined in the *TCEQ Surface Water Quality Monitoring 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). 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 the contamination from field sources such as airborne materials, containers, and preservatives. Field blanks will be collected on a 10% basis, except in the case of TRWD which will collect them on a 5% basis.

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

Field equipment blank - Field equipment blanks are required for metals-in-water samples when collected using sampling equipment. A 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 will be collected at the last site of the day for each day of sampling or on a 10% basis with the exception of the City of Arlington, which will only collect a field equipment blank at one site during each quarterly sampling event, and TRWD, which will collect them on a 5% basis.

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 Split - A field split is a single sample subdivided by field staff immediately following collection and submitted to the laboratory as two separately identified samples according to procedures specified in the *SWQM Procedures*. Split samples are preserved, handled, shipped, and analyzed identically and are used to assess variability in all of these processes. Field splits apply to conventional samples only and are collected on a 10% basis or one per batch, whichever is greater, except as noted above for the City of Arlington and TRWD.

The precision of field split results is calculated by relative percent difference (RPD) using the following equation:

$$RPD = (X1-X2)/((X1+X2)/2))$$

A 30% RPD criteria will be used to screen field split results as a possible indicator of excessive variability in the sample handling and analytical system. If it is determined that elevated quantities of analyte (i.e., > 5 times the RL) were measured and analytical variability can be eliminated as a factor, then variability in field split results will primarily be used as a trigger for discussion with field staff to ensure samples are being handled in the field correctly. Some individual sample results may be

invalidated based on the examination of all extenuating information. The information derived from field splits is generally considered to be event specific and would not normally be used to determine the validity of an entire batch; however, some batches of samples may be invalidated depending on the situation. Professional judgment during data validation will be relied upon to interpret the results and take appropriate action. The qualification (i.e., invalidation) of data will be documented on the Data Summary. Deficiencies will be addressed as specified in this section under Deficiencies, Nonconformances, and Correction Action related to Quality Control.

Laboratory Measurement Quality Control Requirements and Acceptability Criteria

Method Specific QC requirements – QC samples, other than those specified later in this section, are run (e.g., sample duplicates, surrogates, internal standards, continuing calibration samples, interference check samples, positive control, negative control, and media blank) as specified in the methods. 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.

Limit of Quantitation (LOQ) – The laboratory will analyze a calibration standard (if applicable) at the LOQ on each day Clean Rivers Program samples are analyzed. Calibrations including the standard at the LOQ will meet the calibration requirements of the analytical method or corrective action will be implemented.

> LOQ Sediment and Tissue Samples – When considering LOQs for solid samples and how they apply to results, two aspects of the analysis are considered: (1) the LOQ of the sample, based on the "real-world" in which moisture content and interferences affect the result and (2) the LOQ in the QAPP which is a value less than or equal to the AWRL based on an idealized sample with zero % moisture.
>
> The LOQ for a solid sample is based on the lowest non-zero calibration standard (as are those for water samples), the moisture content of the solid sample, and any sample concentration or dilution factors resulting from sample preparation or clean-up.
>
> To establish solid-phase LOQs to be listed in Tables A7.1 to A7.8 of the QAPP, the laboratory will adjust the concentration of the lowest non-zero calibration standard for the amount of sample extracted, the final extract volume, and moisture content (assumed to be zero % moisture). Each calculated LOQ will be less than or equal to the AWRL on the dry-weight basis to satisfy the AWRL requirement for sediment and tissue analyses. When data are reviewed for consistency with the QAPP, they are evaluated based on this requirement. Results may not "appear" to meet the AWRL requirement due to high moisture content, high concentrations of non-target analytes necessitating sample dilution, etc. These sample results will be submitted to the TCEQ with an explanation on the data summary as to why results do not appear to meet the AWRL requirement.
>
> LOQ Check Standard – An LOQ check standard consists of a sample matrix (e.g., deionized water, sand, commercially available tissue) free from the analytes of interest spiked with

verified known amounts of analytes or a material containing known and verified amounts of analytes. It is used to establish intra-laboratory bias to assess the performance of the measurement system at the lower limits of analysis. The LOQ check standard is spiked into the sample matrix at a level less than or near the LOQ for each analyte for each batch of CRP samples are run.

The LOQ check standard is carried through the complete preparation and analytical process. LOQ Check Standards are run at a rate of one per analytical batch. A batch is defined as 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.

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

$$\%R = SR/SA * 100$$

Measurement performance specifications are used to determine the acceptability of LOQ Check Standard analyses as specified in Tables A7.1 to A7.8.

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 mid point 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. LCSs are run at a rate of one per analytical batch. A batch is defined as 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.

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; SR is the measured result; and SA is the true result:

$$\%R = SR/SA * 100$$

Measurement performance specifications are used to determine the acceptability of LCS analyses as specified in Tables A7.1 to A7.8.

Laboratory Duplicates – A laboratory duplicate is prepared by taking aliquots of a sample from the same container under laboratory conditions and processed and analyzed independently. A laboratory control sample duplicate (LCSD) is prepared in the laboratory by splitting aliquots of an LCS. Both samples are carried through the entire preparation and analytical process. LCSDs are used to assess precision and are performed at a rate of one per batch. A batch is defined as 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.

For most parameters, precision is calculated by the relative percent difference (RPD) of LCS 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:

$$RPD = (X_1 - X_2)/\{(X_1+X_2)/2\} * 100$$

A bacteriological duplicate is considered to be a special type of laboratory duplicate and applies when bacteriological samples are run in the field as well as in the lab. Bacteriological duplicate analyses are performed on samples from the sample bottle on a 10% basis. Results of bacteriological duplicates are evaluated by calculating the logarithm of each result and determining the range of each pair.

Measurement performance specifications are used to determine the acceptability of duplicate analyses as specified in Tables A7.1 to A7.8. The specifications for bacteriological duplicates in Tables A7.1 to A7.8 apply to samples with concentrations > 10 org./100mL.

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. Otherwise, the equipment should not be used.

Matrix spike (MS) –Matrix spikes are prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

Percent recovery of the known concentration of added analyte is used to assess accuracy of the analytical process. The spiking occurs prior to sample preparation and analysis. Spiked samples are routinely prepared and analyzed at a rate of 10% of samples processed, or one per batch whichever is greater. A batch is defined as 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. The information from these controls is sample/matrix specific and is not used to determine the validity of the entire batch. The MS is spiked at a level less than or equal to the midpoint of the calibration or analysis range for each analyte. Percent recovery (%R) is defined as 100 times the observed concentration, minus the sample concentration, divided by the true concentration of the spike.

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 laboratory shall document the calculation for %R. The percent recovery of the matrix spike is calculated using the following

equation in which %R is percent recovery, SSR is the observed spiked sample concentration, SR is the sample result, and SA is the reference concentration of the spike added:

$$\%R = (SSR - SR)/SA * 100$$

Measurement performance specifications for matrix spikes are not specified in this document.

The results are compared to the acceptance criteria as published in the mandated test method. Where there are no established criteria, the laboratory shall determine the internal criteria and document the method used to establish the limits. For matrix spike results outside established criteria, corrective action shall be documented or the data reported with appropriate data qualifying codes.

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 carried through the complete sample preparation and analytical procedure. 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 then 5% of the lowest value of the batch, or corrective action will be implemented.

Deficiencies, Nonconformances and Corrective Action Related to Quality Control

Deficiencies are defined as unauthorized deviations from procedures documented in the QAPP. Nonconformances are deficiencies which affect data quantity and/or quality and render the data unacceptable or indeterminate. Deficiencies related to quality control include but are not limited to field and laboratory quality control sample failures.

Deficiencies are documented in logbooks, field data sheets, etc. by field or laboratory staff and reported to the cognizant field or laboratory supervisor who will notify the WBPA Project Manager who will then notify the TRA Project Manager. The TRA Project Manager will notify the TRA QAO of the potential nonconformance. The TRA QAO will initiate a Nonconformance Report (NCR) to document the deficiency.

The TRA Project Manager, in consultation with TRA QAO (and other affected individuals/ organizations), will determine if the deficiency constitutes a nonconformance. If it is determined the activity or item in question does not affect data quality and therefore is not a valid nonconformance, the NCR will be completed accordingly and the NCR closed. If it is determined a nonconformance does exist, the TRA Project Manager in consultation with the TRA QAO will determine the disposition of the nonconforming activity or item and necessary corrective action(s); results will be documented by the TRA QAO by completion of a Corrective Action Report.

Corrective Action Reports (CARs) document: root cause(s); impact(s); specific corrective action(s) to address the deficiency; action(s) to prevent recurrence; individual(s) responsible for each action; the timetable for completion of each action; and, the means by which completion of each corrective action will be documented. CARs will be included with quarterly progress reports. In addition, significant

conditions (i.e., situations 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 both verbally and in writing.

B6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION AND MAINTENANCE

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

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

B7 INSTRUMENT CALIBRATION AND FREQUENCY

Field equipment calibration requirements are contained in the *TCEQ Surface Water Quality Monitoring Procedures*. Post-calibration error limits and the disposition resulting from error are adhered to. Data not meeting post-error limit requirements invalidate associated data collected subsequent to the pre-calibration and are not submitted to the TCEQ.

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

B8 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

Supplies and consumables which affect the quality of the sampling and analysis programs are specified and approved for use by the appropriate WBPA Project Managers. Those items include, but are not limited to: sample bottles, calibration gases, reagents, hoses, materials for decontamination of sampling equipment, deionized water, and potable water. Sample containers are either new and purchased precleaned to EPA specifications, or are cleaned to appropriate specifications by the laboratory. Calibration gases are purchased having known concentrations, and the documentation is maintained on file by the WBPA Project managers. Reagents are analytical grade or better. Hoses and sampling equipment are made of impervious materials that are suited for the materials being sampled. Deionized water is used for rinsing sampling equipment between samples, is typically obtained from the laboratory, and is shown to be free of contamination through daily conductivity testing; monthly bacteria, pH, and residual Chlorine testing; and annual heavy metals testing. Refer to the laboratory QMs for all laboratory related items.

B9 NON-DIRECT MEASUREMENTS

This QAPP does not include the use of routine data obtained from non-direct measurement sources.

B10 DATA MANAGEMENT

Data Management Protocols are addressed in the Data Management Plan which is located in Appendix F of this document.

Data will be managed in accordance with the TCEQ Surface Water Quality Monitoring Data Management Reference Guide and applicable Basin Planning Agency information resource management policies. The Clean Rivers Program grantees do not create TCEQ certified locational data using Global Positioning System (GPS) equipment. GPS equipment may be used as a component of the information required by the Station Location (SLOC) request process, but TCEQ staff are responsible for creating the certified locational data that will ultimately be entered into the TCEQ's Surface Water Quality Monitoring database. Any information developed by Clean Rivers Program grantees using a Geographic Information System (GIS) will be used solely to meet deliverable requirements and will not be submitted to the TCEQ as a certified data set. Because the Clean Rivers Program grantees do not create certified locational data, TCEQ's OPP 8.11 and 8.12 do not apply.

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	TRA	Monitoring of the project status and records to ensure requirements are being fulfilled	Report to TCEQ in Quarterly Report
Monitoring Systems Audit of TRA	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 respond in writing to the TCEQ to address corrective actions
Monitoring Systems Audit of Program Subparticipants	Once per contract period on dates to be determined by the TRA	TRA	Field sampling, handling and measurement; facility review; and data management as they relate to CRP	30 days to respond in writing to the TRA. PA will report problems to TCEQ in Progress Report.
Laboratory Inspection	Dates to be determined by TCEQ	TCEQ Laboratory Inspector	Analytical and quality control procedures employed at the laboratory and the contract laboratory	30 days to respond in writing to the TCEQ to address corrective actions

Corrective Action

The TRA Project Manager is responsible for implementing and tracking corrective action resulting from audit findings outlined in the audit report. Records of audit findings and corrective actions are maintained by both the CRP and the TRA Project Manager. The TRA Project Manager, upon receipt of audit reports from the TCEQ and CRP and responses by WBPAs and subcontractors, will review those documents with the WBPA and subcontractor Project Managers and ensure that the audit findings are addressed to TRA's satisfaction. Resolutions to issues/findings will be documented in writing. If warranted, the TRA Project Manager will perform follow-up audit(s) to ensure that needed corrective action has been performed. The results of these audits will be reported to the appropriate WBPA and subcontract Project Managers. Documentation will be maintained on file by the TRA and the WBPAs and subcontractors. Audit reports and corrective action documentation will be submitted to the TCEQ with the Progress Report.

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

C2 REPORTS TO MANAGEMENT

Laboratory Data Reports

Laboratory data reports contain QC information that is reviewed by the TRA CRP Data Manager. Laboratory data reports are received in both hardcopy and Text format.

Reports to TRA Project Management

WBPAs routinely submit water quality data and associated information such as field data sheets, chain of custody forms and data management checklists to TRA CRP staff. In most cases, data transmittals include both field and laboratory quality assurance information (e.g. results of field and laboratory duplicate analyses). Copies of combination field data sheets/ chain of custody forms are made upon submittal of samples to TRA CRWS laboratory, and are forwarded to TRA CRP staff with lab data reports or are given directly to TRA CRP staff. Field data sheets are not obtained from TRWD, LLP, the City of Fort Worth, or the City of Dallas, but are available upon request from those entities. TRWD submits field and lab data in Excel format along with hardcopy lab QC information. CRWS submits lab data and lab QC information in both Text format and in hardcopy for TRA, the City of Dallas metals, the City of Grand Prairie, the City of Irving, the City of Arlington nutrients and conventionals, and LLP TKN. The City of Fort Worth sends field and lab data and lab QC data in Excel format. The Cities of Grand Prairie and Irving submit their Field Data Sheets/COC Forms in hardcopy and Excel format. The City of Dallas sends field results in Excel format. The City of Arlington submits their Field Data Sheets/COC Forms in hardcopy and Excel format and the metals results and lab QC in both Excel format and hardcopy.

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 TRA's activities for each task; reports monitoring status, problems, delays, and corrective actions; and outlines the status of each task's deliverables.

Monitoring Systems Audit Report and Response - Following any audit performed by the TRA, a report of findings, recommendations and response is sent to the TCEQ in the quarterly progress report.

Reports by TCEQ Project Management

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

D1 DATA REVIEW, VERIFICATION, AND VALIDATION

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

The procedures for verification and validation of data are described in Section D2, below. The TRA, WBPA, or Subcontractor Data Manager is responsible for ensuring that field data are properly reviewed, verified, and submitted in the required format to enter into TRACRAD. Likewise, the Laboratory Managers are responsible for ensuring that laboratory data are reviewed, verified, and submitted in the required format to enter into TRACRAD. Finally, the TRA QAO is responsible for validating that all data collected meet the data quality objectives of the project and are suitable for reporting to TCEQ. The TRA Data Manager will review all new data on a 10% basis prior to submittal to TCEQ. Data will be provided to the TRA Data Manager from the WBPAs in frequencies ranging from monthly to annually.

D2 VERIFICATION AND VALIDATION METHODS

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

Data review, verification, and validation will be performed using self-assessments and peer and management review as appropriate to the project task. The data review tasks to be performed by field and laboratory staff are listed in the first two sections of Table D2.1, respectively. Potential errors are identified by examination of documentation and by manual or computer-assisted examination of corollary or unreasonable data. 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 higher level project management to establish the appropriate course of action, or the data associated with the issue are rejected. 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 TRA Data Manager and QAO. Data review, verification, and validation tasks to be performed on the data set include, but are not limited to, the confirmation of laboratory and field data review, evaluation of field QC results, additional evaluation of anomalies and outliers, analysis of sampling and analytical gaps, and confirmation that all parameters and sampling sites are included in the QAPP.

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 TRA Project Manager validates that the data meet the data quality objectives of the project and are suitable for reporting to TCEQ.

If any requirements or specifications of the CRP are not met, based on any part of the data review, the responsible party should document the nonconforming activities and submit the information to the TRA Data Manager with the data. This information is communicated to the TCEQ by the TRA in the Data Summary.

Table D2.1: Data Review Tasks

Field Data Review	**Responsibility**
Field data reviewed for conformance with data collection, sample handling and chain of custody, analytical and QC requirements	Field and/or TRA QAO
Post-calibrations checked to ensure compliance with error limits	Field
Field data calculated, reduced, and transcribed correctly	Field and/or TRA DM
Laboratory Data Review	**Responsibility**
Laboratory data reviewed for conformance with data collection, sample handling and chain of custody, analytical and QC requirements to include documentation, holding times, sample receipt, sample preparation, sample analysis, project and program QC results, and reporting	Lab and/or TRA QAO
Laboratory data calculated, reduced, and transcribed correctly	Lab and/or TRA DM
LOQs consistent with requirements for Ambient Water Reporting Limits.	Lab and TRA QAO
Analytical data documentation evaluated for consistency, reasonableness and/or improper practices	Lab and/or TRA QAO
Analytical QC information evaluated to determine impact on individual analyses	Lab and/or TRA QAO
All laboratory samples analyzed for all parameters	Lab
Data Set Review	**Responsibility**
The test report has all required information as described in Section A9 of the QAPP	Lab and/or TRA QAO
Confirmation that field and laboratory data have been reviewed	TRA QAO
Data set (to include field and laboratory data) evaluated for reasonableness and if corollary data agree	Lab, Field, and/or TRA DM
Outliers confirmed and documented	Lab, Field, and/or TRA DM
Field QC acceptable (e.g., field splits and trip, field and equipment blanks)	TRA DM and QAO
Sampling and analytical data gaps checked and documented	TRA DM
Verification and validation confirmed. Data meets conditions of end use and are reportable	TRA PM

D3 RECONCILIATION WITH USER REQUIREMENTS

Data produced in this project, and data collected by other organizations (e.g., USGS, TCEQ, etc.), will be analyzed and reconciled with project data quality requirements. Data meeting project requirements will be used by the TCEQ for the *Texas Water Quality Inventory and 303(d) List* in accordance with TCEQ's *Guidance for Assessing Texas Surface and Finished Drinking Water Quality Data*, and for TMDL development, stream standards modifications, and permit decisions as appropriate. Data which do not meet requirements will not be submitted to SWQMIS nor will be considered appropriate for any of the uses noted above.

Appendix A:
Task 3 Workplan

TASK 3: WATER QUALITY MONITORING

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

- planning and coordinating basin-wide monitoring
- routine, regularly-scheduled monitoring to collect long-term information and support statewide assessment of water quality
- systematic, regularly-scheduled short-term monitoring to screen water bodies for issues
- permit support monitoring to provide information for setting permit effluent limits
- special study, intensive monitoring targeted to:
  - identify sources and causes
  - assess priority water quality issues
  - obtain background water quality information
  - provide information for setting site-specific permit effluent limits
  - evaluate & develop statewide, regional, and site-specific water quality standards

Task Description: **Description:** The focus of routine monitoring in the Trinity basin will continue to be on working with participating agencies and gaining new participating agencies to obtain their data on a voluntary basis. TRA CRP staff will collect a limited number of samples as described below.

Monitoring Description

TRA CRP staff will monitor water quality conditions at approximately 20 stations in the Trinity basin. Samples to be collected at these stations will include flow (from USGS gages), field, conventional, bacteriological, and dissolved metals. Samples will be collected either quarterly or semiannually. All monitoring procedures and methods used by within-basin participating agencies as well as TRA CRP staff will follow the guidelines prescribed in the Trinity River Authority QAPP, the TCEQ *Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue (RG-415)* and the TCEQ *Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data (RG-416).* TRA provides assistance to participating agencies contributing data to the Clean Rivers Program by paying for all CRP quality assurance requirements as well as additional parameters collected at TRA's request on behalf of the Clean Rivers Program. Quality Assurance requirements funded by the program include: analysis of duplicate samples, equipment blanks and blanks as required under SWQM guidance and as negotiated with participating agencies; nitric and sulfuric acid for field preservation of parameters as required under the SWQM guidance; filter apparatuses and membranes or filter capsules for field filtration as required under SWQM guidance (i.e. for dissolved metals). TRA also provides other sampling equipment as may be deemed beneficial to the program or as necessitated by quality assurance requirements (e.g. pumps for collection and filtration of water samples, Secchi tubes for recording turbidity measurements, etc.).

Automated Continuous Monitoring

The operation of an automated continuous monitor on the Trinity River at Liberty will be supported through a subcontract with Texas A&M University. The monitor was installed and operated by the university initially for the TCEQ Galveston Bay Program. The monitor collects nutrients and other basic parameters. The Trinity Basin Clean Rivers Program contracted with the university to continue the monitor after the Galveston Bay Program support ended in Spring 2007. The subcontract will cover certain incidental costs such as travel and supplies. Personnel costs are already covered by other university funds.

Coordinated Monitoring Meeting

The Trinity River Authority will hold an annual coordinated monitoring meeting. 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. The changes to the monitoring schedule will be entered into the statewide database on the Internet (http://cms.lcra.org)

and communicated to meeting attendees. Changes to monitoring that occur during the course of the year will be entered into the statewide database on the Internet and communicated to meeting attendees.

Progress Report
Each Progress Report will indicate the number of sampling events and the types of monitoring conducted in the quarter, to include all types of monitoring.

Equipment: Equipment expected to be purchased during this contract may include a portable peristaltic pump, a multiprobe field sonde, and a sonde data display.

Deliverables & Dues Dates:

September 1, 2007 through August 31, 2008

A. Conduct water quality monitoring, summarize activities, and submit with Progress Report - December 15, 2007; March 15 and June 15, 2008
B. Coordinated Monitoring Meeting - between March 15 and April 30, 2008
C. Email notification with summary of changes that Coordinated Monitoring Schedule updates are complete - May 31, 2008

September 1, 2008 through August 31, 2009

A. Conduct water quality monitoring, summarize activities, and submit with Progress Report - September 15 and December 15, 2008; March 15 and June 15 and August 31, 2009
B. Coordinated Monitoring Meeting - between March 15 and April 30, 2009
C. Email notification with summary of changes that Coordinated Monitoring Schedule updates are complete - May 31, 2009

Trinity River Authority Clean Rivers Program

FY 2008/2009 QAPP - Appendix B Monitoring Schedule for FY 2008

Appendix B Sampling Process Design and Monitoring Schedule (plan)

Sample Design Rationale

The sample design is based on the legislative intent of the Clean Rivers Program. Under the legislation, the Basin Planning Agencies have been tasked with providing data to characterize water quality conditions in support of the 305(b) assessment, 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 TRA coordinates closely with the TCEQ and WBPAs to ensure a comprehensive water monitoring strategy within the watershed.

Site Selection Criteria

The intent of the TRA Clean Rivers Program monitoring network is to develop and maintain a basin-wide water quality monitoring program that minimizes duplicative monitoring, facilitates the assessment process, and targets monitoring to support the permits and standards process. This data collection effort involves monitoring routine water quality, using procedures that are consistent with the TCEQ SWQM program, for the purpose of data entry into the statewide database maintained by the TCEQ. To this end, some general guidelines are followed when selecting sampling sites, as basically outlined below, and discussed thoroughly in the *TCEQ Surface Water Quality Monitoring Procedures, Volume 1* (RG-415). Overall consideration is given to accessibility and safety. All monitoring activities have been developed in coordination with the CRP Steering Committee and with the TCEQ.

1. Locate stream sites so that samples can be safely collected from the centroid of flow. Centroid is defined as the midpoint of that portion of stream width which contains 50 percent of the total flow. If few sites are available for a stream segment, choose one that would best represent the water body, and not an unusual condition or contaminant source. Avoid backwater areas or eddies when selecting a stream site.

2. At a minimum for reservoirs, locate sites near the dam (reservoirs) and in the major arms. Larger reservoirs might also include stations in the middle and upper (riverine) areas. Select sites that best represent the water body by avoiding coves and back water areas. A single monitoring site is considered representative of 25 percent of the total reservoir acres, but not more than 5,120 acres.

3. Routine monitoring sites are selected to maximize stream coverage or basin coverage. Very long segments may require more stations. As a rule of thumb, stream segments between 25 and 50 miles long require two stations, and longer than 50 miles require three or more depending on the existence of areas with significantly different sources of contamination or potential water quality concerns. Major hydrological features, such as the confluence of a major tributary or an instream dam, may also limit the spatial extent of an assessment based on one station.

4. Because historical water quality data can be very useful in assessing use attainment or impairment, it may be best to use sites that are on current or past monitoring schedules.

5. All classified segments (including reservoirs) should have at least one routine monitoring site that adequately characterizes the water body., and should be coordinated with the TCEQ or other qualified monitoring entities reporting routine data to TCEQ.

6. Routine monitoring sites may be selected to bracket sources of pollution, influence of tributaries, changes in land uses, and hydrological modifications.

7. Sites should be accessible. When possible, stream sites should have a USGS or IBWC stream flow gauge. If not, it should be possible to conduct flow measurement during routine visits.

Monitoring Sites

Monitoring Tables for fiscal year 2008 are presented on the following pages.

Monitoring Sites for FY 2008

The sample design for surface water quality monitoring is shown in Table B1.1 below. Individual parameters represented by each parameter group are specified in Tables A7.1 to A7.8 by Program Code and sampling entity.

Critical vs. non-critical measurements

All data taken for CRP and entered into SWQMIS are considered critical.

Table B1.1 Monitoring Sites for FY2008

Region	Segment	Station Desc	Station Id	SC1/ SC2	Mon Type	Start Date	End Date	Frequencies (samples per year)														
								24HR	Aquatic Habitat	Benthics	Nekton	Metals Water	Organics Water	Metals Sediment	Organics Sediment	Conventional	AmbToxWat	AmbToxSed	Indicator Bacteria	Inst Flow	Fish Tissue	Field
City of Arlington Sampling																						
4	841	JOHNSON CREEK AT SH 360 IN ARLINGTON (ON THE EAST SIDE OF 360)	10719	TR/AR	RT	09/01/2007	08/31/2008					4				4			4			4
4	841	JOHNSON CREEK AT SH 303 (NEAR MATLOCK INTERSECTION) IN ARLINGTON	10721	TR/AR	RT	09/01/2007	08/31/2008					4							4			4
4	841	NORTH COTTONWOOD CREEK AT TIMBERLAKE DRIVE IN ARLINGTON	10722	TR/AR	RT	09/01/2007	08/31/2008					4				4			4			4
4	841	SOUTH COTTONWOOD CREEK AT FORUM DRIVE IN ARLINGTON	10723	TR/AR	RT	09/01/2007	08/31/2008					4							4			4
4	841	FISH CREEK NORTH BRANCH AT SH 360 IN ARLINGTON (NORTH OF MAYFIELD)	10724	TR/AR	RT	09/01/2007	08/31/2008					4							4			4
4	841	FISH CREEK SOUTH BRANCH AT SH 360 IN ARLINGTON	10725	TR/AR	RT	09/01/2007	08/31/2008					4				4			4			4
4	828	VILLAGE CREEK AT IH 20 (SERVICE ROAD) IN ARLINGTON	10780	TR/AR	RT	09/01/2007	08/31/2008					4							4			4
4	841	RUSH CREEK AT SUBLETT ROAD IN ARLINGTON	10791	TR/AR	RT	09/01/2007	08/31/2008					4							4			4
4	841	KEE BRANCH OF RUSH CREEK AT WEST PLEASANT RIDGE ROAD IN ARLINGTON	10792	TR/AR	RT	09/01/2007	08/31/2008					4							4			4
4	841	VILLAGE CREEK IMMEDIATELY SOUTH OF IH 30 IN ARLINGTON	17189	TR/AR	RT	09/01/2007	08/31/2008					4							4			4
4	841	RUSH CREEK AT IH 20 IN ARLINGTON	17190	TR/AR	RT	09/01/2007	08/31/2008					4							4			4
4	841	RUSH CREEK IMMEDIATELY UPSTREAM OF SH 180, 90 M WEST OF FOREST EDGE ROAD IN ARLINGTON	17191	TR/AR	RT	09/01/2007	08/31/2008					4				4			4			4
City of Dallas Sampling																						
4	507	COWLEECH FORK SABINE RIVER AT US 69 SOUTH OF GREENVILLE AND 5.5KM NW OF LONE OAK (T5)	10343	TR/DA	RT	09/01/2007	08/31/2008					2										12
5	507	LAKE TAWAKONI IN THE MAIN LAKE NEAR THE DAM IN THE OLD RIVER CHANNEL (T1)	10434	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	507	LAKE TAWAKONI AT SH 276/FM 35 (T3)	10437	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	507	CADDO CREEK AT SH34 (T6)	10439	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	820	LAKE RAY HUBBARD NEAR DALLAS WATER INTAKE STRUCTURE AT WEST END OF DAM (H1)	10998	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	823	LEWISVILLE LAKE, ELM FORK ARM (L5)	11026	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	823	LEWISVILLE LAKE AT IH35E IN THE HICKORY CREEK ARM (L7)	11027	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	824	ELM FORK TRINITY RIVER AT FM 2071, SOUTH OF GAINESVILLE (R1)	11031	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	840	RAY ROBERTS LAKE, ISLE DU BOIS CREEK ARM WEST OF JORDAN PARK (AT OLD HIGHWAY 455) (R5)	11076	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	839	ELM FORK TRINITY RIVER, 1600 FT. DOWNSTREAM OF RAY ROBERTS DAM (L2)	13619	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	826	GRAPEVINE LAKE AT MIDLAKE SITE BC (G5)	13875	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	825	DENTON CREEK AT DENTON TAP ROAD, 2 MI. NORTH OF COPPELL (E5)	14244	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	826	DENTON CREEK AT FM 156, 2.4 MI. NORTH OF JUSTIN, UPSTREAM OF LAKE	14483	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	826	DENTON CREEK AT US 377 WEST OF LAKE GRAPEVINE (G2)	14485	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	507	SOUTH FORK OF SABINE RIVER AT FM 1565, APPROXIMATELY 8.34 KM WEST OF QUINLAN (T7)	14967	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	822	ELM FORK TRINITY RIVER AT LEWISVILLE LAKE SPILLWAY, 3 MI. NE OF LEWISVILLE (E1)	15252	TR/DA	RT	09/01/2007	08/31/2008					2										12

Region	Segment	Station Desc	Station Id	SC1/ SC2	Mon Type	Start Date	End Date	Frequencies (samples per year)															
								24HR	Aquatic Habitat	Benthics	Nekton	Metals Water	Organics Water	Metals Sediment	Organics Sediment	Conventional	AmbToxWat	AmbToxSed	Indicator Bacteria	Inst Flow	Fish Tissue	Field
4	822	ELM FORK TRINITY RIVER AT INTAKE OF DALLAS WATER UTILITIES ELM FORK TREATMENT PLANT, 1.2KM NORTH OF SANDY LAKE ROAD IN CARROLLTON (E2)	16438	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	823	LAKE LEWISVILLE IN STEWART CREEK ARM AT FM423 (L4)	16808	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	820	LAKE RAY HUBBARD AT IH30 (H3)	16809	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	840	RAY ROBERTS LAKE IN BUCK CREEK COVE AT US377, SW OF SHERMAN (R3)	16822	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	840	RAY ROBERTS LAKE IN RANGE CREEK COVE AT US 377, SW OF SHERMAN (R2)	16823	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	840	RAY ROBERTS LAKE AT CR3002, 13MI SOUTH OF GAINESVILLE (R4)	16824	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	823	LITTLE ELM CREEK AT UPPER BRANCH CROSSING OF FM1385, APPROX 12KM UPSTREAM OF LEWISVILLE LAKE (L3)	16826	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	823	CLEAR CREEK AT IH35, WEST OF US377, APPROX 24.7KM UPSTREAM OF LEWISVILLE LAKE, SOUTH OF SANGER (L1)	16827	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	820	MUDDY CREEK AT LIBERTY GROVE ROAD, 0.65KM UPSTREAM OF LAKE RAY HUBBARD (H5)	16828	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	820	LAKE RAY HUBBARD, EAST FORK ARM AT SH66, WEST OF ROCKWALL (H4)	16829	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	826	GRAPEVINE LAKE AT DALLAS WATER UTILITIES INTAKE, NORTH OF BUSHONG ROAD AND KAITE DRIVE (G4)	17827	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	826	GRAPEVINE LAKE AT LITTLE PETE'S MARINA, SOUTH OF MURRELL PARK ROAD AND SOUTHEAST OF SIMMONS ROAD (G3)	17828	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	820	LAKE RAY HUBBARD AT MIDLAKE, SOUTH OF COOKE DRIVE (H2)	17829	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	823	LEWISVILLE LAKE NEAR THE MOUTH OF LITTLE ELM CREEK ARM (L6)	17830	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	840	RAY ROBERTS LAKE AT DALLAS WATER UTILITIES INTAKE, WEST SIDE OF DAM, NORTH OF END OF FM 2153 (R6)	17834	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	507	LAKE TAWAKONI AT THE INTAKE APPROX 0.22 KM WEST OF SPRING POINT (T2)	17835	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	507	LAKE TAWAKONI IN THE SABINE RIVER ARM APPROX EQUIDISTANCE FORM BOTH SHORES, WEST OF STONE POINT (T4)	17836	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	820	ROWLETT CREEK AT SH 78, 1.06 KM NORTH OF SH 190, SOUTHWEST OF SACHSE (H6)	17845	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	820	LAKE RAY HUBBARD (EAST FORK TRINITY RIVER) NEAR THE LAKE LAVON OUTFALL, APPROX 0.913 KM UPSTREAM OF SH 78 (V1)	17846	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	822	SKI LAKE NEAR BARCHMAN TREATMENT PLANT INTAKE, APPROX 300 M WEST OF IH 35E AND 0.7 KM SOUTH OF SPUR 482 (STOREY LANE) (E3)	17849	TR/DA	RT	09/01/2007	08/31/2008					2										12
4	822	ELM FORK TRINITY RIVER AT HEBRON PARKWAY SOUTHEAST OF LEWISVILLE TR255	18358	TR/DA	RT	09/01/2007	08/31/2008					2										12

Region	Segment	Station Desc	Station Id	SC1/ SC2	Mon Type	Start Date	End Date	Frequencies (samples per year)														
								24HR	Aquatic Habitat	Benthics	Nekton	Metals Water	Organics Water	Metals Sediment	Organics Sediment	Conventional	AmbToxWat	AmbToxSed	Indicator Bacteria	Inst Flow	Fish Tissue	Field
City of Fort Worth Sampling																						
4	806	WEST FORK TRINITY RIVER AT BEACH STREET IN FORT WORTH	10938	TR/FW	RT	09/01/2007	08/31/2008												12	12		12
4	806	WEST FORK TRINITY RIVER AT HANDLEY EDERVILLE RD., 0.55KM UPSTREAM OF IH820 IN FORT WORTH	16120	TR/FW	RT	09/01/2007	08/31/2008												12			12
4	806	WEST FORK TRINITY RIVER NEAR DAM IMMEDIATELY DOWNSTREAM OF 4TH STREET EAST OF FORT WORTH	17368	TR/FW	RT	09/01/2007	08/31/2008												12			12
4	806	SYCAMORE CREEK AT WESTERN END OF PAVEMENT OF SCOTT AVENUE IN EAST FORT WORTH	17369	TR/FW	RT	09/01/2007	08/31/2008												12			12
4	806	MARINE CREEK AT ABANDONED LOW WATER CROSSING 150 M DOWNSTREAM OF NE 23RD STREET IN NORTH FORT WORTH	17370	TR/FW	RT	09/01/2007	08/31/2008												12			12
4	829	Clear Fork Trinity River immediately upstream of West Rosedale Street in Fort Worth	18456	TR/FW	RT	09/01/2007	08/31/2008												12	12		12
City of Grand Prairie Sampling																						
4	841	MOUNTAIN CREEK AT SINGLETON BLVD. IN GRAND PRAIRIE	10815	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	BEAR CREEK AND ROCK ISLAND ROAD IN IRVING	10867	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	838	WALNUT CREEK, 2.6 MI. NE OF MANSFIELD AT COUNTY ROAD (MATLOCK)	13621	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	BEAR CREEK AT SHADY GROVE WEST ROAD IN GRAND PRAIRIE	17663	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	JOHNSON CREEK AT NORTH CARRIER PARKWAY IN GRAND PRAIRIE	17664	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	ARBOR CREEK AT EGYPTIAN WAY IN GRAND PRAIRIE	17666	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	LOWER WEST FORK TRINITY RIVER AT ROY ORR BLVD. IN GRAND PRAIRIE	17669	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	DALWORTH CREEK AT PALACE PARKWAY IN GRAND PRAIRIE	17671	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	COPART BRANCH MOUNTAIN CREEK (MUCK RUN) AT IDLEWILD ROAD IN GRAND PRAIRIE	17672	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	NORTH FORK COTTONWOOD CREEK AT WEST FREEWAY STREET IN GRAND PRAIRIE	17673	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	COTTONWOOD CREEK AT SOUTH BELTLINE ROAD IN GRAND PRAIRIE	17674	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	KIRBY CREEK AT CORN VALLEY ROAD IN GRAND PRAIRIE	17675	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	SOUTH FORK COTTONWOOD CREEK AT ROBINSON ROAD IN GRAND PRAIRIE	17676	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	SOUTH FORK FISH CREEK AT ROBINSON ROAD/SOUTH BELTLINE ROAD IN GRAND PRAIRIE	17677	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	NORTH FORK FISH CREEK AT ROBINSON ROAD/SOUTH BELTLINE ROAD IN GRAND	17678	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	FISH CREEK AT SOUTHEAST 14TH STREET/FM 1382 IN GRAND PRAIRIE	17679	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	838	SUGAR CREEK AT SETON ROAD IMMEDIATELY NORTH OF SPRING CREEK PARK IN GRAND PRAIRIE	17680	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	MOUNTAIN CREEEK AT WEST CAMP WISDOM ROAD IN GRAND PRAIRIE	17681	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	MOUNTAIN CREEK AT EAST JEFFERSON STREET IN GRAND PRAIRIE	17682	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12

Region	Segment	Station Desc	Station Id	SC1/ SC2	Mon Type	Start Date	End Date	Frequencies (samples per year)														
								24HR	Aquatic Habitat	Benthics	Nekton	Metals Water	Organics Water	Metals Sediment	Organics Sediment	Conventional	AmbToxWat	AmbToxSed	Indicator Bacteria	Inst Flow	Fish Tissue	Field
4	841	CROCKETT BRANCH COTTONWOOD CREEK AT BRANNON STREET IN GRAND PRAIRIE	17683	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	838	JOE POOL LAKE MOUNTAIN CREEK ARM AT SEETON ROAD BOAT RAMP IN BRITTON PARK IN MANSFIELD	17684	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
4	841	JOHNSON CREEK 229 M W AND 12 M N OF THE NORTH INTERSECTION OF BRIARWOOD AND WILDWOOD DR 425 M DNSTR OF DUNCAN PERRY RD IN GRAND PRAIRI	18311	TR/GP	RT	09/01/2007	08/31/2008					1	1			4			12			12
City of Irving Sampling																						
4	841	BEAR CREEK AT WEST HUNTER FERRELL ROAD IMMEDIATELY WEST OF THE INTERSECTION WITH SOUTH STORY ROAD IN IRVING	10865	TR/IR	RT	09/01/2007	08/31/2008					4				4			4			4
4	841	BEAR CREEK AT COUNTY LINE ROAD SOUTH OF SR 183 IN IRVING	10869	TR/IR	RT	09/01/2007	08/31/2008					4				4			4			4
4	822	ELM FORK TRINITY RIVER AT VALLEY VIEW LANE FROM KEENAN BRIDGE IN IRVING	17162	TR/IR	RT	09/01/2007	08/31/2008					4				4			4			4
4	822	HACKBERRY CREEK AT INTERSECTION OF NEW COLWELL BLVD AND COLWELL BLVD 0.3 KM UPSTREAM OF SR 348 IN IRVING	17170	TR/IR	RT	09/01/2007	08/31/2008					4				4			4			4
4	841	DELAWARE CREEK AT EAST OAKDALE ROAD APPROX. 1.6 KM UPSTREAM OF LP 12 (NORTH WALTON WALKER BLVD) IN IRVING	17178	TR/IR	RT	09/01/2007	08/31/2008					4				4			4			4
4	822	ELM FORK TRINITY RIVER AT EAST SHADY GROVE ROAD-EAST IRVING BOULEVARD 1700 FT OR 520 M DOWNSTREAM OF SR 356 IN IRVING	18310	TR/IR	RT	09/01/2007	08/31/2008					4				4			4			4
TRA Lake Livingston Project Sampling																						
12	2422	DOUBLE BAYOU EAST FORK AT FM 562, SE OF ANAHUAC	10658	TR/LL	RT	09/01/2007	08/31/2008									12						12
10	802	MENARD CREEK AT SH 146 SOUTHEAST OF LIVINGSTON TRA #37	10688	TR/LL	RT	09/01/2007	08/31/2008									1			1	1		1
10	802	LONG KING CREEK AT FM 1988 WEST OF GOODRICH TRA #36	10689	TR/LL	RT	09/01/2007	08/31/2008									1			1	1		1
10	803	WHITE ROCK CREEK AT SH 94 NORTHEAST OF TRINITY TRA #21	10696	TR/LL	RT	09/01/2007	08/31/2008									1			1			1
12	803	HARMON CREEK AT END OF COUNTY ROAD EAST OF FM 980 AND 7.6 MILES NORTHEAST OF HUNTSVILLE	10698	TR/LL	RT	09/01/2007	08/31/2008									2			2			2
12	803	NELSON CREEK AT UNNUMBERED COUNTY ROAD NEAR MOUNT OLIVE TRA #20	10700	TR/LL	RT	09/01/2007	08/31/2008									1			1			1
9	803	BEDIAS CREEK AT BRIDGE ON FM 247 EAST OF MADISONVILLE	10702	TR/LL	RT	09/01/2007	08/31/2008									1			1	1		1
12	801	TRINITY RIVER TIDAL AT IH 10 NEAR LIBERTY TRA #35	10892	TR/LL	RT	09/01/2007	08/31/2008									12						12
10	802	TRINITY RIVER AT US 59 SOUTH OF GOODRICH TRA #30	10897	TR/LL	RT	09/01/2007	08/31/2008					2				4			4	4		4
10	803	LAKE LIVINGSTON IN MAIN POOL NEAR DAM AT TRA BOUY #2	10899	TR/LL	BS	09/01/2007	08/31/2008	2														
10	803	LAKE LIVINGSTON IN MAIN POOL NEAR DAM AT TRA BOUY #2	10899	TR/LL	RT	09/01/2007	08/31/2008					2				12			12			12
10	803	LAKE LIVINGSTON IN KICKAPOO CREEK BAY CHANNEL TRA #12	10909	TR/LL	RT	09/01/2007	08/31/2008					2				4			4			4
10	803	LAKE LIVINGSTON AT US 190 WEST OF ONALASKA	10911	TR/LL	RT	09/01/2007	08/31/2008					2				4			4			4
10	803	LAKE LIVINGSTON IN MAIN CHANNEL NEAR MOUTH OF WHITE ROCK CREEK BAY TRA #6	10913	TR/LL	RT	09/01/2007	08/31/2008					2				4			4			4
10	803	LAKE LIVINGSTON AT SH 19 SOUTH OF TRINITY	10914	TR/LL	BS	09/01/2007	08/31/2008					4				12			12	12		12
10	803	LAKE LIVINGSTON AT SH 19 SOUTH OF TRINITY	10914	TR/LL	RT	09/01/2007	08/31/2008	2														

Region	Segment	Station Desc	Station Id	SC1/ SC2	Mon Type	Start Date	End Date	Frequencies (samples per year)														
								24HR	Aquatic Habitat	Benthics	Nekton	Metals Water	Organics Water	Metals Sediment	Organics Sediment	Conventional	AmbToxWat	AmbToxSed	Indicator Bacteria	Inst Flow	Fish Tissue	Field
10	803	LAKE LIVINGSTON HEADWATERS AT SH 21 NORTHEAST OF MIDWAY TRA #97	10917	TR/LL	RT	09/01/2007	08/31/2008					4				12			12			12
12	902	CEDAR BAYOU AT US 90 NE OF CROSBY	11120	TR/LL	RT	09/01/2007	08/31/2008									12						12
10	802	BIG CREEK AT US 59, 1.5 MI NE OF SHEPHERD, 11.6 MI UPSTREAM FROM MOUTH	13685	TR/LL	RT	09/01/2007	08/31/2008									1			1			1
10	804	TRINITY RIVER 1000 FT. UPSTREAM FROM SH 7, 11.9 MI. WEST OF CROCKETT	13690	TR/LL	RT	09/01/2007	08/31/2008					4				12			12	12		12
10	803	LAKE LIVINGSTON USGS SITE BC	14005	TR/LL	BS	09/01/2007	08/31/2008	2														
10	803	LAKE LIVINGSTON USGS SITE CC	14006	TR/LL	BS	09/01/2007	08/31/2008	2														
10	803	LAKE LIVINGSTON USGS SITE DL	14007	TR/LL	BS	09/01/2007	08/31/2008	2														
10	803	LAKE LIVINGSTON USGS SITE HC	14014	TR/LL	BS	09/01/2007	08/31/2008	2														
12	802	COASTAL WATER AUTHORITY CANAL (LYNCHBURG CANAL) AT FM1409, 3.6KM DOWNSTREAM OF CONFLUENCE WITH TRINITY RIVER, SOUTH OF LIBERTY	16148	TR/LL	RT	09/01/2007	08/31/2008					1				1			1			1
10	802	TRINITY RIVER AT FM3278, 0.75KM DOWNSTREAM OF LAKE LIVINGSTON AND 8MI EAST OF COLDSPRING	16998	TR/LL	RT	09/01/2007	08/31/2008									12						12
12	801	OLD RIVER AT FM 1409 SOUTHWEST OF WINFREE	18360	TR/LL	RT	09/01/2007	08/31/2008									12						12
12	2422	DOUBLE BAYOU WEST FORK AT FM 2936 SOUTHEAST OF ANAHUAC	18361	TR/LL	RT	09/01/2007	08/31/2008									12						12
Tarrant Regional Water District Sampling																						
4	806	WEST FORK TRINITY RIVER AT BEACH STREET IN FORT WORTH	10938	TR/TD	RT	09/01/2007	08/31/2008					4				4			4			4
4	809	EAGLE MOUNTAIN RESERVOIR AT RIGHT END OF DAM	10944	TR/TD	RT	09/01/2007	08/31/2008					4				4			4			4
4	809	EAGLE MOUNTAIN RESERVOIR AT RIGHT END OF DAM	10944	TR/TD	BS	09/01/2007	08/31/2008	2														
4	809	EAGLE MOUNTAIN RESERVOIR NEAR TEXAS ELECTRIC	10952	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	809	EAGLE MOUNTAIN RESERVOIR NEAR COLE SUBDIVISION	10956	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	809	EAGLE MOUNTAIN RESERVOIR NEAR INDIAN CREEK COVE	10960	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	809	EAGLE MOUNTAIN RESERVOIR NEAR NEWARK BEACH	10964	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	810	WEST FORK TRINITY RIVER AT VAN METER BRIDGE	10967	TR/TD	RT	09/01/2007	08/31/2008												4			4
4	810	WEST FORK TRINITY RIVER AT SH 114 EAST OF BOYD	10968	TR/TD	RT	09/01/2007	08/31/2008												4			4
4	810	WEST FORK TRINITY RIVER AT FM 730 NE OF BOYD	10969	TR/TD	RT	09/01/2007	08/31/2008												4			4
4	811	LAKE BRIDGEPORT MID LAKE NEAR DAM	10970	TR/TD	RT	09/01/2007	08/31/2008					4				4			4			4
4	811	LAKE BRIDGEPORT MID LAKE NEAR DAM	10970	TR/TD	BS	09/01/2007	08/31/2008	2														
4	828	LAKE ARLINGTON AT MID LAKE	11042	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	836	RICHLAND-CHAMBERS RESERVOIR, RICHLAND CREEK ARM MID-LAKE NEAR CRAB CREEK BRANCH	11068	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	828	LAKE ARLINGTION USGS SITE FC	13897	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	828	LAKE ARLINGTION USGS SITE EC	13899	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	828	LAKE ARLINGTON USG SITE AC	13904	TR/TD	RT	09/01/2007	08/31/2008	2														
4	828	LAKE ARLINGTON USG SITE AC	13904	TR/TD	BS	09/01/2007	08/31/2008					4				4			4			4
4	810	WEST FORK TRINITY RIVER AT WISE CR 3390, 2.2 MI. SE OF PARADISE OFF HWY	14246	TR/TD	RT	09/01/2007	08/31/2008												4			4

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								24HR	Aquatic Habitat	Benthics	Nekton	Metals Water	Organics Water	Metals Sediment	Organics Sediment	Conventional	AmbToxWat	AmbToxSed	Indicator Bacteria	Inst Flow	Fish Tissue	Field
4	810	WEST FORT TRINITY RIVER AT US 380, 1.8 MI. SW OF BRIDGEPORT	14904	TR/TD	RT	09/01/2007	08/31/2008												4			4
4	830	BENBROOK LAKE, EAST END OF DAM, NEAR INTAKE STRUCTURE	15151	TR/TD	RT	09/01/2007	08/31/2008					4				4			4			4
4	830	BENBROOK LAKE, EAST END OF DAM, NEAR INTAKE STRUCTURE	15151	TR/TD	BS	09/01/2007	08/31/2008	2														
4	830	BENBROOK LAKE, NORTH OF ST. FRANCIS VILLAGE, EAST SIDE OF RESERVOIR IN MAIN CHANNEL	15156	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	830	BENBROOK LAKE, EAST OF BOAT RAMP AT HOLIDAY PARK IN MAIN CHANNEL	15158	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	811	LAKE BRIDGEPORT AT NORTH END OF BODY OF RESERVOIR	15164	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	836	RICHLAND-CHAMBERS RESERVOIR, NORTH END OF DAM	15168	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	836	RICHLAND-CHAMBERS RESERVOIR AT CONFLUENCE OF RICHLAND CREEK AND CHAMBERS CREEK	15169	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	836	RICHLAND-CHAMBERS RESERVOIR, MIDDLE SECTION OF CHAMBERS CREEK ARM NEAR TCWCID #1 PUMP STATION	15170	TR/TD	RT	09/01/2007	08/31/2008	2														
4	836	RICHLAND-CHAMBERS RESERVOIR, MIDDLE SECTION OF CHAMBERS CREEK ARM NEAR TCWCID #1 PUMP STATION	15170	TR/TD	BS	09/01/2007	08/31/2008					12				12			4			12
4	836	RICHLAND-CHAMBERS RESERVOIR IN UPPER END OF RICHLAND CREEK ARM	15172	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	836	RICHLAND-CHAMBERS RESERVOIR UPPER END OF CHAMBERS CREEK ARM	15199	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	810	BIG SANDY CREEK AT US 380, 4.0 MI EAST OF BRIDGEPORT	15688	TR/TD	RT	09/01/2007	08/31/2008												4			4
5	818	CEDAR CREEK RESERVOIR, SOUTH END OF RESERVOIR, MIDLAKE, 0.6KM EAST OF JOE B HOGSETT ROAD	16747	TR/TD	RT	09/01/2007	08/31/2008	2														
5	818	CEDAR CREEK RESERVOIR, SOUTH END OF RESERVOIR, MIDLAKE, 0.6KM EAST OF JOE B HOGSETT ROAD	16747	TR/TD	BS	09/01/2007	08/31/2008					12				12			4			12
5	818	CEDAR CREEK RESERVOIR, SOUTH END OF RESERVOIR, 0.9KM SOUTH OF BLUEBIRD LANE AT CONFL. OF CANEY CREEK COVE AND CLEAR CREEK COVE	16748	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
5	818	CEDAR CREEK RESERVOIR, SOUTH END OF RESERVOIR, MIDLAKE, 1.1KM SOUTH OF DEER ISLAND ROAD	16749	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
5	818	CEDAR CREEK RESERVOIR, MIDDLE SECTION OF RESERVOIR, MIDLAKE	16750	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
5	818	CEDAR CREEK RESERVIOR, MIDLAKE, 1.1KM NORTH OF SH334	16753	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	811	LAKE BRIDGEPORT, SOUTH END OF LAKE IN MAIN CHANNEL, 0.8KM EAST OF RATTLESNAKE ISLAND	16762	TR/TD	RT	09/01/2007	08/31/2008									4			4			4
4	810	SALT CREEK NORTH OF EAGLE MOUNTAIN RESERVOIR, 29.8KM UPSTREAM OF THE RESERVOIR AT SH114, NW OF BOYD	16766	TR/TD	RT	09/01/2007	08/31/2008												4			4
4	810	GARRETT CREEK NORTH OF EAGLE MOUNTAIN RESERVOIR, 31.9KM UPSTREAM OF THE RESERVOIR AT SH114, NW OF BOYD	16767	TR/TD	RT	09/01/2007	08/31/2008												4			4
4	818	CEDAR CREEK RESERVOIR, NORTH END OF RESERVOIR, MIDLAKE, 4.7KM EAST OF SH274	16772	TR/TD	RT	09/01/2007	08/31/2008									4			4			4

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4	806	WEST FORK TRINITY RIVER NEAR DAM IMMEDIATELY DOWNSTREAM OF 4TH STREET EAST OF FORT WORTH	17368	TR/TD	RT	09/01/2007	08/31/2008					4				4			4			4
4	810	WEST FORK TRINITY RIVER AT BOBO BRIDGE ON WISE CR 4668, SOUTH OF BOYD	17844	TR/TD	RT	09/01/2007	08/31/2008												4			4
4	810	MARTIN BRANCH CENTER CREEK AT FM 51, EAST OF PARADISE	17848	TR/TD	RT	09/01/2007	08/31/2008												4			4
TRA General Office Sampling																						
4	820	ROWLETT CREEK AT SH 66	10753	TR/TR	RT	09/01/2007	08/31/2008					4				12			12			12
5	804	TRINITY RIVER AT US 79 NE OF OAKWOOD	10919	TR/TR	RT	09/01/2007	08/31/2008					4				12			12	12		12
5	804	TRINITY RIVER AT SH 31 IN TRINIDAD	10922	TR/TR	RT	09/01/2007	08/31/2008					4				12			12	12		12
4	805	TRINITY RIVER AT SH 34 NE OF ENNIS	10925	TR/TR	RT	09/01/2007	08/31/2008					4				12			12	12		12
4	805	TRINITY RIVER AT SOUTH LOOP SH 12 BELOW DALLAS	10934	TR/TR	RT	09/01/2007	08/31/2008					4				12			12	12		12
4	805	TRINITY RIVER AT MOCKINGBIRD LANE IN DALLAS	10937	TR/TR	RT	09/01/2007	08/31/2008					4				12			12	12		12
4	841	LOWER WEST FORK TRINITY RIVER AT BELT LINE RD IN GRAND PRAIRE	11081	TR/TR	RT	09/01/2007	08/31/2008					4				12			12	12		12
4	806	WEST FORK TRINITY RIVER AT GATEWAY PARK, OFF OF PIER AT RIVERBANK DRIVE, IN FORTH WORTH	17863	TR/TR	RT	09/01/2007	08/31/2008					4				12			12	12		12
4	822	ELM FORK TRINITY RIVER AT WILDWOOD DRIVE IN DALLAS	TR293	TR/TR	RT	09/01/2007	08/31/2008					4				12			12			12
4	827	WHITE ROCK CREEK AT I-635	TR295	TR/TR	RT	09/01/2007	08/31/2008					4				12			12			12