SURFACE WATER QUALITY MONITORING PROJECT
FOR THE
GUADALUPE RIVER BASIN

Quality Assurance Project Plan

Guadalupe-Blanco River Authority
933 E. Court St.
Seguin, Texas 78155

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:

Debbie Magin
Director of Water Quality Services
933 E. Court St.
Seguin, Texas 78155
(830) 379-5822
dmagin@gbra.org

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

Allison Woodall 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

GUADALUPE-BLANCO RIVER AUTHORITY and REGIONAL LABORATORY

Debbie Magin Date	Josie Longoria Date
GBRA Project Manager	GBRA QAO and Laboratory Director

UPPER GUADALUPE RIVER AUTHORITY LABORATORY

Tara Bushnoe Date	Bobby Caldwell Date
UGRA Project Manager and QAO	UGRA Laboratory Director

SAN ANTONIO RIVER AUTHORITY ENVIRONMENTAL LABORATORY

Chuck Lorea Date	Patricia Carvajal Date
SARA Laboratory Director	SARA Quality Assurance Officer

DEPARTMENT OF STATE HEALTH SERVICES LABORATORY

Don Brown Date	Dr. Yue Zhang Date
DSHS Mgr., Inorganic and Nuclear Chemistry	DSHS Quality Assurance Officer

LOWER COLORADO RIVER AUTHORITY ENVIRONMENTAL LABORATORY SERVICES

Alicia Gill Date	Hollis Pantalion Date
LCRA Laboratory Manager	LCRA Quality Assurance Officer

GBRA 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. GBRA will maintain this documentation as part of the project's quality assurance records, and will ensure the documentation is 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**
DSHS	**Department of State Health Services**
EPA	**United States Environmental Protection Agency**
FY	**Fiscal Year**
GBRA	**Guadalupe-Blanco River Authority**
LIMS	**Laboratory Information Management System**
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)**
LCRA	**Lower Colorado River Authority**
QA	**Quality Assurance**
QSM	**Quality Systems 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**
RL	**Reporting Limit**
SARA	**San Antonio River Authority**
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**
UGRA	**Upper Guadalupe River Authority**
VOA	**Volatile Organic Analytes**
WMT	**Watershed Management Team**
WVWA	**Wimberley Valley Watershed Association**

A3 DISTRIBUTION LIST

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

Allison Woodall, Project Manager
Clean Rivers Program
MC-165
(512) 239-4628

Daniel R. Burke
Lead CRP Quality Assurance Specialist
MC-176
(512) 239-0011

David Manis
Mgr, Data Mgt and QA Section
MC-165
(512) 239-5853

GBRA
933 E. Court St.
Seguin, Texas 78155

Debbie Magin, Project Manager
(830) 379-5822

Josie Longoria, Quality Assurance Officer
(830) 379-5822

UGRA
125 Lehmann, Suite 100
Kerrville, TX 78028

Tara Bushnoe
(830) 896-5456 x.227

WIMBERLEY VALLEY WATERSHED ASSOCIATION
1405 Mt. Sharp Rd.
Wimberley, TX 78676

David Baker
(512) 847-9391

SARA ENVIRONMENTAL LAB
600 E. Euclid
San Antonio, TX 78212

Chuck Lorea
(210) 227-1373

DEPARTMENT OF STATE HEALTH SERVICES
Laboratory Services Section
1100 W. 49th St.
Austin, Texas 78756-3199

Don Brown
(512) 458-7318 x. 3827

LCRA ENVIRONMENTAL LAB SERVICES
3505 Montopolis
Austin, TX 78744

Gary Franklin
(512) 356-6023

GBRA 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. GBRA 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.

Allison Woodall
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 GBRA 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.

GUADALUPE-BLANCO RIVER AUTHORITY

Debbie Magin
GBRA 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 GBRA 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. 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.

Josie Longoria
GBRA Quality Assurance Officer

Responsible for coordinating the implementation of the QA program. Responsible for identifying, receiving, and maintaining project quality assurance records. Responsible for coordinating with the TCEQ QAS to resolve QA-related issues. Notifies the GBRA 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. Ensures that monitoring systems audits on project participants are conducted to determine compliance with project and program specifications, reviews written reports, and follows through on findings. Ensures that field staff are properly trained and that training records are maintained.

Debbie Magin
GBRA 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 GBRA internet site.

Lee Gudgell
GBRA Water Quality Investigator/Field Technician

Responsible for coordinating sampling events, including maintenance of sampling bottles, supplies, and equipment. Maintains records of field data collection and observations. Conducts monitoring systems audits on project participants to determine compliance with project and program specifications, issues written reports, and follows through on findings.

Josephine Longoria
GBRA Regional Laboratory Director

The responsibilities of the lab director include supervision of laboratory, purchasing of equipment, maintain quality assurance manual for laboratory operations, and supervision of lab safety program. Additionally, the lab director will review and verify all field and laboratory data for integrity and continuity, reasonableness and conformance to project requirements, and then validated against the data quality objectives listed in Tables A7.1.

GBRA Laboratory Analyst/Technicians (5)

Perform laboratory analysis for inorganic constituents, nutrients, etc.; assist in collection of field data and samples for stream monitoring and chemical sampling of environmental sites. Perform sample custodial duties.

LCRA ENVIRONMENTAL LABORATORY SERVICES

Gary Franklin
LCRA Project Manager

Reviews and verifies all laboratory data for integrity and continuity, reasonableness and conformance to project requirements, and then validated against the measurement performance specifications listed in Table A7.1.

Alicia C. Gill
LCRA Lab Manager

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

Hollis Pantalion
LCRA Quality Assurance Officer

Maintains operating procedures that are in compliance with the QAPP, amendments and appendices. Responsible for the overall quality control and quality assurance of analyses performed by LCRA's Environmental Laboratory Services. Assists with monitoring systems audits for CRP projects.

SAN ANTONIO RIVER AUTHORITY

Chuck Loera
SARA Lab Manager

The responsibilities of the lab director include supervision of laboratory, purchasing of equipment, and supervision of lab safety program. The SARA lab director will review and verify all laboratory data for integrity and continuity, reasonableness and conformance to project requirements, and then validated against the measurement performance specifications listed in Table A7.1.

Patricia Carvajal
SARA Quality Assurance Officer

Maintains quality assurance manual for laboratory operations, maintains operating procedures that are in compliance with the QAPP, amendments and appendices. Responsible for the overall quality control and quality assurance of analyses performed by SARA's Environmental Services Department. Assists with monitoring systems audits for CRP projects.

UPPER GUADALUPE RIVER AUTHORITY

Tara Bushnoe
UGRA Project Manager

Responsible for directing CRP activities in the upper Guadalupe River Basin, in Kerr County. Assures strict compliance with the CRP requirements for project administration and quality assurance. Responsible for coordinating and conducting sampling events, including maintenance of sampling bottles, supplies, and equipment. Maintains records of field data collection and observations. Assists GBRA staff in collecting and analyzing bioassessment samples.

Tara Bushnoe
UGRA Quality Assurance Officer

Maintains operating procedures that are in compliance with the QAPP, amendments and appendices. Assists with monitoring systems audits for CRP projects. Ensures that field staff are properly trained and that training records are maintained. Additionally, the UGRA QAO will review and verify all field and laboratory data for integrity and continuity, reasonableness and conformance to project requirements, validating the field and lab data in accordance with the data quality objectives listed in Table A7.2.

Tara Bushnoe
UGRA Data Manager

Responsible for ensuring that field and lab 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 link from the water monitoring section of the UGRA web page to the Kerr County monitoring sites section of the GBRA web page.

Bobby Caldwell
UGRA Laboratory Director

The responsibilities of the lab director include supervision of the laboratory and lab staff, maintaining quality assurance manual for laboratory operations, and supervision of lab safety program. Performs laboratory analyses for inorganic constituents, nutrients, etc. Additionally, the lab director will review and verify all laboratory data for integrity and continuity, reasonableness and conformance to project requirements, validating the lab data in accordance with the data quality objectives listed in Table A7.2. Will assist when necessary in the collection of field data and samples for stream monitoring and chemical

sampling of environmental sites.

UGRA Laboratory Analyst/Field Technicians

Perform laboratory analyses for inorganic constituents, nutrients, etc.; assist in the collection of field data and samples for stream monitoring and chemical sampling of environmental sites.

Wimberley Valley Watershed Association

David Baker
Wimberley Valley Watershed Association Project Manager

Responsible for directing CRP activities for the Wimberley Valley Watershed Association for the Blanco River-Cypress Creek Water Quality Monitoring Study. Assures strict compliance with the CRP requirements for project administration and quality assurance. Maintains operating procedures that are in compliance with the QAPP. Assists with monitoring systems audits for CRP projects. Responsible for ensuring that field data are properly reviewed and verified. Responsible for the transfer of project quality-assured water quality data to GBRA Project Manager.

Wimberley Valley Watershed Association Field Technicians

Responsible for coordinating sampling events, including maintenance of sampling bottles, supplies, and equipment. Maintains records of field data collection and observations. Responsible for the transfer of project quality-assured water quality data to GBRA Project Manager.

DEPARTMENT OF STATE HEALTH SERVICES LABORATORY

Jeff Rathbone
DSHS Water Radiochemistry Team Leader

Reviews and verifies all laboratory data for integrity and continuity, reasonableness and conformance to project requirements, and then validated against the measurement performance specifications listed in Table A7.1.

Don Brown
DSHS Inorganic and Radiochemistry Group Manager

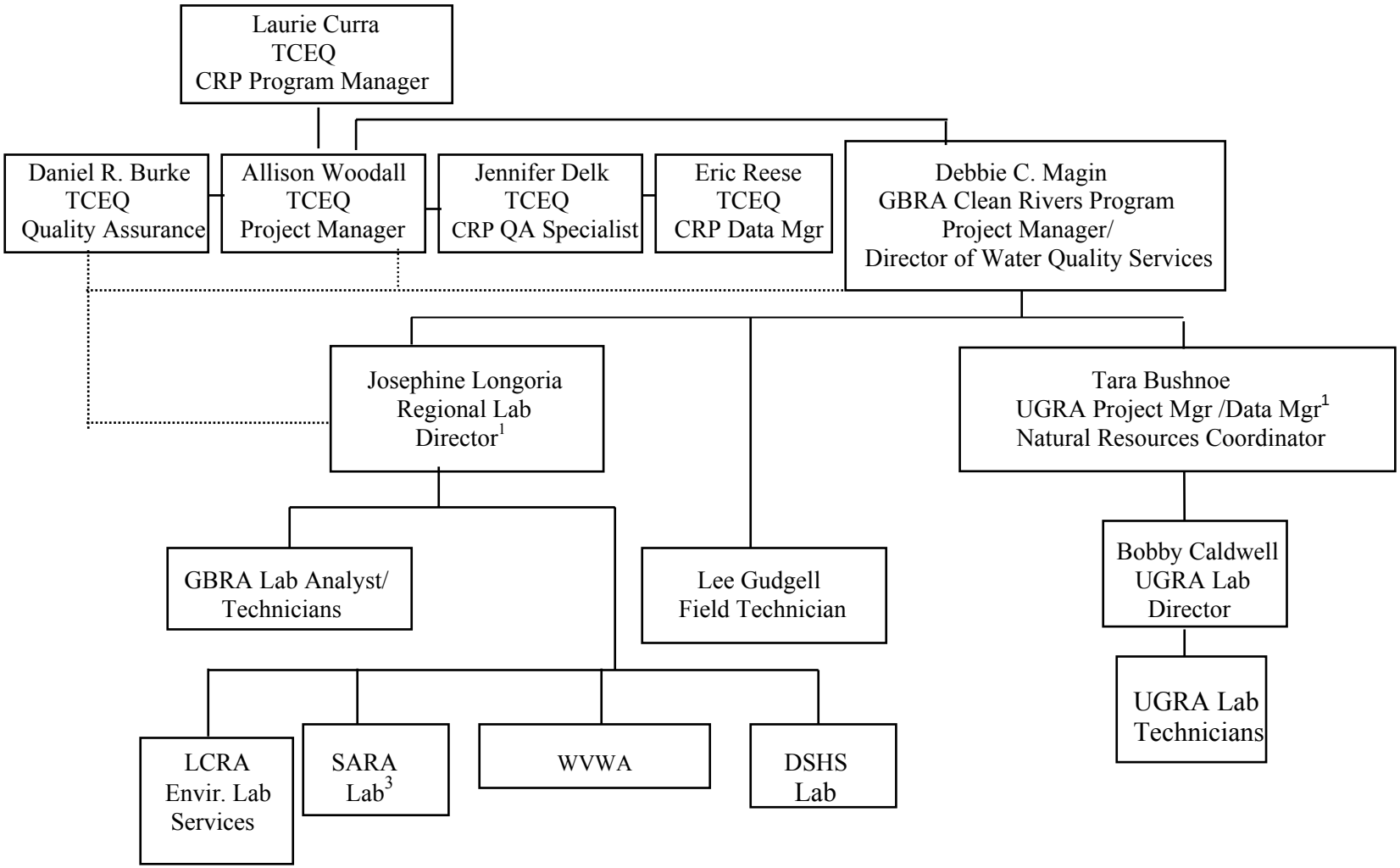
The responsibilities of the group manager include supervision of laboratory, purchasing of equipment, for laboratory operations, and supervision of lab safety program. The DSHS Group Manager will review and verify all field and laboratory data for integrity and continuity, reasonableness and conformance to project requirements, and then validated against the measurement performance specifications listed in Table A7.1.

Yue Zhang, Ph.D.
DSHS Environmental Sciences Quality Assurance Officer

Maintains operating procedures that are in compliance with the QAPP, amendments and appendices. Responsible for maintenance of the quality assurance manual and the overall quality control and quality assurance of analyses performed by the Environmental Science Branch of the DSHS Laboratory Services Section.

PROJECT ORGANIZATION CHART

Figure A4.1. Organization Chart – Lines of Communication



1 Serve as Quality Assurance Officer for each River Authority
2 See Project/Task Organization in this section for a description of each position's responsibilities.
3 SARA will be used in the event of an equipment failure and the need to meet holding times.

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 GBRA 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 the GBRA 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.

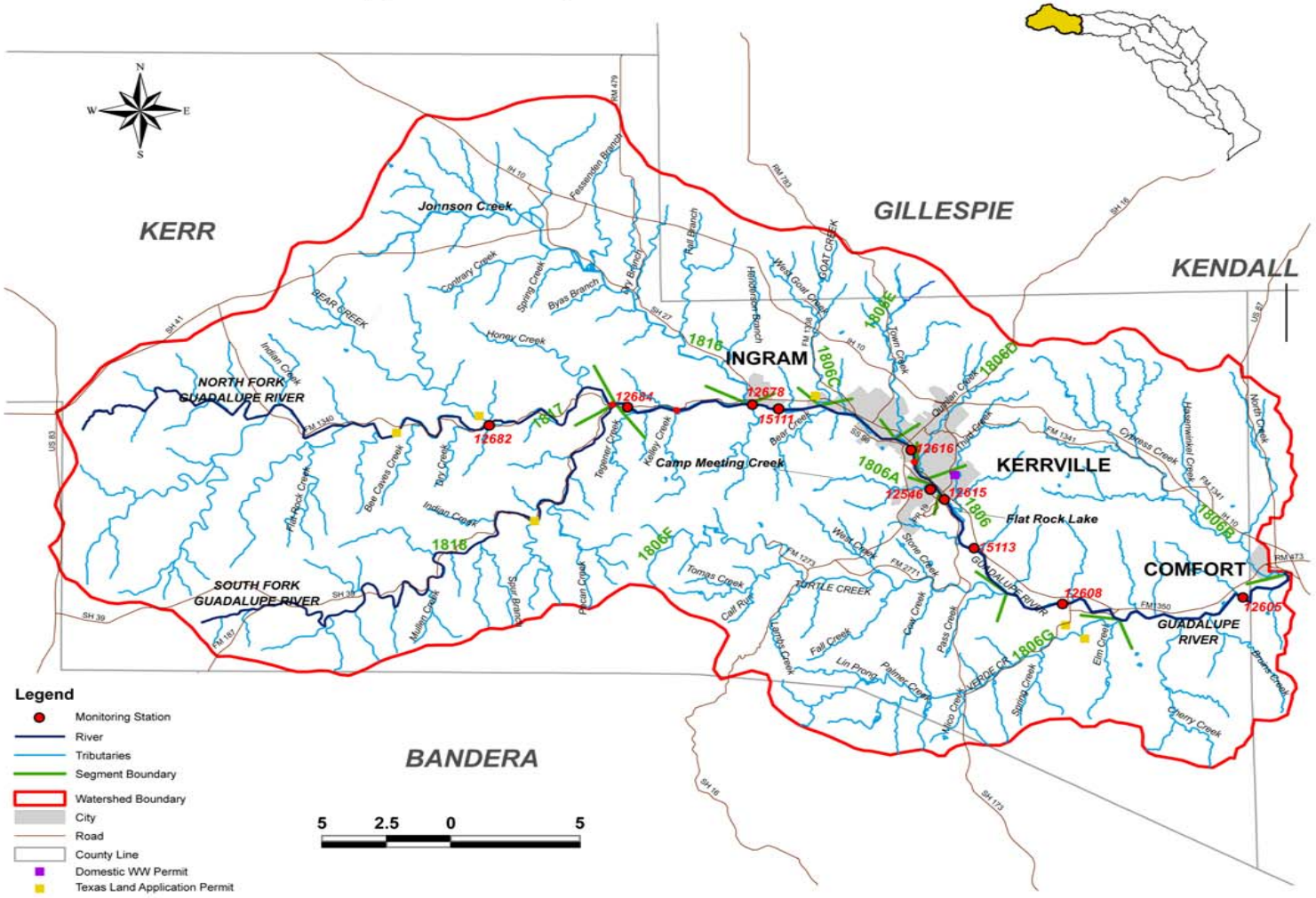
The GBRA in conjunction with UGRA have been monitoring water quality since the mid-1980s and have been actively involved in water quality planning since the early 1970s. Through the Clean Rivers Program's Surface Water Quality Monitoring Project, the river authorities have enhanced and modified their existing programs. The expansion of the existing monitoring efforts has allowed the river authorities' staffs to gather data to characterize water quality conditions in areas not previously monitored. The program for FY 2008-2009 includes continuation of the existing monitoring program, including biological monitoring, and annual sampling for trace metals concentrations in water and in sediment at selected sites. Additionally, organics analyses in water will be performed in FY 2008 at one site on the lower Plum Creek and in sediment in the San Marcos River in the city of San Marcos and at a site selected in Kerr County. The Coleto Creek at Arnold Road site will be sampled quarterly in FY 2008 for radiological isotopes of uranium to establish background concentrations in advance of uranium mining proposed for the area. Metals in sediment will be performed on samples collected from Geronimo Creek in Guadalupe County and at a site where there is sediment in Kerr County.

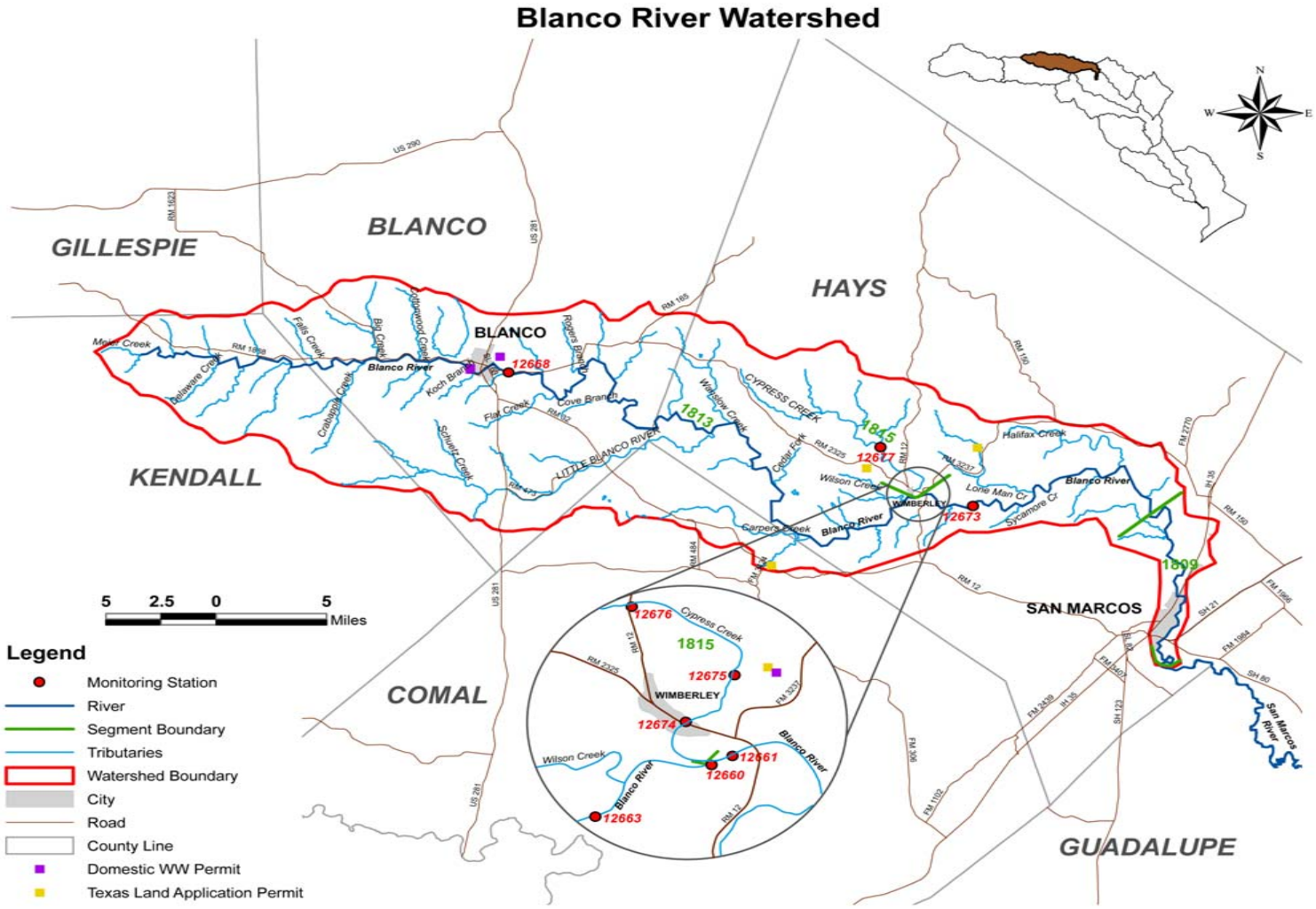
The monitoring goals for the CRP program in the Guadalupe River Basin are to verify that the overall health of the stream is and remains in good condition.

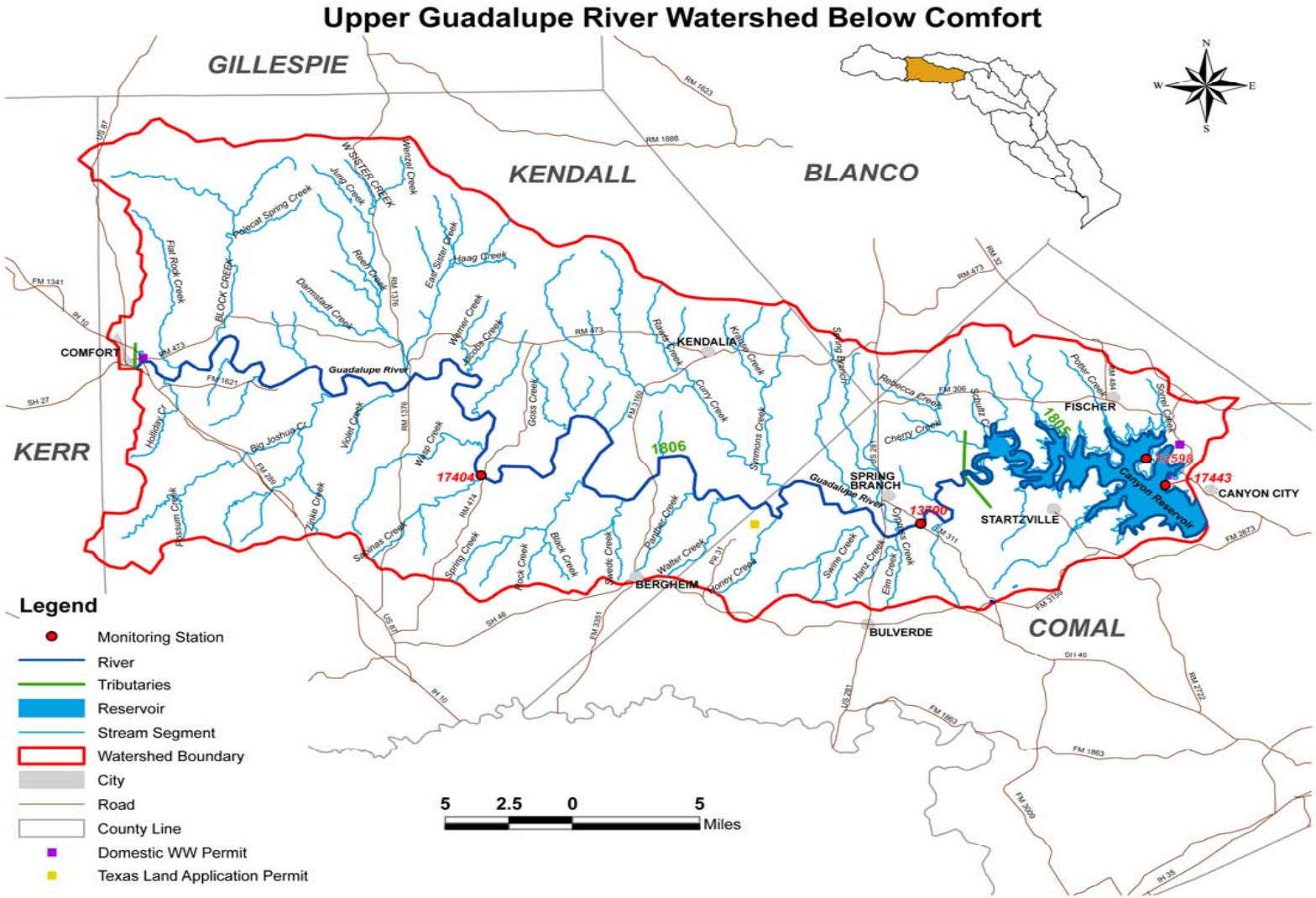
The Wimberley Valley Watershed Association is a monitoring entity in the Guadalupe River Basin that contributes data collected under the GBRA QAPP. The WVWA will collect data at sites on the Blanco River and Cypress Creek monthly March through October. These sites are coordinated with the GBRA and TCEQ monitoring schedule annually.

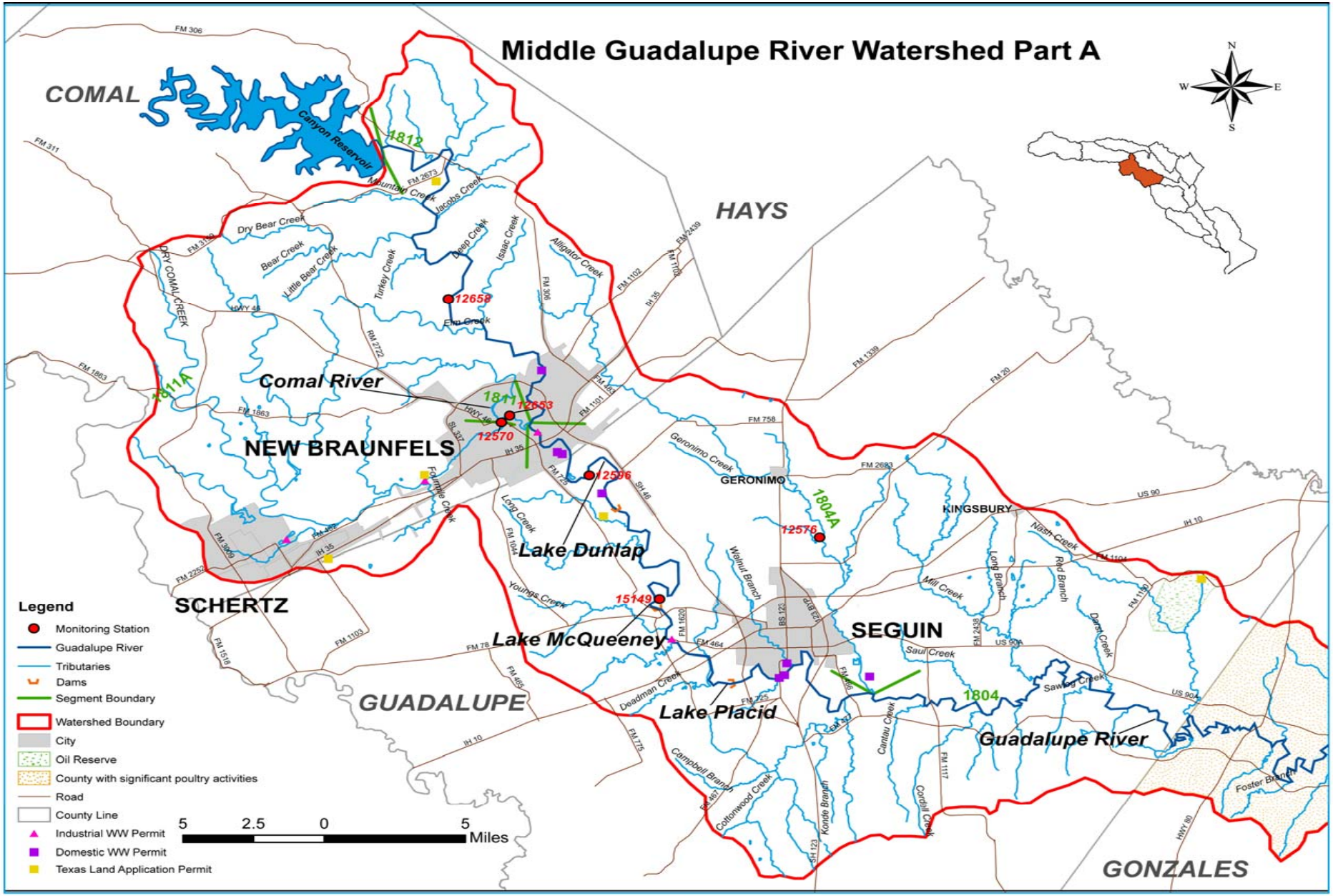
Figure A5.1 is a map of the sampling locations for FY 2008.

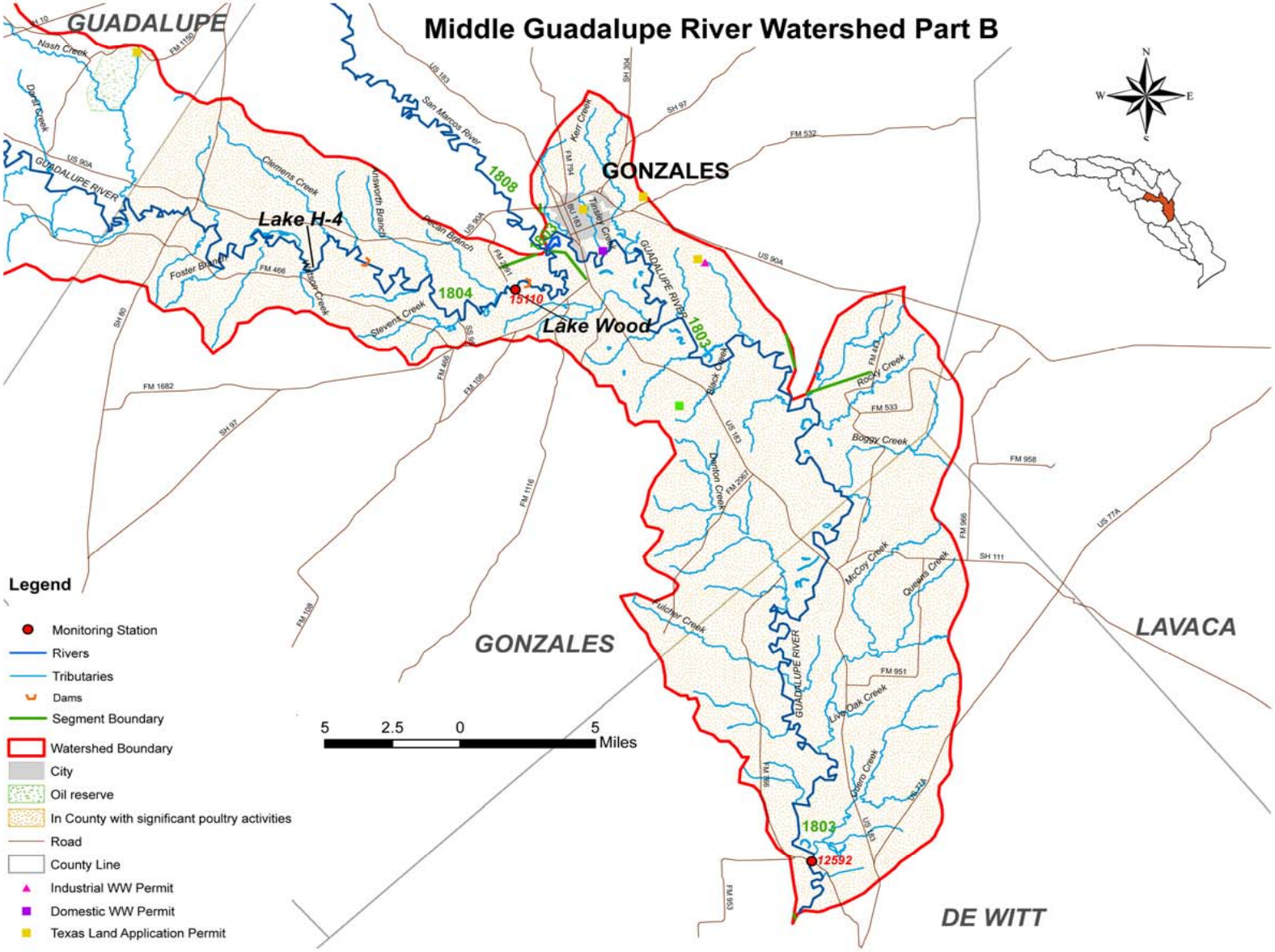
Upper Guadalupe River Watershed Above Comfort

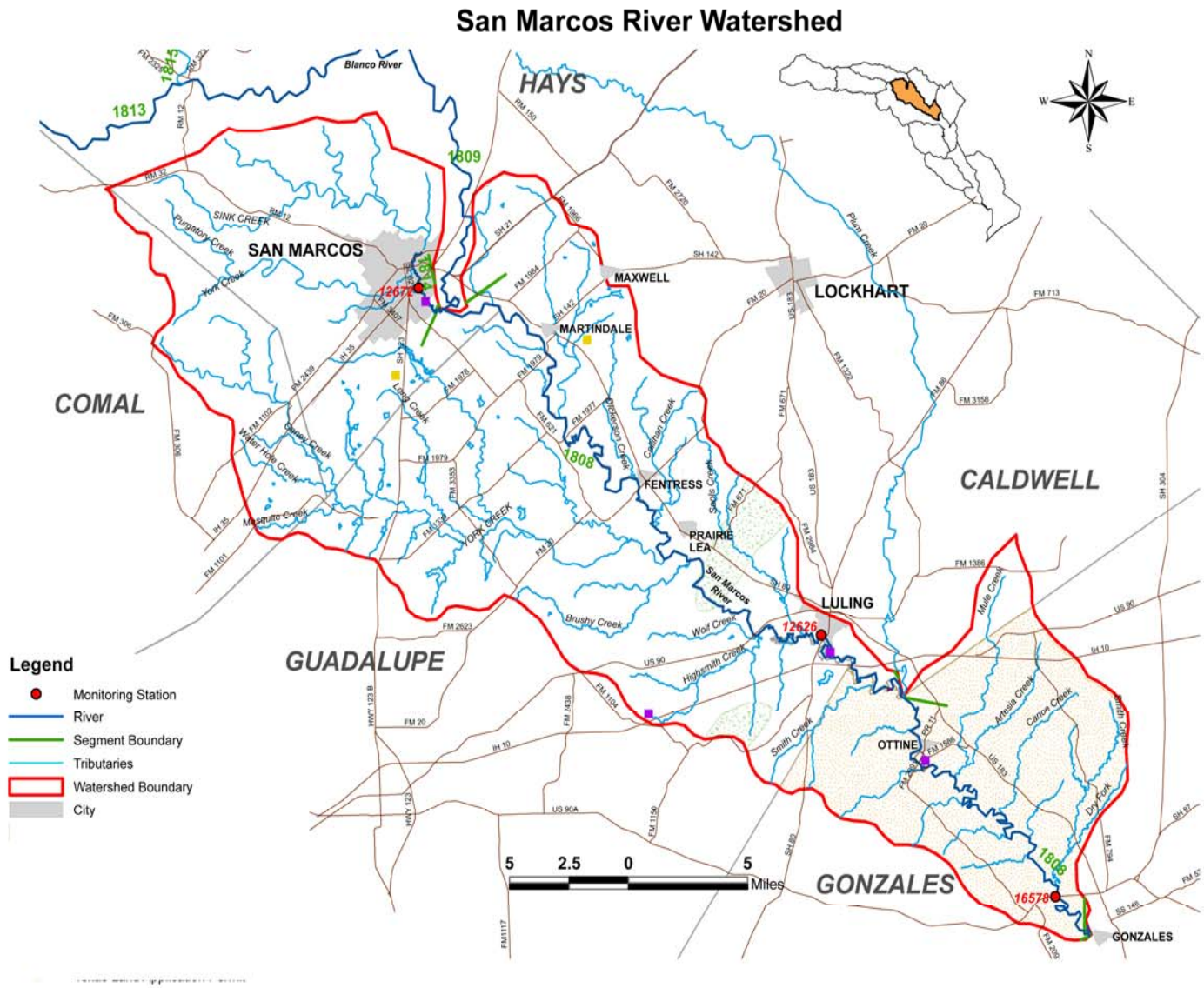


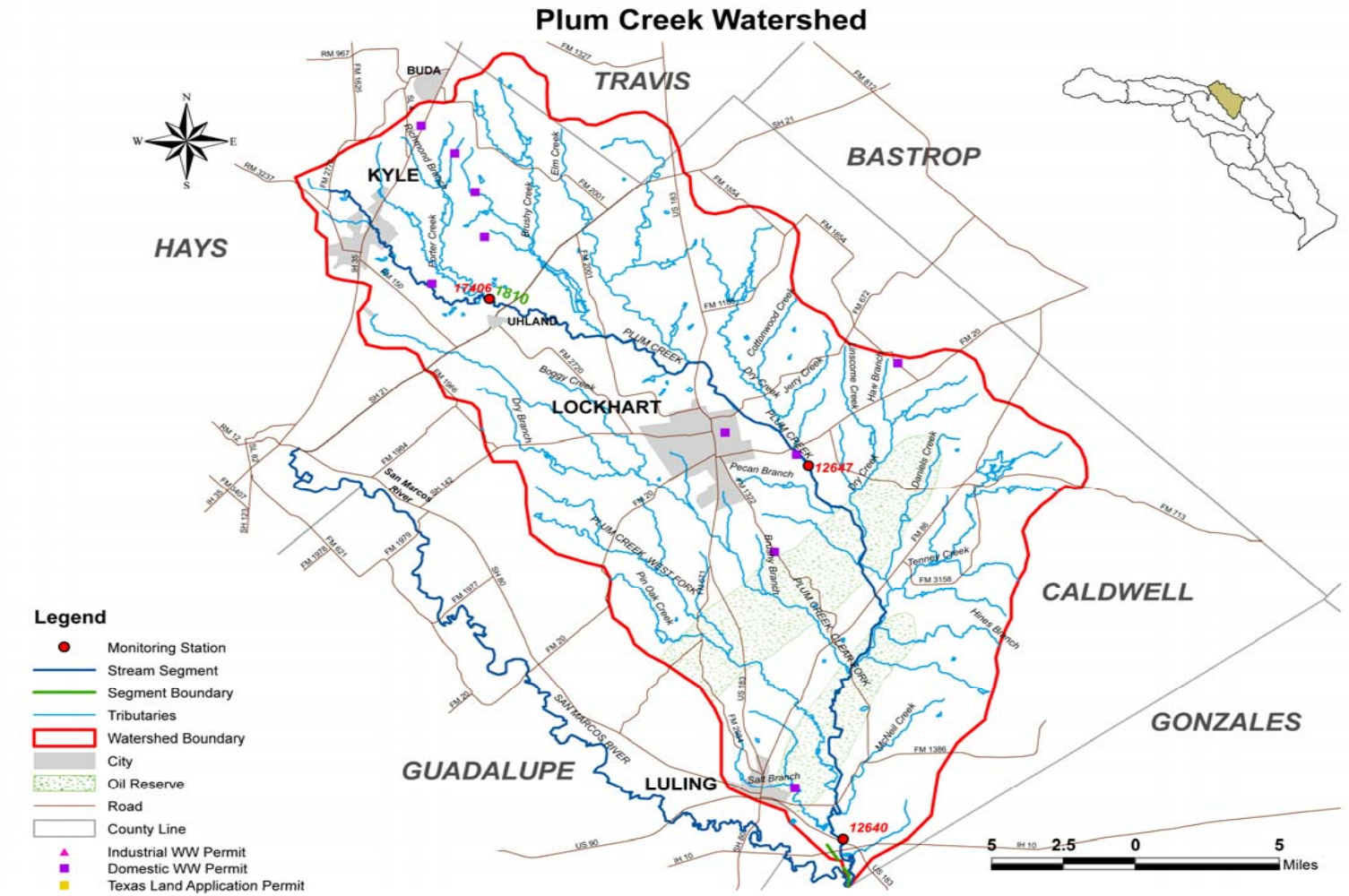

Blanco River Watershed
GILLESPIE
BLANCO
HAYS
KENDALL
COMAL
GUADALUPE
SAN MARCOS
WIMBERLEY
BLANCO
Blanco River
LITTLE BLANCO RIVER
CYPRESS CREEK
Cypress Creek
Wilson Creek
Cedar Park
Lone Man Cr
Sycamore Cr
Halifax Creek
Carpers Creek
Meier Creek
Falls Creek
Big Creek
Cottonwood Creek
Rogers Branch
Koch Branch
Cove Branch
Flat Creek
Schultz Creek
Whitlow Creek
Delaware Creek
Cabaniss Creek
San Marcos River
12668
12676
12675
12674
12661
12660
12663
12617
12673
1813
1815
1845
1809
5 2.5 0 5
Miles
Legend
Monitoring Station
River
Segment Boundary
Tributaries
Watershed Boundary
City
Road
County Line
Domestic WW Permit
Texas Land Application Permit

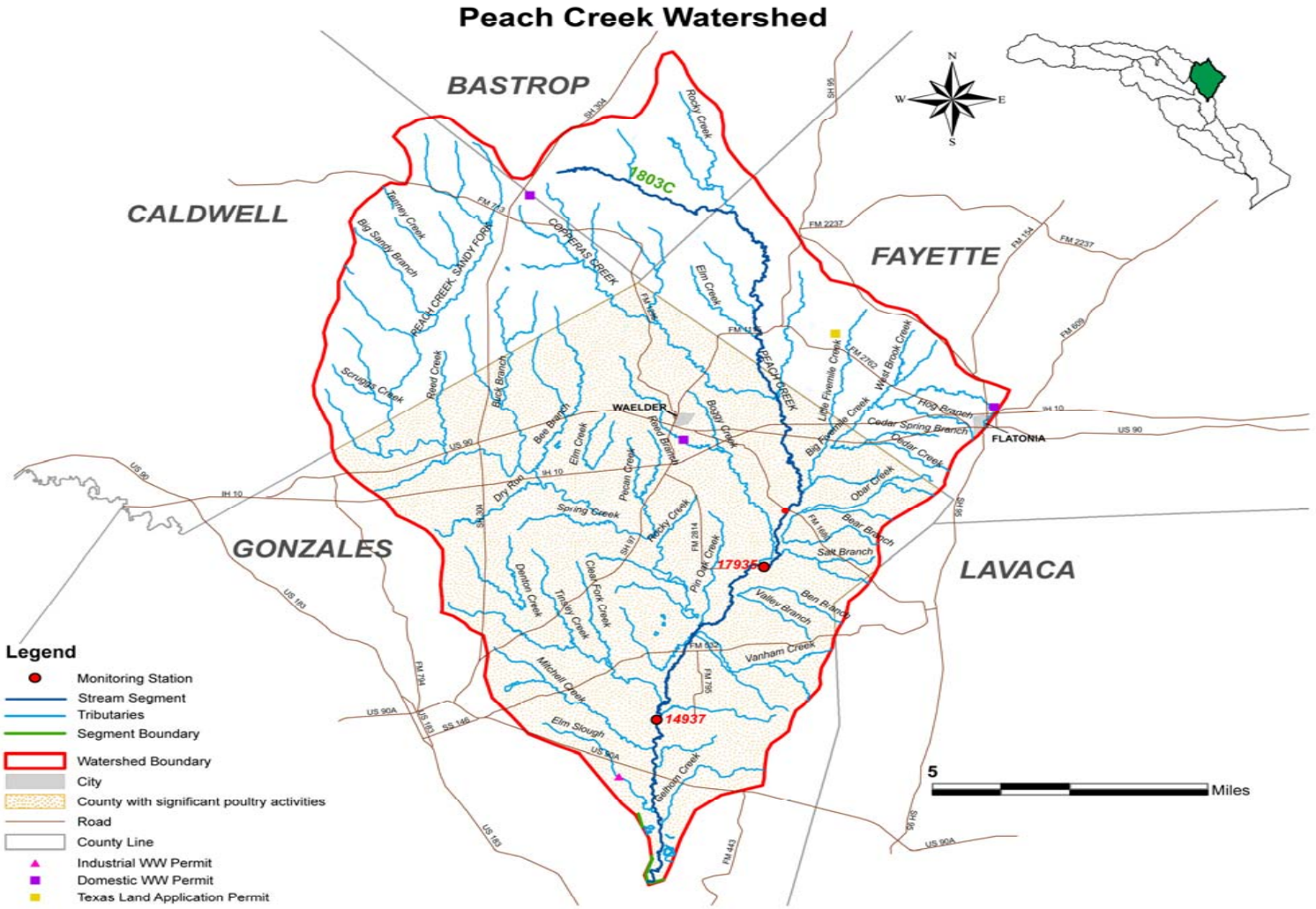

Upper Guadalupe River Watershed Below Comfort
GILLESPIE
KENDALL
BLANCO
KERR
COMAL
COMFORT
KENDALIA
SPRING BRANCH
STARTZVILLE
BERGHEIM
BULVERDE
FISCHER
CANYON CITY
Canyon Reservoir
Guadalupe River
1806
1805
17404
13700
17598
17443
Legend
Monitoring Station
River
Tributaries
Reservoir
Stream Segment
Watershed Boundary
City
Road
County Line
Domestic WW Permit
Texas Land Application Permit
5 2.5 0 5
Miles

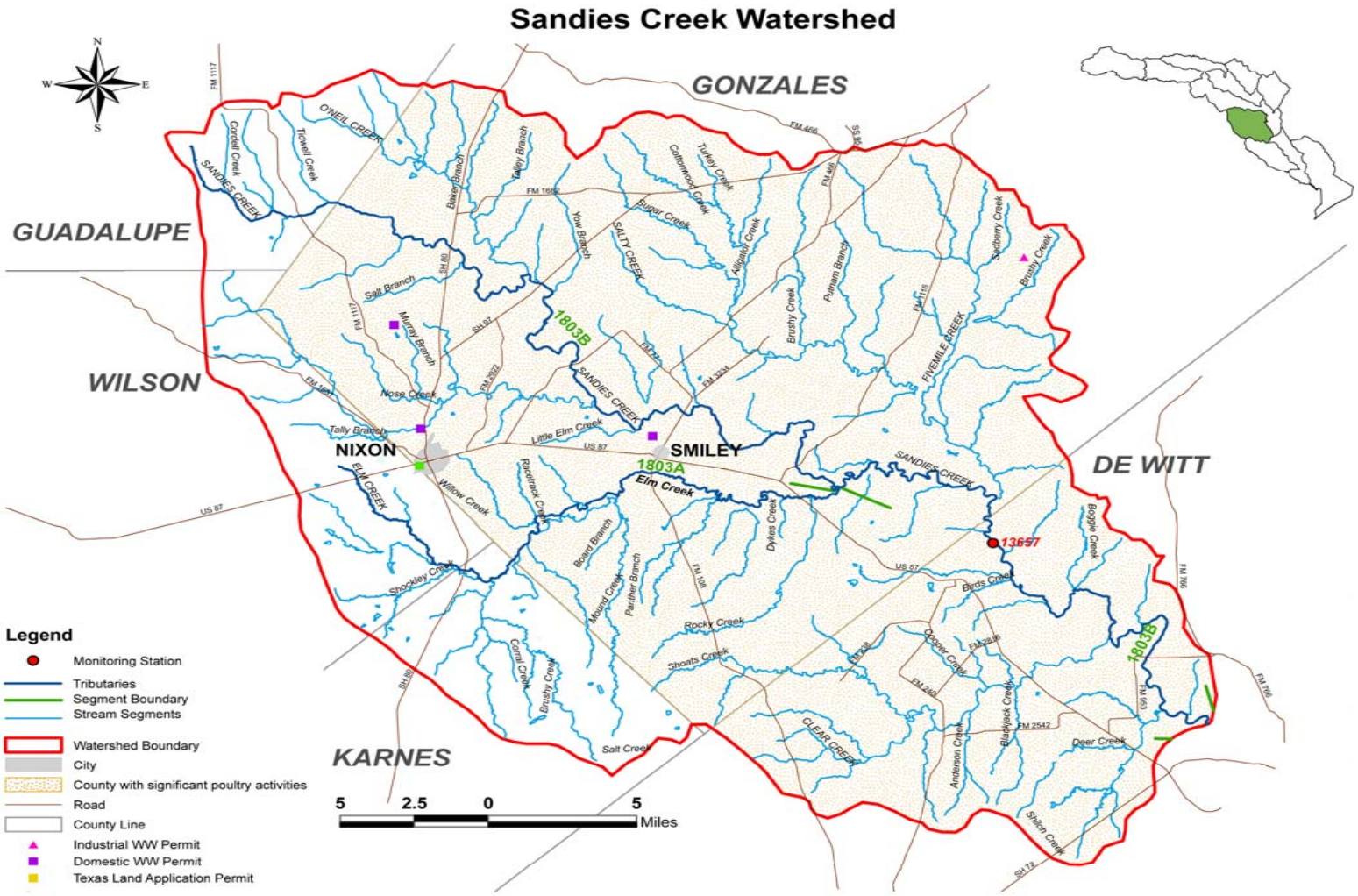

Middle Guadalupe River Watershed Part A
COMAL
HAYS
GUADALUPE
GONZALES
Canyon Reservoir
NEW BRAUNFELS
SCHERTZ
SEGUIN
GERONIMO
KINGSBURY
Comal River
Lake Dunlap
Lake McQueeney
Lake Placid
Guadalupe River
1812
1811
1811A
1804
1804A
12658
12653
12570
12596
12576
15149
Legend
Monitoring Station
Guadalupe River
Tributaries
Dams
Segment Boundary
Watershed Boundary
City
Oil Reserve
County with significant poultry activities
Road
County Line
Industrial WW Permit
Domestic WW Permit
Texas Land Application Permit
5 2.5 0 5 Miles

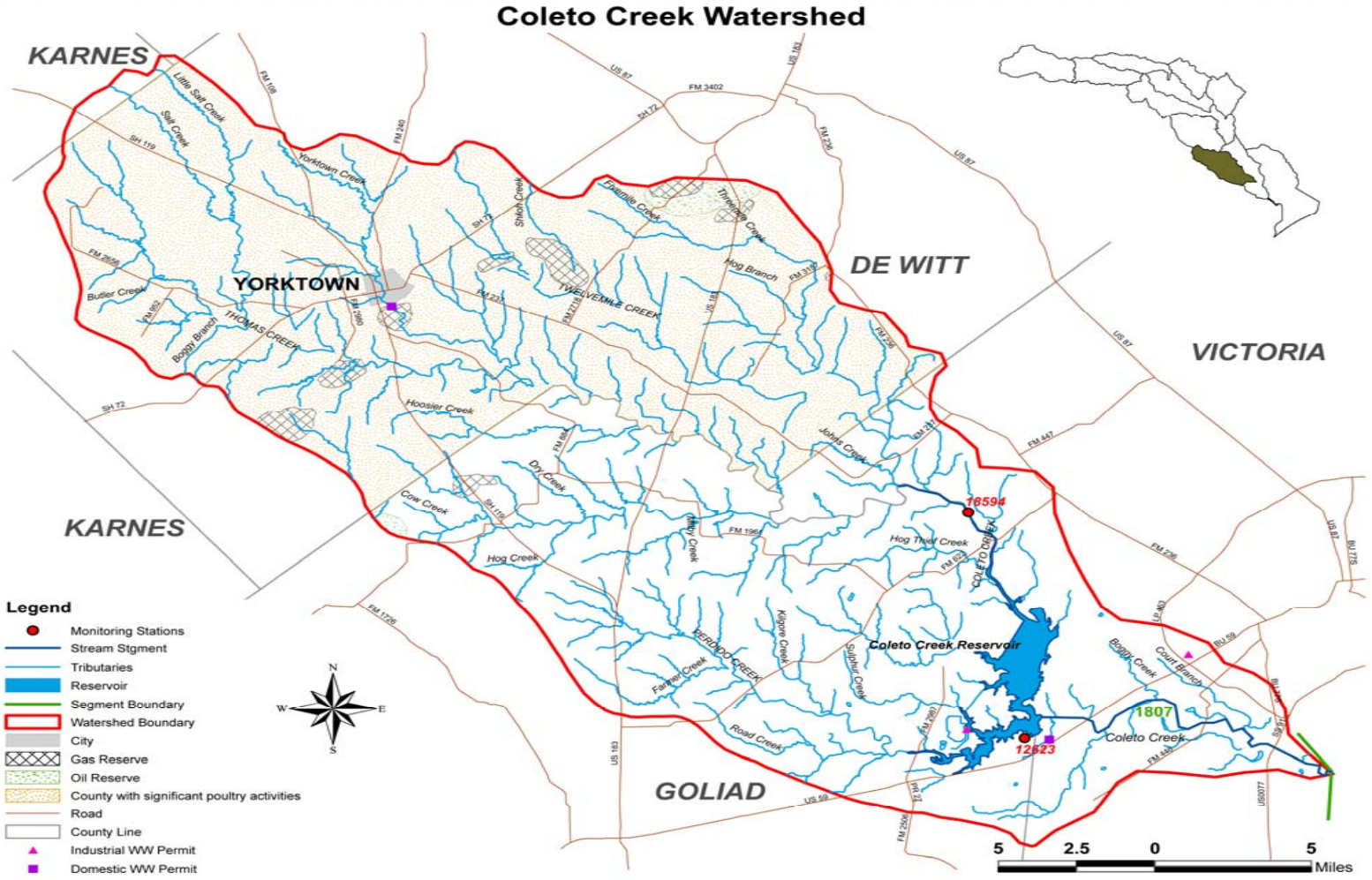

Middle Guadalupe River Watershed Part B
GUADALUPE
GONZALES
LAVACA
DE WITT
Lake H-4
Lake Wood
1808
1804
1803
15110
12592
Legend
Monitoring Station
Rivers
Tributaries
Dams
Segment Boundary
Watershed Boundary
City
Oil reserve
In County with significant poultry activities
Road
County Line
Industrial WW Permit
Domestic WW Permit
Texas Land Application Permit
5 2.5 0 5
Miles

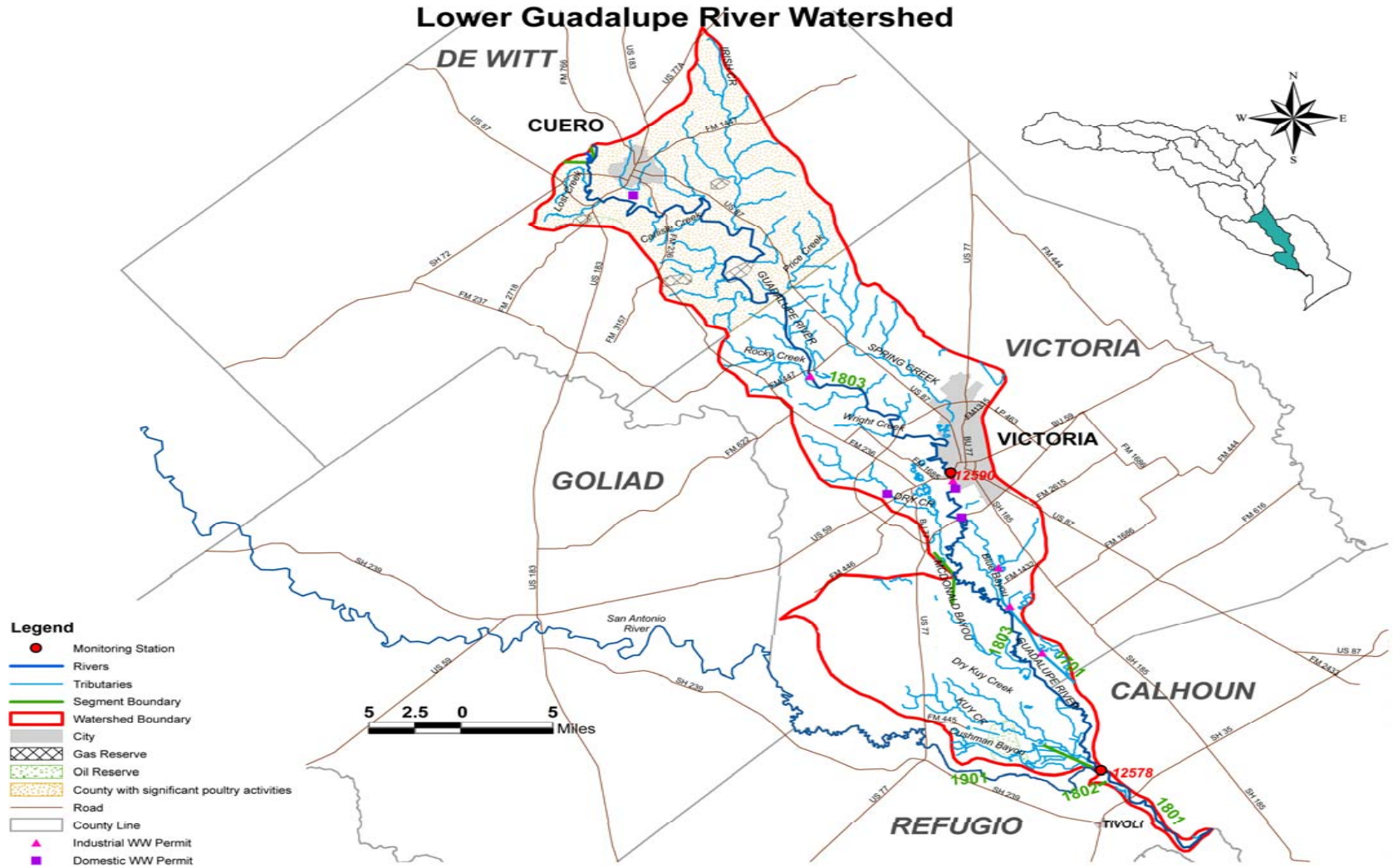

San Marcos River Watershed
Blanco River
HAYS
1813
1809
1808
SAN MARCOS
12674
MAXWELL
LOCKHART
MARTINDALE
COMAL
FENTRESS
CALDWELL
PRAIRIE LEA
LULING
12626
GUADALUPE
OTTINE
GONZALES
16578
Legend
Monitoring Station
River
Segment Boundary
Tributaries
Watershed Boundary
City
5 2.5 0 5
Miles


Plum Creek Watershed
TRAVIS
BASTROP
HAYS
CALDWELL
GONZALES
GUADALUPE
BUDA
KYLE
UHLAND
LOCKHART
LULING
PLUM CREEK
PLUM CREEK WEST FORK
SAN MARCOS RIVER
San Marcos River
11406
T810
12647
12640
Legend
Monitoring Station
Stream Segment
Segment Boundary
Tributaries
Watershed Boundary
City
Oil Reserve
Road
County Line
Industrial WW Permit
Domestic WW Permit
Texas Land Application Permit
5 2.5 0 5
Miles


Peach Creek Watershed
BASTROP
CALDWELL
FAYETTE
GONZALES
LAVACA
WAELDER
FLATONIA
1803C
17935
14937
Legend
Monitoring Station
Stream Segment
Tributaries
Segment Boundary
Watershed Boundary
City
County with significant poultry activities
Road
County Line
Industrial WW Permit
Domestic WW Permit
Texas Land Application Permit
5
Miles


Sandies Creek Watershed
GONZALES
GUADALUPE
WILSON
KARNES
DE WITT
NIXON
SMILEY
1803A
1803B
1803B
13657
Elm Creek
SANDIES CREEK
Legend
Monitoring Station
Tributaries
Segment Boundary
Stream Segments
Watershed Boundary
City
County with significant poultry activities
Road
County Line
Industrial WW Permit
Domestic WW Permit
Texas Land Application Permit
5 2.5 0 5
Miles


Coleto Creek Watershed
KARNES
DE WITT
VICTORIA
KARNES
GOLIAD
YORKTOWN
Coleto Creek Reservoir
Coleto Creek
16594
12823
1807
Legend
Monitoring Stations
Stream Stgment
Tributaries
Reservoir
Segment Boundary
Watershed Boundary
City
Gas Reserve
Oil Reserve
County with significant poultry activities
Road
County Line
Industrial WW Permit
Domestic WW Permit
5 2.5 0 5
Miles


Lower Guadalupe River Watershed
DE WITT
CUERO
VICTORIA
VICTORIA
GOLIAD
CALHOUN
REFUGIO
TIVOLI
1803
12590
1802
1801
12578
1901
Legend
Monitoring Station
Rivers
Tributaries
Segment Boundary
Watershed Boundary
City
Gas Reserve
Oil Reserve
County with significant poultry activities
Road
County Line
Industrial WW Permit
Domestic WW Permit
5 2.5 0 5
Miles
San Antonio River
GUADALUPE RIVER
SPRING CREEK
Rocky Creek
Price Creek
Cabeza Creek
Lone Creek
Wright Creek
Dry Kuy Creek
Cashman Bayou
McDONALD BAYOU
SUMAN UPPER RIVER
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A6 PROJECT/TASK DESCRIPTION

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 GBRA Project Manager to the CRP Project Manager electronically. Amendments are effective immediately upon approval by the GBRA Project Manager, the GBRA QAO, 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 GBRA Project Manager.

Special Project Appendices

Projects requiring QAPP appendices will be planned in consultation with GBRA 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 GBRA Project Manager, the GBRA QAO, 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 GBRA 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.

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). GBRA 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.

GBRA will conduct biological monitoring using a systematic approach. The biological monitoring will adhere to the specifications described in the TCEQ *Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data, 2005* (RG-416). One difference in methods is with respect to vouchering requirements: GBRA will maintain voucher specimens for each species found in the basin, and will retain questionable or unusual vouchers found during a sampling event. Due to this difference in methods, biological data will be reported using the Program Code BS. The BS Program Code refers to biological sampling that follows SWQM Procedures but does not meet the specimen vouchering requirements. The objectives of the Routine Biological Monitoring are to:

* inventory fish and benthic macroinvertebrate communities,
* collect data to be used for community structure trend analysis,
* where possible, correlate measures of chemical water quality to biological information,
* verify the Aquatic Life Use designations assigned to these water bodies, and
* collect data useful to the TCEQ for assessing Aquatic Life Use assessment.

The organics in sediment and organics in water sampling scheduled in Appendix B follows the systematic approach. The purpose for this sampling is to determine whether and at what concentrations pollutants associated with urban activities are found in the stream. The sites chosen for this sampling are downstream of urban areas or areas of oil production. The organic compounds to be analyzed by the LCRA Environmental Laboratory are identified in Table A7.1 (See Appendix F).

The total and dissolved metals identified in Table A7.1 will be collected following the systematic approach. LCRA Environmental Laboratory Services will analyze for metals in the stream and sediment samples collected at the selected sites.

The sampling for uranium radioisotopes also follows the systematic approach. Samples will be collected to establish background stream concentrations in advance of in-situ mining for uranium in the Coleto Creek watershed. The Department of State Health Services will be analyzing the sample that will be collected quarterly over the next two years (See Appendix F).

The SARA laboratory has been included in the QAPP and on Table A7.1 so that in the event of an equipment failure, samples can be processed within the prescribed holding time. The SARA laboratory has applied to TCEQ for NELAP accreditation and their application has been declared administratively complete (See Appendix F).

The measurement performance specifications to support the project objectives for a minimum data set are specified in Tables A7.1 through A7.3, and in the text following.

Table A7.1 – GBRA Measurement Performance Specifications

PARAMETER	UNITS	MATRIX	METHOD	PARA-METER CODE	AWRL	LIMIT OF QUANTITATION (LOQ)	LOQ CHECK STD %Rec	PRECI-SION (RPD of LCS/LCS dup)	BIAS (%Rec. of LCS)	Lab
Field Parameters										
pH	pH/ units	water	SM 4500-H^+ B. and TCEQ SOP, V1	00400	NA[1]	NA	NA	NA	NA	Field
DO	mg/L	water	SM 4500-O G. and TCEQ SOP, V1	00300	NA[1]	NA	NA	NA	NA	Field
Conductivity	umhos/cm	water	SM 2510 and TCEQ SOP, V1	00094	NA[1]	NA	NA	NA	NA	Field
Conductivity	umhos/cm	water	SM 2510	00095	NA[1]	NA	NA	NA	NA	GBRA
Temperature	°C	water	SM 2550 and TCEQ SOP, V1	00010	NA[1]	NA	NA	NA	NA	Field
Flow	cfs	water	TCEQ SOP, V1	00061	NA[1]	NA	NA	NA	NA	Field
Flow measurement method	1-gage 2-electric 3-mechanical 4-weir/flume 5-doppler	water	TCEQ SOP, V1	89835	NA[1]	NA	NA	NA	NA	Field
Flow severity	1-no flow 2-low 3-normal 4-flood 5-high 6-dry	water	TCEQ SOP, V1	01351	NA[1]	NA	NA	NA	NA	Field
Flow Estimate	cfs	water	TCEQ SOP, V1	74069	NA[1]	NA	NA	NA	NA	Field
Conventional and Bacteriological Parameters										
TSS	mg/L	water	SM 2540 D.	00530	4	1[7]	NA	20	80-120	GBRA[6]
Turbidity	NTU	water	SM 2130 B.	82079	0.5	0.5	NA	20	NA	GBRA[6]
Sulfate	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00945	5	1	70-130	20	80-120	GBRA[6]
Chloride	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00940	5	1	70-130	20	80-120	GBRA
Chlorophyll-a, spectrophotometric method	ug/L	water	SM 10200-H[4]	32211	3	1[7]	70-130	20	80-120	GBRA
Pheophytin, spectrophotometric method	ug/L	water	SM 10200-H[4]	32218	3	1[7]	70-130	20	NA	GBRA
E. coli, IDEXX Colilert	MPN/100 mL	water	Colilert-18	31699	1	1[7]	NA	0.5[2]	NA	GBRA[6]
Ammonia-N, total[3]	mg/L	water	SM 4500-NH_3 D.	00610	0.1	0.1	70-130	20	80-120	GBRA
Ammonia-N, total	mg/L	water	EPA 350.1 Rev. 2.0 (1993)	00610	0.1	0.1	70-130	20	80-120	GBRA[6]
Hardness, total (as CaC03)	mg/L	water	SM 2340 C.	00900	5	5	70-130	20	80-120	GBRA
Nitrate-N, total	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00620	0.05	0.05	70-130	20	80-120	GBRA[6]

PARAMETER	UNITS	MATRIX	METHOD	PARA-METER CODE	AWRL	LIMIT OF QUANTITATION (LOQ)	LOQ CHECK STD %Rec	PRECISION (RPD of LCS/LCS dup)	BIAS (%Rec. of LCS)	Lab
Total phosphorus[5]	mg/L	water	EPA 365.3	00665	0.05	0.05	70-130	20	80-120	GBRA[6]
Total Kjeldahl Nitrogen	mg/L	water	EPA 351.2 Rev. 2 (1993)	00625	0.2	0.2	70-130	20	80-120	GBRA[6]
Metals in Water										
Aluminum, dis.	ug/L	water	EPA 200.8 EPA 200.7 Rev. 4.4 (1994)	01106	200	4 50	70-130	20	80-120	LCRA
Arsenic, dis.	ug/L	water	EPA 200.8 Rev. 4.4 (1994)	01000	5	2	70-130	20	80-120	LCRA
Cadmium, dis.	ug/L	water	EPA 200.8 Rev. 5.4 (1998)	01025	0.1 for waters <50 mg/L hardness .3 for waters ≥50 mg/L hardness	1	70-130	20	80-120	LCRA
Chromium, dis.	ug/L	water	EPA 200.8 Rev. 5.4 (1998)	01030	10	1	70-130	20	80-120	LCRA
Copper, dis.	ug/L	water	EPA 200.8 Rev. 5.4 (1998)	01040	1 for waters <50 mg/L hardness 3 for waters ≥50 mg/L hardness	1	70-130	20	80-120	LCRA
Lead, dis.	ug/L	water	EPA 200.8 Rev. 5.4 (1998)	01049	0.1 for waters <85 mg/L hardness 1 for waters >85 mg/L hardness	1	70-130	20	80-120	LCRA
Mercury, total	ug/L	water	SW7470 A EPA 1631	71960	0.006	0.2	70-130	20	80-120	LCRA
Nickel, dis.	ug/L	water	EPA 200.8 Rev. 5.4 (1998)	01065	10	1	70-130	20	80-120	LCRA
Selenium, total	ug/L	water	EPA 200.8 Rev. 5.4 (1998)	01147	2	2	70-130	20	80-120	LCRA
Silver, dis.	ug/L	water	EPA 200.8 Rev. 5.4 (1998)	01075	0.5	0.5	70-130	20	80-120	LCRA
Zinc, dis.	ug/L	water	EPA 200.8 Rev. 5.4 (1998)	01090	5.0	5.0	70-130	20	80-120	LCRA

PARAMETER	UNITS	MATRIX	METHOD	PARA-METER CODE	AWRL	LIMIT OF QUANTI-TATION (LOQ)	LOQ CHECK STD %Rec	PRECISION (RPD of LCS/LCSD)	BIAS (%Rec. of LCS)	Lab
Metals in Sediment										
Aluminum, total	mg/kg	sediment	SW 846 6010 B SW 846 6020	01108	25	25 2.5	60-140	30	60-140	LCRA

PARAMETER	UNITS	MATRIX	METHOD	PARA-METER CODE	AWRL	LIMIT OF QUANTI-TATION (LOQ)	LOQ CHECK STD %Rec	PRECISION (RPD of LCS/LCS dup)	BIAS (%Rec. of LCS)	Lab
Metals in Sediment (cont.)										
Arsenic, total	mg/kg	sediment	SW 846 6010 B SW 846 6020	01003	7.0	2.5 0.5	60-140	30	60-140	LCRA
Cadmium, total	mg/kg	sediment	SW 846 6010 B SW 846 6020	01028	0.6	0.5 0.05	60-140	30	60-140	LCRA
Chromium, total	mg/kg	sediment	SW 846 6010 B SW 846 6020	01029	21	2.5 0.5	60-140	30	60-140	LCRA
Copper, total	mg/kg	sediment	SW 846 6010 B SW 846 6020	01043	14	2.5 0.5	60-140	30	60-140	LCRA
Lead, total	mg/kg	sediment	SW 846 6010 B SW 846 6020	01052	20	2.5 0.5	60-140	30	60-140	LCRA
Mercury, total	mg/kg	sediment	SW 846 7471 B	71921	0.1	0.1	60-140	30	60-140	LCRA
Nickel, total	mg/kg	sediment	SW 846 6010 B SW 846 6020	01068	15	2.5 0.5	60-140	30	60-140	LCRA
Selenium, total	mg/kg	sediment	SW 846 6020	01148	1.0	1.0	60-140	30	60-140	LCRA
Silver, total	mg/kg	sediment	SW 846 6020	01078	0.5	0.05	60-140	30	60-140	LCRA
Zinc, total	mg/kg	sediment	SW 846 6010 B SW 846 6020	01093	64	25 2.5	60-140	30	60-140	LCRA

PARAMETER	UNITS	MATRIX	METHOD	PARA-METER CODE	AWRL	LIMIT OF QUANTITATION (LOQ)	LOQ CHECK STD %REC	PRECISION (RPD of LCS/LCS dup)	BIAS (%Rec. of LCS)	Lab
Organics in Sediment										
TPH C06-C12 C12-C28 C28-C35	mg/kg	sediment	TX1005	89995	NA	500 500 ----	60-140	30	60-140	LCRA
Benzene	ug/kg	sediment	SW846 8260B	34237	250	50	60-140	30	60-140	LCRA
Toluene	ug/kg	sediment	SW846 8260B	34483	300	50	60-140	30	60-140	LCRA
Ethylbenzene	ug/kg	sediment	SW846 8260B	34374	250	50	60-140	30	60-140	LCRA
Xylenes, total	ug/kg	sediment	SW846 8260B	45510	650	150	60-140	30	60-140	LCRA
Organics in Water										
TPH C06-C12 C12-C28 C28-C35	mg/L	water	TX1005	04720	NA	66.6 66.6 ----	60-140	30	60-140	LCRA
Benzene	ug/L	water	SW846 8260B	04721	250	50	60-140	30	60-140	LCRA
Toluene	ug/L	water	SW846 8260B	04721	300	50	60-140	30	60-140	LCRA
Ethylbenzene	ug/L	water	SW846 8260B	04721	250	50	60-140	30	60-140	LCRA
Xylenes, total	ug/L	water	SW846 8260B	04721	650	150	60-140	30	60-140	LCRA

PARAMETER	UNITS	MATRIX	METHOD	STORET	AWRL	Lab Quanti-tation Limit (LOQ)	LOQ CHECK STD %REC	PRECISION (RPD of LCS/LCS dup)	BIAS (%Rec. of LCS)	Lab
Radiologicals in water										
Uranium-238	pCi/L	water	SM 7500 C	22603	0.5	0.5[7]	Not monitored	LCS dup not required	99.8	DSHS
Uranium-235l	pCi/L	water	SM 7500 C	22620	0.5	0.5[7]	Not monitored	LCS dup not required	Not monitored	DSHS
Uranium-234	pCi/L	water	SM 7500 C	22610	0.5	0.5[7]	Not monitored	LCS dup not required	103.9	DSHS
Combined Uranium	µg/L	water	SM 7500 C	75990	2.0	2.0[7]	Combined Uranium is calculated from individual isotopes			DSHS

PARAMETER	UNIT	MATRIX	METHOD	STORET	LABORATORY PERFORMING ANALYSIS
Benthics- Freshwater – Qualitative					
Biological Data Reporting Units	1= number of individuals from sub-sample; 2 = number of individuals/ft^2; 3 = number of individuals/m^2; 4 = total number in kicknet	water	TCEQ SOP, V2	89899	GBRA
Kicknet Effort, area kicked	m^2	water	TCEQ SOP, V2	89903	GBRA
Kicknet Effort, minutes kicked	minutes	water	TCEQ SOP, V2	89904	GBRA
Snags and Shoreline Sampling Effort, minutes picked	minutes	water	TCEQ SOP, V2	89905	GBRA
Number of individuals in benthic RBA sub-sample (± 100)	#	water	TCEQ SOP, V2	89906	GBRA
Benthic Sampler	1=Surber, 2=Ekman, 3=kicknet, 4=Petersen, 5=Hester-Dendy	water	TCEQ SOP, V2	89950	GBRA
Undercut bank at sample point	%	water	TCEQ SOP, V2	89921	GBRA
Overhanging brush at sample point	%	water	TCEQ SOP, V2	89922	GBRA
Gravel substrate at sample point	%	water	TCEQ SOP, V2	89923	GBRA
Sand substrate at sample point	%	water	TCEQ SOP, V2	89924	GBRA
Soft bottom at sample point	%	water	TCEQ SOP, V2	89925	GBRA
Macrophyte bed at sample point	%	water	TCEQ SOP, V2	89926	GBRA
Snags and brush at sample point	%	water	TCEQ SOP, V2	89927	GBRA
Stream Order	#	water	TCEQ SOP, V1	84161	GBRA
Ecoregion (Texas Ecoregion Code)	#	NA	TCEQ SOP, V1	89961	GBRA
Total Taxa (Taxa Richness)	#	water	TCEQ SOP, V2	90055	GBRA
EPT Taxa	#	water	TCEQ SOP, V2	90008	GBRA
Biotic Index (HBI)	NA	water	TCEQ SOP, V2	90007	GBRA
Chironomidae	#	water	TCEQ SOP, V2	92491	GBRA

Dominant Taxon	%	water	TCEQ SOP, V2	90042	GBRA
Dominant FFG	%	water	TCEQ SOP, V2	90010	GBRA
PARAMETER	**UNIT**	**MATRIX**	**METHOD**	**STORET**	**LABORATORY PERFORMING ANALYSIS**
Benthics- Freshwater – Qualitative (cont.)					
Predators	%	water	TCEQ SOP, V2	90036	GBRA
Ratio of Intolerant:Tolerant taxa	NA	water	TCEQ SOP, V2	90050	GBRA
Total Trichoptera as Hydropsychidae	%	water	TCEQ SOP, V2	90069	GBRA
Non-insect taxa	#	water	TCEQ SOP, V2	90052	GBRA
Collector-gatherers	%	water	TCEQ SOP, V2	90025	GBRA
Total number as Elmidae	%	water	TCEQ SOP, V2	90054	GBRA

PARAMETER	UNIT	MATRIX	METHOD	STORET	LABORATORY PERFORMING ANALYSIS
Nekton Freshwater					
Nekton, none captured	NA	water	TCEQ SOP, V2	98005	GBRA
Electrofishing effort, duration of shocking	Seconds	water	TCEQ SOP, V2	89944	GBRA
Seining effort	# of Hauls	water	TCEQ SOP, V2	89947	GBRA
Combined length of seine hauls	meters	water	TCEQ SOP, V2	89948	GBRA
Seining effort, duration	minutes	water	TCEQ SOP, V2	89949	GBRA
Minimum Seine Mesh Size, net average bar	inches	water	TCEQ SOP, V2	89930	GBRA
Maximum Seine Mesh Size, net average bar	inches	water	TCEQ SOP, V2	89931	GBRA
Net length	m	water	TCEQ SOP, V2	89941	GBRA
Electrofishing method	1 = boat, 2 = backpack, 3=tote barge	water	TCEQ SOP, V2	89943	GBRA
Area seined	m^2	water	TCEQ SOP, V2	89976	GBRA
Stream Order	#	NA	TCEQ SOP, V1	84161	GBRA
Ecoregion (Texas Ecoregion Code)	#	NA	TCEQ SOP, V1	89961	GBRA
Total fish species (richness)	#	water	TCEQ SOP, V2	98003	GBRA
Total darter species	#	water	TCEQ SOP, V2	98004	GBRA
Total sunfish species (except bass)	#	water	TCEQ SOP, V2	98008	GBRA
Total sucker species	#	water	TCEQ SOP, V2	98009	GBRA

Total intolerant species	#	water	TCEQ SOP, V2	98010	GBRA
Tolerant individuals	%	water	TCEQ SOP, V2	98016	GBRA

PARAMETER	UNIT	MATRIX	METHOD	STORET	LABORATORY PERFORMING ANALYSIS
Nekton Freshwater (cont.)					
Omnivore individuals	%	water	TCEQ SOP, V2	98017	GBRA
Insectivore individuals	%	water	TCEQ SOP, V2	98021	GBRA
Piscivore individuals	%	water	TCEQ SOP, V2	98022	GBRA
Total individuals	#	water	TCEQ SOP, V2	98023	GBRA
Hybrid individuals	%	water	TCEQ SOP, V2	98024	GBRA
Individuals w/ disease/anomalies	%	water	TCEQ SOP, V2	98030	GBRA

PARAMETER	UNITS	METHOD	STORET	LABORATORY PERFORMING ANALYSIS
Physical Habitat				
Streambed slope over evaluated reach (from USGS map)	NA	TCEQ SOP, V2	72052	GBRA
Approximate drainage area above the most downstream transect from USGS map	km^2	TCEQ SOP, V2	89859	GBRA
Length of stream	km	TCEQ SOP, V2	89860	GBRA
Lateral transects made	#	TCEQ SOP, V2	89832	GBRA
Average stream width	m	TCEQ SOP, V2	89861	GBRA
Average stream depth	m	TCEQ SOP, V2	89862	GBRA
Instantaneous stream flow	cfs	TCEQ SOP, V2	00061	GBRA
Flow measurement method	1=gage, 2= electric, 3= mechanical, =weir/flume	TCEQ SOP, V2	89835	GBRA
Channel Flow Status	1=no flow, 2=low, 3=moderate, 4=high	TCEQ SOP, V2	89848	GBRA
Maximum pool width at time of study	m	TCEQ SOP, V2	89864	GBRA
Maximum pool depth in study area	m	TCEQ SOP, V2	89865	GBRA
Total stream bends	#	TCEQ SOP, V2	89839	GBRA
Moderately defined stream bends	#	TCEQ SOP, V2	89841	GBRA
Well-defined stream bends	#	TCEQ SOP, V2	89840	GBRA
Poorly defined stream bends	#	TCEQ SOP, V2	89842	GBRA
Riffles	#	TCEQ SOP, V2	89843	GBRA
Dominant substrate	1 = clay, 2 = silt, 3 = sand, 4 = gravel, 5 = cobble, 6 = boulder,	TCEQ SOP, V2	89844	GBRA

PARAMETER	UNITS	METHOD	STORET	LABORATORY PERFORMING ANALYSIS
	7 = bedrock, 8 = other			
Avg. % of substrate gravel >2mm	%	TCEQ SOP, V2	89845	GBRA
Avg. % instream cover	%	TCEQ SOP, V2	84159	GBRA
Stream Cover Types	#	TCEQ SOP, V2		GBRA
Avg. % stream bank erosion potential	%	TCEQ SOP, V2	89846	GBRA
Physical Habitat (cont.)				
Avg. stream bank angle	degrees	TCEQ SOP, V2	89847	GBRA
Avg. width natural riparian vegetation	m	TCEQ SOP, V2	89866	GBRA
Avg. % trees as riparian vegetation	%	TCEQ SOP, V2	89849	GBRA
Avg. % shrubs as riparian vegetation	%	TCEQ SOP, V2	89850	GBRA
Avg. % grasses and forbes as riparian vegetation	%	TCEQ SOP, V2	89851	GBRA
Avg. % cultivated fields as riparian vegetation	%	TCEQ SOP, V2	89852	GBRA
Avg. % other as riparian vegetation	%	TCEQ SOP, V2	89853	GBRA
Avg.% tree canopy coverage	%	TCEQ SOP, V2	89854	GBRA
Overall Aesthetics	1= wilderness, 2= natural, 3= common, 4= offensive	TCEQ SOP, V2	89867	GBRA
Stream order	#	TCEQ SOP, V1	84161	GBRA
Texas Ecoregion Code	#	TCEQ SOP, V1	89961	GBRA
Land development impact	1= unimpacted, 2= low, 3= moderate, 4=high	TCEQ SOP, V2	89962	GBRA

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

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

3 Secondary method listed. To be used in the event that the primary method cannot be used or needs to be confirmed, i.e. automated method cannot be used due to instrument failure.

4 In addition to SM 10200 H. cited for chlorophyll a, the SOP posted on the TCEQ CRP web site will be followed as well.

5 Automated method for total phosphorus on the Konelab Aquakem 200, following the GBRA SOP written based on the EPA method 365.3 and the Konelab operating parameters. The manual method will be used as a secondary method in case of instrument failure.

6 The SARA laboratory may be used in the event of an equipment failure so that samples will be processed within the prescribed holding time. The SARA laboratory has applied to TCEQ for NELAP accreditation and their application has been declared administratively complete (See Appendix F).

7 Reporting limit. Not a NELAP-defined LOQ (no commercially available spiking solution used as LOQ check standard).

References for Table A7.1:

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

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), "Standard Methods for the Examination of Water and Wastewater," 20th Edition, 1998

TCEQ SOP, V1 – TCEQ Surface Water Quality Monitoring Procedures Manual, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, June 2003 or subsequent editions (RG-415)

TCEQ SOP, V2 – TCEQ Surface Water Quality Monitoring Procedures Manual, 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 UGRA Measurement Performance Specifications

PARAMETER	UNITS	MATRIX	METHOD	PARA-METER CODE	AWRL	LIMIT OF QUANTITATION (LOQ)	LOQ CHECK STD (%REC)	PRECISION (RPD of LCS/LCS dup)	BIAS (%Rec. of LCS)	Lab
Field Parameters										
pH	pH/ units	water	SM 4500-H^+ B. and TCEQ SOP, V1	00400	NA[1]	NA	NA	NA	NA	UGRA
DO	mg/L	water	SM 4500-O G. and TCEQ SOP, V1	00300	NA[1]	NA	NA	NA	NA	UGRA
Conductivity	umhos/cm	water	SM 2510 and TCEQ SOP, V1	00094	NA[1]	NA	NA	NA	NA	UGRA
Temperature	°C	water	SM 2550 and TCEQ SOP, V1	00010	NA[1]	NA	NA	NA	NA	UGRA
Flow	cfs	water	TCEQ SOP, V1	00061	NA[1]	NA	NA	NA	NA	UGRA
Flow measurement method	1-gage 2-electric 3-mechanical 4-weir/flume 5-doppler	water	TCEQ SOP, V1	89835	NA[1]	NA	NA	NA	NA	UGRA
Flow severity	1-no flow, 2-low, 3-normal 4-flood, 5-high, 6-dry	water	TCEQ SOP, V1	01351	NA[1]	NA	NA	NA	NA	UGRA
Flow estimate	cfs	water	TCEQ SOP, V1	74069	NA[1]	NA	NA	NA	NA	UGRA
Conventional and Bacteriological Parameters										
TSS	mg/L	water	SM 2540 D.	00530	4	1[4]	NA	20	80-120	UGRA
Turbidity	NTU	water	SM 2130 B	82079	0.5	0.5	NA	NA	NA	UGRA
Sulfate	mg/L	water	EPA 300.0 Rev. 2.1, (1993)	00945	5	1	70-130	20	80-120	UGRA
Chloride	mg/L	water	EPA 300.0 Rev. 2.1, (1993)	00940	5	1	70-130	20	80-120	UGRA
Chlorophyll-a, spectrophotometric method	ug/L	water	SM 10200-H[4]	32211	3	3[4]	70-130	20	NA	GBRA
Pheophytin, spectrophotometric method	ug/L	water	SM 10200-H[4]	32218	3	3	NA	20	NA	GBRA
E. coli, IDEXX Colilert	MPN/100 mL	water	Colilert	31699	1	1[4]	NA	0.5[2]	NA	UGRA
Nitrate, total	mg/L	water	EPA 300.0	00620	0.05	0.05	75-125	20	80-120	UGRA
Total phosphorus	mg/L	water	EPA 365.3	00665	0.06	0.05	75-125	20	80-120	GBRA
VSS	mg/L	water	SM 2540 E.	00535	4	1[4]	NA	20	80-120	UGRA

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

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

3 Secondary method listed. To be used in the event that the primary method cannot be used or needs to be confirmed, i.e., automated method cannot be used due to instrument failure.

4 Reporting limit. Not a NELAP-defined LOQ (no commercially available spiking solution used as LOQ check standard).

References for Table A7.2:

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

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), "Standard Methods for the Examination of Water and Wastewater," 20th Edition, 1999

TCEQ SOP V1 – TCEQ Surface Water Quality Monitoring Procedures Manual, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, June 2003 or subsequent editions

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

Table A7.3 Wimberley Valley Watershed Association Measurement Performance Specifications

PARAMETER	UNITS	MATRIX	METHOD	PARA-METER CODE	AWRL	LIMIT OF QUANTITATION (LOQ)	LOQ CHECK STD (%REC)	PRECISION (RPD of LCS/LCS dup)	BIAS (%Rec. of LCS)	Lab
Field Parameters										
pH	pH/ units	water	SM 4500-H^+ B. and TCEQ SOP, V1	00400	NA[1]	NA	NA	NA	NA	Field
DO	mg/L	water	SM 4500-O G. and TCEQ SOP, V1	00300	NA[1]	NA	NA	NA	NA	Field
Conductivity	umhos/cm	water	SM 2510 and TCEQ SOP, V1	00094	NA[1]	NA	NA	NA	NA	Field
Temperature	°C	water	SM 2550 and TCEQ SOP, V1	00010	NA[1]	NA	NA	NA	NA	Field
Flow	cfs	water	TCEQ SOP, V1	00061	NA[1]	NA	NA	NA	NA	Field
Flow measurement method	1-gage 2-electric 3-mechanical 4-weir/flume 5-doppler	water	TCEQ SOP, V1	89835	NA[1]	NA	NA	NA	NA	Field
Flow severity	1-no flow, 2-low, 3-normal, 4-flood, 5-high, 6-dry	water	TCEQ SOP, V1	01351	NA[1]	NA	NA	NA	NA	Field
Flow estimate	cfs	water	TCEQ SOP, V1	74069	NA[1]	NA	NA	NA	NA	Field
Conventional and Bacteriological Parameters										
TSS	mg/L	water	SM 2540 D.	00530	4	1[5]	NA	20	NA	GBRA
E. coli, IDEXX Colilert	MPN/100 mL	water	SM 9223-B	31699	1	1[5]	NA	0.5[2]	NA	GBRA
Ammonia-N, total[3]	mg/L	water	SM 4500-NH_3 D.	00610	0.02	0.02	70-130	20	80-120	GBRA
Ammonia-N, total	mg/L	water	EPA 350.1 Rev. 2.0 (1993)	00610	0.02	0.02	70-130	20	80-120	GBRA
Nitrate-N, total	mg/L	water	EPA 300.0 Rev. 2.5 (1993)	00620	0.05	0.05	70-130	20	80-120	GBRA
Total phosphorus[4]	mg/L	water	EPA 365.3	00665	0.06	0.05	70-130	20	80-120	GBRA

PARAMETER	UNITS	MATRIX	METHOD	PARA-METER CODE	LIMIT OF QUANTITATION (LOQ)	LOQ CHECK STD (%REC)	PRECISION (RPD of LCS/LCS dup)	BIAS (%Rec. of LCS)	Lab
Diurnal monitoring summary statistics									
24-hour average dissolved oxygen	mg/L	water	TCEQ SOP, V1	89857	NA	NA	NA	NA	GBRA
Maximum daily dissolved oxygen	mg/L	water	TCEQ SOP, V1	89856	NA	NA	NA	NA	GBRA
Minimum daily dissolved oxygen	mg/L	water	TCEQ SOP, V1	89855	NA	NA	NA	NA	GBRA
Number of measurements	none	none	TCEQ SOP, V1	89858	NA	NA	NA	NA	GBRA
24-hour average water temperature	°C	water	TCEQ SOP, V1	00209	NA	NA	NA	NA	GBRA

Maximum daily water temperature	°C	water	TCEQ SOP, V1	00210	NA	NA	NA	NA	GBRA
PARAMETER	**UNITS**	**MATRIX**	**METHOD**	**STORET**	**AWRL**	**LOQ CHECK STD (%REC)**	**PRECISION (RPD of LCS/LCS dup)**	**BIAS (%Rec. of LCS)**	**Lab**
Diurnal monitoring summary statistics (cont.)									
Minimum daily water temperature	°C	water	TCEQ SOP, V1	00211	NA	NA	NA	NA	GBRA
24-hour average conductivity	umhos/cm	water	TCEQ SOP, V1	00212	NA	NA	NA	NA	GBRA
Maximum daily conductivity	umhos/cm	water	TCEQ SOP, V1	00213	NA	NA	NA	NA	GBRA
Minimum daily conductivity	umhos/cm	water	TCEQ SOP, V1	00214	NA	NA	NA	NA	GBRA
Maximum daily pH	s.u.	water	TCEQ SOP, V1	00215	NA	NA	NA	NA	GBRA
Minimum daily pH	s.u.	water	TCEQ SOP, V1	00216	NA	NA	NA	NA	GBRA

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

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

3 Secondary method listed. To be used in the event that the primary method cannot be used or needs to be confirmed, i.e. automated method cannot be used due to instrument failure.

4 Automated method for total phosphorus on the Konelab Aquakem 200, following the GBRA SOP written based on the EPA method 365.2 and the Konelab operating parameters. The manual method will be used as a secondary method in the case of instrument failure.

5 Reporting limit. Not a NELAP-defined LOQ (no commercially available spiking solution used as LOQ check standard).

References for Table A7.3:

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

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), "Standard Methods for the Examination of Water and Wastewater," 20th Edition, 1999

TCEQ SOP V1 – TCEQ Surface Water Quality Monitoring Procedures Manual, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, June, 2003 or subsequent editions

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

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 Table A7.1 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, A7.2 and A7.3.

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, A7.2 and A7.3.

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 includes 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.

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 (Paper/electronic)	Format
QAPPs, amendments and appendices	TCEQ/GBRA/UGRA	8 years/one year/ indefinitely	Paper/Electronic
QAPP distribution documentation	GBRA	one year/ indefinitely	Paper/Electronic
QAPP commitment letters	GBRA	one year/ indefinitely	Paper/Electronic
Field notebooks or data sheets	UGRA/GBRA/WVWA	one year/ indefinitely	Paper/electronic
Field equipment calibration/maintenance logs	UGRA/GBRA/WVWA	one year/ indefinitely	Paper/electronic
Field staff training records	UGRA/GBRA/WVWA	one year/ indefinitely	Paper/electronic
Chain of custody records	UGRA/GBRA/WVWA	one year/ indefinitely	Paper/electronic
Field SOPs	UGRA/GBRA/WVWA	one year/ indefinitely	Paper/electronic
Laboratory QA Manuals	GBRA/UGRA/LCRA/SARA/ DSHS	one year/ indefinitely/5 years*	Paper/electronic
Laboratory SOPs	GBRA/UGRA/LCRA/SARA/ DSHS	one year/ indefinitely/5 years*	Paper/electronic
Laboratory staff training records	GBRA/UGRA/LCRA/SARA/ DSHS	one year/ indefinitely/5 years*	Paper/electronic
Laboratory data reports/results	GBRA/UGRA/LCRA/SARA/ DSHS	one year/ indefinitely/5 years*	Paper/electronic
Instrument printouts	GBRA/UGRA/LCRA/SARA/ DSHS	one year/ indefinitely/5 years*	Paper/electronic
Laboratory equipment maintenance logs	GBRA/UGRA/LCRA/SARA/ DSHS	one year/ indefinitely/5 years*	Paper/electronic
Laboratory calibration records	GBRA/UGRA/LCRA/SARA/ DSHS	one year/ indefinitely/5 years*	Paper/electronic
Corrective Action Documentation	GBRA/UGRA/LCRA/SARA/ DSHS	one year/ indefinitely/5 years*	Paper/electronic

* LCRA

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.

* title of report and unique identifiers on each page
* name and address of the laboratory
* name and address of the client
* a clear identification of the sample(s) analyzed
* date and time of sample receipt
* date and time of collection
* sample depth
* identification of method used
* identification of samples that did not meet QA requirements and why (e.g., holding times exceeded)
* sample results
* units of measurement
* sample matrix
* dry weight or wet weight (as applicable)
* clearly identified subcontract laboratory results (as applicable)
* a name and 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 LOQ and LOD confirmation (% recovery)
* narrative information on QC failures or deviations from requirements that may affect the quality of results or is necessary for verification and validation of data
* certification of NELAC compliance on a result by result basis.

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.

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

Table B2.1 Sample Storage, Preservation and Handling Requirements

Parameter	Matrix	Container	Preservation*	Sample Volume	Holding Time
Turbidity	Water	Plastic or glass	Cool, 0-6°C	100 mL	48 hours
Hardness	Water	Plastic or glass	Cool, 0-6°C, H_2SO_4 to pH < 2*	1 L	6 months
Solids (TSS,VSS)	Water	Plastic or glass	Cool, 0-6°C	1 L	7 days
Nitrate-nitrogen	Water	Plastic or glass	Cool, 40-6°C	1 L	48 hours
Ammonia-nitrogen	Water	Plastic or glass	Cool, 0-6°C, H_2SO_4 to pH < 2*	1 L	28 days
Total phosphorus	Water	Plastic or glass	Cool, 0-6°C, H_2SO_4 to pH < 2*	1 L	28 days
Sulfate	Water	Plastic or glass	Cool, 0-6°C	1 L	28 days
Chloride	Water	Plastic or glass	Cool, 0-6°C	1 L	28 days
Chlorophyll a /Pheophytin	Water	Amber plastic or glass	Dark, Cool, 0-6°C before Filtration; Dark, 0°C after Filtration	1 L	Filter within 24 hours/28 days at 0°C
E. coli	Water	Sterile, plastic	Cool, 0-6°C	100 mL	6 hours
Metals, total	Water	Plastic or glass	Cool, 0-6°C, HNO_3 to pH < 2*	1 L	6 months
Metals, dissolved	Water	Plastic or glass	Cool, 0-6°C, HNO_3 to pH < 2*	1 L	Filtered on site/6 months
Mercury, total	Water	Teflon or glass	Cool, 0-6°C, HNO_3 to pH < 2*	1 L	28 days
BTEX	Sediment	Glass	Cool, 0-6°C	40 mL	7 days
TPH	Sediment	Glass	Cool, 0-6°C	40 mL	7 days
Biological	Water	Plastic or glass	Ethanol CDA 19 (field); 10% Formalin (voucher)	1 L/5 mL specimen jars	1 day (field); indefinitely (voucher)
Radiologicals	Water	Plastic	Cool, 0-6°C	1 gal	30 days
Metals, total	Sediment	Plastic or glass	Cool, 0-6°C	100 g	6 months

* Preservation occurs within 15 minutes of collection.

Sample Containers

Sample containers are plastic one liter bottles that are cleaned and reused for conventional parameters. The bottles are cleaned with the following procedure: 1) wash containers with tap water and alconox (laboratory detergent), 2) triple rinse with hot tap water, and 3) triple rinse with deionized water. The sample containers for metals in water are provided by LCRA and are new, certified glass or plastic bottles, or glass or plastic bottles cleaned and documented according to EPA method 1669. The sample containers for organic analyses are provided pre-cleaned from LCRA and are 40 mL VOA vials for BTEX and TPH.

One-gallon plastic containers are used for radiological samples. Amber plastic bottles are used routinely for chlorophyll samples. Disposable, pre-cleaned, sterile bottles are purchased for bacteriological samples. Certificates are maintained in a notebook by each laboratory. The sample containers for metals in sediment are provided by LCRA and are new, certified glass or plastic bottles, or glass or plastic bottles.

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.

Documentation of Field Sampling Activities

Field sampling activities are documented on field data sheets. The following will be recorded for all visits:

* station ID
* sampling date
* location
* sampling depth
* sampling time
* sample collector's name/signature
* values for all field parameters
* detailed observational data, including:
* water appearance
* weather
* biological activity
* unusual odors
* 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:

* Write legibly in indelible ink
* Changes should be made by crossing out original entries with a single line, entering the changes, and initialing and dating the corrections.
* 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 GBRA Project Manager. The GBRA Project Manager will notify the GBRA QAO of the potential nonconformance. The GBRA QAO will initiate a Nonconformance Report (NCR) to document the deficiency.

The GBRA Project Manager, in consultation with the GBRA 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 GBRA Project Manager in consultation with the GBRA QAO will determine the disposition of the nonconforming activity or item and necessary corrective action(s); results will be documented by the GBRA 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 form in Appendix D.

* date and time of collection
* site identification
* sample matrix
* number of containers

* preservative used
* was the sample was filtered
* analyses required
* name of collector
* custody transfer signatures and dates and time of transfer
* bill of lading (*if applicable*)

Sample Labeling

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

* site identification
* date and time of collection
* preservative added, if applicable
* designation of "field-filtered" *(for metals)* as applicable
* sample type (i.e., analysis(es)) to be performed

Sample Handling

After collection of samples are complete, sample containers are immediately stored in an ice chest for transport to the laboratories (GBRA, UGRA), accompanied by the chain of custody. Ice chests will remain in the possession of the field technician or in the locked vehicle until delivered to the respective lab. After samples for trace metal are filtered in the field, these sample containers are immediately stored in an ice chest for transport to the LCRA Environmental Laboratory Services, Austin, Texas by regional lab or field staff, accompanied by the chain of custody. Samples for metals in sediment will be carried on ice, to the LCRA Environmental Laboratory Services, Austin, Texas by regional lab or field staff, accompanied by the chain of custody. Samples for organics analyses are immediately stored in an ice chest and delivered by GBRA lab or field staff, along with the chain of custody, to the LCRA Environmental Laboratory Services in Austin, Texas. Samples for radiological analyses are immediately stored in an ice chest and delivered by GBRA lab or field staff to the DSHS Laboratory in Austin, Texas, along with the chain of custody. If in the event of laboratory equipment failure and in order to meet holding times, chain of custodies and samples will be delivered on ice to the SARA laboratory, in San Antonio, Texas by GBRA personnel. After receipt at the GBRA or UGRA lab, the samples are stored in the refrigeration unit or given to the analyst for immediate analysis. Only authorized laboratory personnel will handle samples received by the laboratory.

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 GBRA Project Manager. The GBRA Project Manager will notify the GBRA QAO of the potential nonconformance. The GBRA QAO will initiate a Nonconformance Report (NCR) to document the deficiency.

The GBRA Project Manager, in consultation with the GBRA 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 GBRA Project Manager in consultation with the GBRA QAO will determine the disposition of the nonconforming activity or item and necessary corrective action(s); results will be documented by the GBRA 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 Table A7.1 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 (see Appendix F). Copies of laboratory QASMs 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 GBRA Project Manager. The GBRA

Project Manager will notify the GBRA QAO of the potential nonconformance. The GBRA QAO will initiate a Nonconformance Report (NCR) to document the deficiency.

The GBRA Project Manager, in consultation with the GBRA 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 GBRA Project Manager in consultation with the GBRA QAO will determine the disposition of the nonconforming activity or item and necessary corrective action(s); results will be documented by the GBRA 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) and a minimum of one field blank for total metals- in-water samples is collected per sample run or one for every 10 samples if more the 10 samples are collected. A field blank consists of deionized water that is taken to the field and poured into the sample container. Field blanks are used to assess the contamination from field sources such as airborne materials, containers, and preservatives. Field blanks are collected when sampling for total mercury, total selenium, and l uranium as per the coordinated monitoring schedule.

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 minimum of one field equipment blank for metals-in-water samples is collected per sample run or one for every 10 samples if more the 10 samples are collected.. A field equipment blank is a sample of reagent water poured into or over a sampling device or pumped through a sampling device. 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 are collected when sampling for dissolved metals as per Appendix B.

The analysis of field equipment blanks should yield values lower than theLOQ, 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 more frequent.

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

$$RPD = (X1-X2)/((X1+X2)/2)) * 100$$

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, than 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.

Trip blank – Trip blanks are required for volatile organic analyses (VOA) only. VOA trip blanks are samples prepared in the laboratory with laboratory pure water and preserved as required. A trip blank is submitted with each ice chest of VOA samples submitted to the laboratory. They are transported to the sampling site, handled like an environmental sample, and returned to the laboratory for analysis. Trip blanks are not opened in the field. Their purpose is to check contamination of the sample through leaching of the septum. The analysis of trip blank should yield values less than the LOQ. When target analyte concentrations are very high, blank values should be less then 5% of the lowest value of the batch, or corrective action will be implemented.

Laboratory Measurement Quality Control Requirements and Acceptability Criteria

Method Specific QC requirements – QC samples, other than those specified later 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 systems manuals (QSMs). 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 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 Table A7.1 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 Table A7.1.

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 Table A7.1.

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 Table A7.1. The specifications for bacteriological duplicates in Table A7.1 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 GBRA Project Manager. The GBRA Project Manager will notify the GBRA QAO of the potential nonconformance. The GBRA QAO will initiate a Nonconformance Report (NCR) to document the deficiency.

The GBRA Project Manager, in consultation with the GBRA 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 GBRA Project Manager in consultation with the GBRA QAO will determine the disposition of the nonconforming activity or item and necessary corrective action(s); results will be documented by the GBRA 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 QSM(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 QSM(s).

B8 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

All field supplies and consumables are accepted upon inspection for breaches in shipping integrity.

B9 NON-DIRECT MEASUREMENTS

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

B10 DATA MANAGEMENT

GBRA and UGRA Data Management Process

Field technicians and laboratory personnel follow protocols that ensure that the CRP database maintains its integrity and usefulness. Field data collected at the time of the sampling event is logged by the field technician, along with notes on sampling conditions in field logs or on field data sheets. The field log/sheet is the responsibility of the field technician and is transported with the sample to the laboratory. The lab technician /sample custodian logs the sample in the Lab Samples Database. Each sample is assigned a separate and distinct sample number. The sample is accompanied by a chain of custody. The lab technician /sample custodian must review the chain of custody to verify that it is filled out correctly and complete. Lab technicians take receipt of the sample and review the chain of custody, begin sample prep or analysis and transfer samples into the refrigerator for storage. Examples of the field data sheets and chains of custody used can be found in Appendices C and D. Samples that are outsourced to other laboratories are accompanied by a copy of the chain of custody. For an explanation data management process used by the labs listed as possible outsource laboratories see Appendix F.

Data generated by lab technicians are logged permanently on analysis bench sheets. The data are reviewed by the analyst prior to entering the data into the Lab Samples Database. In the review, the analyst verifies that the data includes date and time of analysis, that calculations are correct, that data includes documentation of dilutions and correction factors, that data meets data quality objectives and that the data includes documentation of instrument calibrations, standard curves and control standards. A second review by another lab analyst/technician validates that the data meets the data quality objectives and that the data includes documentation of instrument calibrations, standard curves and control standards. After this review the lab analyst/technician inputs the data and quality control information into the Lab Samples Database for report generation and data storage.

The GBRA Regional Laboratory Director supervises the GBRA Regional laboratory and reviews the report that is generated when all analyses are complete. The UGRA Laboratory Director supervises the UGRA lab and reviews the analysis logs when all data is complete. The analysis log is reviewed to see that all necessary information is included and that the data quality objectives have been met. When the report generated by the GBRA laboratory is complete, the lab director signs the report. If the GBRA /UGRA lab director or QAO designee feel there has been an error or finds that information is missing, the report is returned to the analyst for review and tracking to correct the error and generate a corrected copy. The GBRA Project Manager and the UGRA Project Manager reviews the respective data for

reasonableness and if errors or anomalies are found the report is returned to the laboratory staff for review and tracking to correct the error. After review for reasonableness the data is cross-checked to the analysis logs by the GBRA and UGRA Project Managers. If at any time errors are identified, the laboratory and water quality databases are corrected. The UGRA project manager transmits the data produced by UGRA to the GBRA Project Manager for review. If errors are found after the GBRA review, those errors are corrected by the UGRA Project Manager and logged in a data correction log. The GBRA and UGRA Project Managers are responsible for transmitting the data to TCEQ. If errors are found after the TCEQ review, those errors are corrected by the GBRA or UGRA Project Manager and logged in a data correction log.

The following flow diagram outlines the path that data that is generated in the field takes:

Field data collected → Field data sheets → Lab database → Quality control review by GBRA/UGRA QAO → Report generation → Data checked for reasonableness by GBRA/UGRA Project Manager → Data transferred to GBRA/UGRA water quality databases → Data verification to analysis logs by GBRA/UGRA Project Manager → UGRA data reviewed by GBRA Project Manager → ASCII file format created → TCEQ CRP Project Manager

The following flow diagram outlines the path that data that is generated by the lab takes:

Laboratory data → Laboratory analysis logs → Lab database → Quality control review by GBRA/UGRA QAO→ Report generation → Data checked for reasonableness by GBRA/UGRA Project Manager → Data transferred to GBRA/UGRA water quality databases → Data verification to analysis logs by GBRA/UGRA Project Manager → UGRA data reviewed by GBRA Project Manager → ASCII file format created → TCEQ CRP Project Manager

The following flow diagram outlines the path that data that are generated by outsource labs takes:

Sample delivered to outsource lab → Laboratory data → Laboratory analysis logs → Lab database → Report generation→ Quality control review by laboratory QAO → Data transferred to GBRA→ Data checked for reasonableness by GBRA/UGRA Project Manager → Data transferred to GBRA water quality database (GBRA only) → Data verification to outsource lab reports by GBRA/UGRA Project Manager → UGRA data reviewed by GBRA Project Manager → ASCII file format created → TCEQ CRP Project Manager

Data Errors and Loss

The GBRA Regional Laboratory Director supervises the GBRA Regional laboratory and reviews the report that is generated when all analyses are complete. The UGRA Laboratory Director supervises the UGRA lab and reviews the report when all data is complete. The report is reviewed to see that all necessary information is included and that the data quality objectives have been met. When the report is complete, the lab director signs the report. If the lab director or QAO feel there has been an error or finds that information is missing, the report is returned to the analyst for review and tracking to correct the error and generate a corrected copy. The GBRA/UGRA Project Manager reviews the data for reasonableness and if errors or anomalies are found the report is returned to the laboratory director for review and tracking to correct the error. After review for reasonableness the data is cross-checked to the analysis logs by the GBRA/UGRA Project Manager. If at any time errors are identified, the laboratory and water quality databases are corrected. The GBRA/UGRA Project Manager is responsible for transmitting the data to

TCEQ. If errors are found after the TCEQ review, those errors are corrected by the GBRA/UGRA Project Manager and logged in a data correction log.

To minimize the potential for data loss, the databases, both lab and server files are backed up nightly and copies of the files are stored off-site weekly. If the laboratory database or network server fails, the back up files can be accessed to restore operation or replace corrupted files.

Record Keeping and Data Storage

After data is collected and recorded on field data sheets, the data sheets are filed for review and use later. These files are kept in paper form for a minimum of one year and then scanned for permanent record.

The data produced during each analysis is recorded on analysis bench sheets. The information contained in the bench sheets include all quality control data associated with each day's or batch's analysis. The data on the logs are transferred to the laboratory database for report generation. The bench sheets are kept in paper form for a minimum of one year and then scanned for permanent record.

The data reports that are generated are reviewed by the laboratory director and signed. They are then given to the GBRA/UGRA Project Manager for verification. If an anomaly or error is found the report is marked and returned to the laboratory for review, verification and correction, if necessary. These reports may or may not be kept in paper form since the reports can be regenerated from the lab database at any time. If kept, the paper form is kept for a minimum of one year and then sent for scanning into the ITRAX records management system.

The laboratory database is housed on the laboratory computer and is backed up on the network server nightly. The GBRA back-up copy of the network server files is made every Monday and that copy is stored off-site at a protected location. The UGRA back-up copies of the network server files are stored on -site. The network administrator is responsible for the servers and back up generation.

After data is sent to the TCEQ CRP Project Manager for review, the file that has been created is kept on the network server permanently. The network server is backed up nightly. Paper copies of the data and field duplicate sample reports are kept for a minimum of one year and then microfilmed for permanent record.

The database containing the scanned images of all lab records is contained on a network server and backed up nightly. A back-up copy of the network server files is made every Monday and that copy for GBRA is stored off-site at a protected location. UGRA stores back-up copies on-site. The GBRA records manager is the custodian of these files.

Data Handling, Hardware, and Software Requirements

The laboratory database is housed on a GBRA server and backed up each evening. The laboratory database uses SQL 2000 database software. The systems are operating in Windows 2003 and any additional software needed for word processing, spreadsheet or presentations uses Microsoft Office 2000.

Information Resource Management Requirements

Data will be managed in accordance with the TCEQ *Surface Water Quality Monitoring Data Management Reference Guide*, GIS Policy (TCEQ OPP 8.11), GPS Policy (TCEQ OPP 8.12) and applicable GBRA and

UGRA 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	GBRA	Monitoring of the project status and records to ensure requirements are being fulfilled	Report to TCEQ in Quarterly Report
Monitoring Systems Audit	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 Participants	Dates to be determined by the GBRA; minimum of one per contract period or as needed due to sub-tier staff changes	GBRA	Field sampling, handling and measurement; facility review; and data management as they relate to CRP	30 days to respond in writing to the GBRA. GBRA 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 GBRA 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 GBRA Project Manager. 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

Reports to GBRA Project Management

Laboratory data reports contain QC information so that this information can be reviewed by the GBRA/UGRA Project Managers. After review, the GBRA/UGRA Project Managers mark the lab report as "QA Reviewed" and begins the process of data transmittal to TCEQ. Project status, assessments and significant QA issues will be dealt with by the GBRA/UGRA Project Managers who will determine whether it will be included in reports to the TCEQ Project Management.

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 GBRA'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 GBRA, a report of findings, recommendations and response is sent to the TCEQ in the quarterly progress report.

Reports by TCEQ Project Management

Contractor Evaluation – GBRA 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 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.

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, 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 is performed by the GBRA 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 GBRA 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 GBRA Data Manager with the data. This information is communicated to the TCEQ by GBRA in the Data Summary.

Table D2: 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	GBRA Field Technicians/UGRA Field Technicians/WVWA Field Technicians
Post-calibrations checked to ensure compliance with error limits	GBRA Field Technicians/UGRA Field Technicians/ WVWA Field Technicians
Field data calculated, reduced, and transcribed correctly	GBRA Project Manager/UGRA Project Manager/ WVWA Project Manager
Laboratory Data Review	
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	GBRA Laboratory Director(QAO)/UGRA QAO/ LCRA-Project Manager/DSHS QAO/SARA QAO/
Laboratory data calculated, reduced, and transcribed correctly	G GBRA Laboratory Director(QAO)/UGRA QAO/ LCRA-Project Manager/DSHS QAO/SARA QAO
LOQsconsistent with requirements for Ambient Water Reporting Limits	GBRA Laboratory Director(QAO)/UGRA QAO/ LCRA-Project Manager/DSHS QAO/SARA QAO

Table D2: Data Review Tasks (cont.)	
Analytical data documentation evaluated for consistency, reasonableness and/or improper practices	GBRA Laboratory Director(QAO)/UGRA QAO/ LCRA-Project Manager/DSHS QAO/SARA QAO
Analytical QC information evaluated to determine impact on individual analyses	GBRA Laboratory Director(QAO)/UGRA QAO/ LCRA-Project Manager/DSHS QAO/SARA QAO
All laboratory samples analyzed for all parameters	GBRA/UGRA Project Managers
Data Set Review	
The test report has all required information as described in Section A9 of the QAPP	GBRA/UGRA Project Managers
Confirmation that field and lab data have been reviewed	GBRA Laboratory Director(QAO) and Project Manager/UGRA Project Manager(QAO)
Data set (to include field and laboratory data) evaluated for reasonableness and if corollary data agree	GBRA /UGRA Project Managers
Outliers confirmed and documented	GBRA /UGRA Project Managers
Field QC acceptable (e.g., field splits and trip, field and equipment blanks)	GBRA Field Technicians/UGRA Field Technicians/WVWA Field Technicians
Sampling and analytical data gaps checked and documented	GBRA Field Technicians and Project Manager /UGRA Field Technicians and Project Manager/ WVWA Field Technicians
Verification and validation confirmed. Data meets conditions of end use and are reportable	**GBRA/UGRA Project Managers**

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: **Monitoring Description**

The GBRA will conduct water quality monitoring and provide details in the Progress Report format as prescribed in the FY 2008-09 CRP Guidance, Exhibit 1C.

GBRA will conduct routine monitoring at 18 sites on a monthly basis, collecting field, conventional, flow and bacteria parameter groups. In addition GBRA will monitor seven sites quarterly and one site bimonthly for the same parameter group. There will be 10 sites monitored in Kerr County. The Upper Guadalupe River Authority will assume the quarterly water quality monitoring for the same parameter groups at the stations in Kerr County under a subcontract when they have an administratively complete NELAP application. Until such time GBRA will conduct the Kerr County quarterly monitoring and laboratory analyses.

Biological and habitat assessments will be collected annually at 7 sites, 2 in Kerr County and 5 in the GBRA district. Three sites in the GBRA district will be sampled for metals in water and two sites will be monitored for metals in sediment, one time each year. The Wimberley Valley Watershed Associations (WVWA), another sub-tier participant, will monitor seven sites eight times per year for conventional, flow, bacteria and field parameter groups in Hays County and will conduct a diurnal monitoring event once per year at one site. GBRA will monitor organics in sediment, as listed as Priority Surface Water Quality Monitoring Core Parameters, at one site in Kerr County and two sites on the San Marcos River in 2008. GBRA will monitor organics in water, as listed as Priority Surface Water Quality Monitoring Core Parameters, at one site on Plum Creek. Samples will be collected from the Coleto Creek watershed and analyzed for radiological constituents once per quarter for the biennium.

All monitoring procedures and methods will follow the guidelines prescribed in the GBRA 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).*

Coordinated Monitoring Meeting - GBRA 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.

Biological Data Reporting
Biological/habitat data reported to the TCEQ under an approved QAPP, will be submitted electronically using the TCEQ Events/Results file format, as well as in a pdf document using Biological Data Reporting Packet outlined in Exhibit 3D in the CRP Guidance.

Equipment: Marsh McBirney flow meter; spectrophotometer for chlorophyll a analyses.

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
D. Biological Data Report - coordinate due date(s) with TCEQ Project Manager

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
D. Biological Data Report - coordinate due date(s) with TCEQ Project Manager

Appendix B

Sampling Process Design and 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, GBRA coordinates closely with the TCEQ and other participants to ensure a comprehensive water monitoring strategy within the watershed. *A discussion of past or ongoing water quality issues should be provided here to justify the monitoring schedule.*

Site Selection Criteria

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 page. The sample design for surface water quality monitoring is shown in Table B1.1

Legend for Table B1.1:

GB = Guadalupe Blanco River Authority
UG = Upper Guadalupe River Authority
WV = Wimberley Valley Watershed Association
DO 24hr = diurnal monitoring for dissolved oxygen, conductivity, temperature and pH; measurements taken every hour for 24 hours; includes minimum, maximum and average.
Aq Hab = aquatic habitat assessment
Benthics = benthic macroinvertabrate biological data collection
Nekton = nekton biological data collection
Metals Water = collection of samples for dissolved arsenic, silver, aluminum, cadmium, chromium, copper, nickel, lead and zinc, total mercury and selenium, and uranium isotopes
Metals Sediment = collection of samples for total arsenic, silver, aluminum, cadmium, chromium, copper, nickel, lead, zinc, mercury and selenium
Organics Water = BTEX, and TPHs
Organics Sediment = BTEX and TPHs
Conventional (GB) = total suspended solids, turbidity, sulfate, chloride, nitrate nitrogen, ammonia nitrogen, chlorophyll a, pheophytin, total hardness, total phosphorus
Conventional (UG) = total suspended solids, turbidity, sulfate, chloride, nitrate nitrogen, ammonia nitrogen, chlorophyll a, pheophytin, total hardness, total phosphorus, volatile suspended solids
Conventional (WV) = total suspended solids, ammonia nitrogen, total phosphorus, nitrate nitrogen
Bacteria = E. coli
Flow = flow collected by gage, electric, mechanical or Doppler; includes severity
Field (GB and UG) = pH, temperature, conductivity, dissolved oxygen
Field (WV) = pH, temperature, conductivity, dissolved oxygen, days since last significant rainfall, secchi disk
RT = samples are scheduled in advance without intentionally trying to target any certain environmental condition. The sample is collected regardless of the conditions encountered.
BS = samples are scheduled for a certain time of year because the sample is meant to capture the conditions characteristic of that time of year. The sample will be taken regardless of the flow condition encountered.

Appendix Table B Sample Design and Schedule, FY 2008

Segment	TCEQ Station ID	Site Description	QAPP	Monitor	Monitor Type	DO 24hr	Aq Hab	Benthics	Nekton	Metals Water	Organics Water	Metal Sed	Organics Sed	Conventional	Amb Tox Water	Amb Tox Sed	Bacteria	Flow	Fish Tissue	Field	Comments
1802	12578	GUADALUPE RIVER AT LOWER GUADALUPE DIVERSION DAM AND SALT WATER BARRIER	GB	GB	RT					1				12			12	12		12	
1803	12590	GUADALUPE RIVER AT FM 447, WEST OF NURSERY AND UPSTREAM OF SOUTH TEXAS ELECTRIC	GB	GB	RT									4			4	4		4	
1803	12592	GUADALUPE RIVER AT OLD SAN ANTONIO ROAD WEST OF CUERO	GB	GB	RT									12			12	12		12	
1803	14937	PEACH CREEK AT GONZALES CR 353, 14.0KM EAST OF GONZALES	GB	GB	RT		1	1	1	1				12			12	12		12	
1803	17935	PEACH CREEK, E BANK IMMEDIATELY DOWNSTREAM OF FM397, 0.49MI E OF THE INTERSECTION WITH GONZALES CR409, WEST OF MOULTON	GB	GB	RT									6			6	6		6	
1803	13657	SANDIES CREEK 100 FT. DOWNSTREAM OF COUNTY HIGHWAY, 1.9 MI. UPSTREAM FROM BIRDS CREEK, 2.0 MI. NE OF WESTHOFF	GB	GB	RT									12			12	12		12	
1804	12576	GERONIMO CREEK AT HABERLE ROAD 3 MILES SOUTH OF GERONIMO	GB	GB	RT							1		12			12	12		12	ecoregion reference site
1804	15110	GUADALUPE RIVER IMMEDIATELY DOWNSTREAM OF H-5 DAM AT WOOD LAKE, SW OF GONZALES, TX	GB	GB	RT									12			12	12		12	
1804	12596	LAKE DUNLAP-GUADALUPE RIVER NORTH BANK AT AC'S PLACE AT MIDPOINT OF LONE STAR DRIVE	GB	GB	RT									12			12	12		12	
1804	15149	LAKE MCQUEENEY, 0.5 MI. UPSTREAM OF MCQUEENEY DAM ON SOUTHEAST BANK	GB	GB	RT									12			12	12		12	
1805	17443	CANYON LAKE AT JACOB'S CREEK PARK BOAT RAMP	GB	GB	RT									4			4			4	
1805	12598	CANYON LAKE SOUTH OF JACOBS CREEK PARK 500 YARDS EAST OF PENINSULA	GB	GB	RT									12			12			12	
1806	12546	CAMP MEETING CREEK, 0.1 KM ABOVE CONFLUENCE WITH GUADALUPE IN KERRVILLE	GB	UG	RT									4			4	4		4	
1806	12605	GUADALUPE RIVER AT COUNTY RD ADJACENT TO HERMANN SONS' HOME, WEST OF COMFORT	GB	UG	RT									4			4	4		4	

Appendix Table B Sample Design and Schedule, FY 2008

Segment	TCEQ Station ID	Site Description	QAPP	Monitor	Monitor Type	DO 24hr	Aq Hab	Benthics	Nekton	Metals Water	Organics Water	Metal Sed	Organics Sed	Conventional	Amb Tox Water	Amb Tox Sed	Bacteria	Flow	Fish Tissue	Field	Comments
1806	17404	GUADALUPE RIVER AT FM 474 AT AMMANS CROSSING NE OF BOERNE	GB	GB	RT									4			4	4		4	
1806	12616	GUADALUPE RIVER AT G STREET (FORMERLY OLD MEDINA RD) IN KERRVILLE, SEGMENT KM 177.9	GB	UG	RT									4			4	4		4	
1806	12615	GUADALUPE RIVER AT KERRVILLE STATE PARK, SEGMENT KM 174.4	GB	UG	RT							1	1	4			4			4	ORGANICS IN SEDIMENT=TPH, BTEX
1806	15111	GUADALUPE RIVER AT RIVERVIEW RD IN INGRAM, TX	GB	UG	RT		1	1	1					4			4	4		4	
1806	13700	GUADALUPE RIVER AT RR 311, 1.9 MI. SE OF SPRING BRANCH, 7.5 MI. DOWNSTREAM FROM CURRY CREEK	GB	GB	RT									12			12	12		12	
1806	15113	GUADALUPE RIVER AT SPLIT ROCK RD OFF SH 27, 2.6 KM DOWNSTREAM OF FLATROCK DAM	GB	UG	RT		1	1	1					4			4	4		4	
1806	12608	GUADALUPE RIVER CENTER POINT LAKE	GB	UG	RT									4			4			4	
1807	12623	COLETO CREEK AT US 59 ON VICTORIA-GOLIAD COUNTY LINE	GB	GB	RT									12			12			12	
1807	18594	COLETO CREEK AT ARNOLD ROAD/CAMP COLETO ROAD NEAR SCHROEDER TEXAS	GB	GB	BS					4											QUARTERLY SAMPLES FOR URANIUM ISOTOPES
1808	12626	LOWER SAN MARCOS RIVER AT SH 80 SOUTH OF LULING	GB	GB	RT								1	12			12	12		12	ORGANICS IN SEDIMENT=TPH, BTEX
1808	16578	SAN MARCOS RIVER AT US90A, 3.3KM WEST OF INTERSECTION OF US90A AND US183 IN GONZALES, 7KM UPSTREAM OF CONFL. WITH GUADALUPE RIVER	GB	GB	RT									4			4	4		4	
1810	12647	PLUM CREEK AT CR 202, SE OF LOCKHART	GB	GB	RT		1	1	1									1		1	coordinate w. region 11
1810	12640	PLUM CREEK AT OLD WOODEN BRIDGE ON CALDWELL CR 135, SE OF LULING	GB	GB	RT						1			12			12	12		12	
1810	17406	PLUM CREEK AT PLUM CREEK ROAD NORTH OF UHLAND	GB	GB	RT		1	1	1					12			12	12		12	
1811	12653	COMAL RIVER BELOW CLEMONS DAM IN NEW BRAUNFELS	GB	GB	RT									12			12	12		12	
1811	12570	DRY COMAL CREEK AT MISSOURI-KANSAS-TEXAS RAILROAD CROSSING IN NEW BRAUNFELS	GB	GB	RT		1	1	1					12			12	12		12	

Appendix Table B Sample Design and Schedule, FY 2008

Segment	TCEQ Station ID	Site Description	QAPP	Monitor	Monitor Type	DO 24hr	Aq Hab	Benthics	Nekton	Metals Water	Organics Water	Metal Sed	Organics Sed	Conventional	Amb Tox Water	Amb Tox Sed	Bacteria	Flow	Fish Tissue	Field	Comments
1812	12658	GUADALUPE RIVER AT RIVER RD 2ND CROSSING, UPSTREAM OF NEW BRAUNFELS	GB	GB	RT									12			12	12		12	
1813	12661	BLANCO RIVER AT BRIDGE ON SH 12 AT WIMBERLEY	GB	WV	RT									8			8	8		8	7 samples collected Mar-Oct.; one sample collected Nov.-Feb.
1813	12668	BLANCO RIVER AT FM 165 1/2 MILE EAST OF BLANCO	GB	GB	RT									12			12	12		12	
1813	12660	BLANCO RIVER AT LOW WATER CROSSING AT CR 174	GB	WV	RT									8			8	8		8	7 samples collected Mar-Oct.; one sample collected Nov.-Feb.
1813	12663	BLANCO RIVER AT LOW WATER CROSSING AT PIONEER TOWN	GB	WV	RT									8			8	8		8	7 samples collected Mar-Oct.; one sample collected Nov.-Feb.
1814	12672	UPPER SAN MARCOS RIVER IMMEDIATELY UPSTREAM OF IH 35 BRIDGE AT SAN MARCOS	GB	GB	RT								1	4			4	4		4	samples collected downstream of bridge temporarily due to construction
1815	12673	CYPRESS CREEK AT CONFLUENCE WITH THE BLANCO RIVER	GB	WV	RT									8			8	8		8	7 samples collected from Mar.-Oct.; one in Nov.-Feb.
1815	12675	CYPRESS CREEK AT DOWNSTREAM END IN BLUE HOLE CAMPGROUND	GB	WV	RT									8			8	8		8	7 samples collected Mar-Oct.; one sample collected Nov.-Feb.
1815	12674	CYPRESS CREEK AT FM 12 AT WIMBERLEY	GB	GB	RT		1	1	1					4			4	4		4	
1815	12675	CYPRESS CREEK AT DOWNSTREAM END IN BLUE HOLE CAMPGROUND	GB	WV	BS	1															
1815	12677	CYPRESS CREEK AT JACOBS WELL	GB	WV	RT									8			8	8		8	7 samples collected Mar.-Oct.; one in Nov.-Feb.
1815	12676	CYPRESS CREEK AT RR 12, 1 MILE NORTH OF WIMBERLEY	GB	WV	RT									8			8	8		8	7 samples collected in Mar.-Oct.; one sample in Nov.-Feb.
1816	12678	JOHNSON CREEK AT SH 39 IN INGRAM	GB	UG	RT									4			4	4		4	
1817	12682	NORTH FORK GUADALUPE AT RIVER GAGING STATION NEAR CAMP WALDEMAR	GB	UG	RT									4			4	4		4	
1818	12684	SOUTH FORK GUADALUPE ADJACENT TO HUNT LIONS PARK	GB	UG	RT									4			4	4		4	

Appendix Table B Sample Design and Schedule, FY 2008

Segment	TCEQ Station ID	Site Description	QAPP	Monitor	Monitor Type	DO 24hr	Aq Hab	Benthics	Nekton	Metals Water	Organics Water	Metal Sed	Organics Sed	Conventional	Amb Tox Water	Amb Tox Sed	Bacteria	Flow	Fish Tissue	Field	Comments
1901	12790	SAN ANTONIO RIVER FM 2506 EAST OF FANNIN	GB	GB	RT									12			12	12		12	

Critical vs. non-critical measurements

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

Appendix C:

Field Data Sheet

Texas Commission on Environmental Quality
Surface Water Quality Monitoring Program

Field Data Reporting Form

RTAG# | REGION | EMAIL-ID: | COLLECTOR

STATION ID | SEGMENT | SEQUENCE | DATA SOURCE

Station Description _____

GRAB SAMPLE

M M D D Y Y Y Y — DATE
H H M M — TIME
DEPTH
M = meters
F = feet

COMPOSITE SAMPLE

COMPOSITE CATEGORY: T=Time S=Space (i.e. Depth) B=Both F=Flow Weight

M M D D Y Y Y Y — START DATE
H H M M — START TIME
START DEPTH (SURFACE)
M = meters F = feet

M M D D Y Y Y Y — END DATE
H H M M — END TIME
END DEPTH (DEEPEST)
M = meters F = feet

COMPOSITE TYPE: ## = Number of Grabs in Composite CN = Continuous

00010		WATER TEMP (°C only)	72053		DAYS SINCE LAST SIGNIFICANT PRECIPITATION
00400		pH (s.u)	01351		FLOW SEVERITY 1-no flow 2-low 3-normal 5-high 4-flood 6-dry
00300		D.O. (mg/L)			
00094		SPECIFIC COND (µmhos/cm)	00061		INSTANTANEOUS STREAM FLOW (ft^3/sec)
00480		SALINITY (ppt, marine only)	89835		FLOW MEASUREMENT METHOD 1- Flow Gage Station 2- Electric 3- Mechanical 4- Weir/Flume
50060		CHLORINE RESIDUAL (mg/L)			
00078		SECCHI DISK (meters)	74069		FLOW ESTIMATE (ft^3/sec)
82078		TURBIDITY-FIELD (NTU)	82903		TOTAL WATER DEPTH (meters)
31616		FECAL COLIFORM (#/100 ml)	00055		WATER VELOCITY (maximum)(ft/sec)
31699		E. coli (#/100 ml) (Colilert Method)	89864		MAXIMUM POOL WIDTH (meters) *
31701		Enterococci (#/100 ml) (Enterolert Method)	89869		POOL LENGTH (meters) *
			89865		MAXIMUM POOL DEPTH (meters) *
			89870		% POOL COVERAGE IN 500 M REACH *

*Parameters related to data collection in perennial pools; i.e., Flow Severity of 1 and Flow of zero reported.

Measurement Comments and Field Observations:

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Appendix D:

Chain-of-Custody Forms

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Upper Guadalupe River Authority Environmental Laboratory

Chain-of-Custody Record

Report To:			Invoice To:			Fax To:
Customer			Customer			Name
Address			Address			Fax#
City	State	Zip	City	State	Zip	
Attn:	Phone #		Attn:	Phone #		

Sample Information:	
Project Name:	**Comments:**
Sampled By:	

Requested Analysis:

System Name: and Public ID #	Point of Collection	Collected Date:	Collected Time:	Sample Type:	Source	Cl_2 residual	#of containers	Preservative	Bacteria Analysis	Bacteria counts	BOD	CBOD	TSS	pH	Dissolved Oxygen	Fecal count	Ammonia	Standard Water						UGRA Sample number (Lab use only)
				☐ Distribution ☐ Construction ☐ Raw ☐ Repeat	☐ Groundwater ☐ Surface water																			
				☐ Distribution ☐ Construction ☐ Raw ☐ Repeat	☐ Groundwater ☐ Surface water																			
				☐ Distribution ☐ Construction ☐ Raw ☐ Repeat	☐ Groundwater ☐ Surface water																			
				☐ Distribution ☐ Construction ☐ Raw ☐ Repeat	☐ Groundwater ☐ Surface water																			
				☐ Distribution ☐ Construction ☐ Raw ☐ Repeat	☐ Groundwater ☐ Surface water																			
				☐ Distribution ☐ Construction ☐ Raw ☐ Repeat	☐ Groundwater ☐ Surface water																			
				☐ Distribution ☐ Construction ☐ Raw ☐ Repeat	☐ Groundwater ☐ Surface water																			
				☐ Distribution ☐ Construction ☐ Raw ☐ Repeat	☐ Groundwater ☐ Surface water																			
				☐ Distribution ☐ Construction ☐ Raw ☐ Repeat	☐ Groundwater ☐ Surface water																			
				☐ Distribution ☐ Construction ☐ Raw ☐ Repeat	☐ Groundwater ☐ Surface water																			

Condition of Sample(s):	Temperature:	Send out:			
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time

125 Lehmann Drive, Suite 100 Kerrville, TX 78028 (830) 896 5445 - Fax (830) 257 2621

GBRA
GUADALUPE-BLANCO RIVER AUTHORITY

Chain of Custody

Guadalupe-Blanco River Authority - Regional Laboratory
933 E. Court Street • Seguin, Texas 78155
(830) 379-5822 • Fax: (830) 401-0991

Account #: _____

Customer Information

Name: _____ Phone # _____

Adress: _____ Cell #: _____ Email: _____

_____ Fax #: _____

Sample Collected By: _____ _____
Signature Printed Name

Temp C°	Date Collected	Time Collected	Matrix	Sx Vol.	Sample Name/ Description	TCEQ I.D. #	Grab/ Comp.	Analysis Requested	GBRA Sample I.D.	Bottle I.D. #	pH	Ship To

Delivered By: _____ **Date/Time:** _____ **Received By:** _____ **Date/Time:** _____

Delivered By: _____ **Date/Time:** _____ **Received By:** _____ **Date/Time:** _____

** Special Notes: _____

Condition of Container(s), (intact) _____ Preservation: _____ (acidified, etc.)

Ice: _____ (y/n) Number of Containers: _____ Date/Time of Preservation: _____

entered by: _____
date: _____

05/07

Appendix E:

Data Summary

Data Summary

Data Information

Data Source: _____

Date Submitted: _____

Tag_id Range: _____

Date Range: _____

Comments

Please explain in the space below any data discrepancies including:

- **Inconsistencies with AWRL specifications;**
- **Failures in sampling methods and/or laboratory procedures that resulted in data that could not be reported to the TCEQ; and**
- **Other discrepancies.**

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Planning Agency Data Manager: _____

Date: _____

Appendix F:

Data Management by Outsource Laboratories

Lower Colorado River Authority Environmental Laboratory Services

The Sample Custodian or designee performs sampling receiving and login in accordance with specified procedures. In general the process can be described as follows:

Upon receiving the samples, proper sample bottles, preservation, temperature, and holding times are checked and verified and the customer is made aware of any discrepancies. The Sample Custodian verifies that the forms are correctly filled out including any notations regarding sample condition. Any headspace in VOA vials greater than 6mm is reported to the customer and documented on the COC. Any other sample condition (i.e., insufficient sample volume, improper preservation, broken container, etc.) is also reported to the customer and documented on the COC. The Sample Custodian enters information into the LIMS regarding the sample, project or client information, any sample conditions noted and any other pertinent information. The LIMS auto-generates a unique identification number for each sample and creates a work order for the analyses. In addition, the LIMS automatically prints out labels for all sample bottle(s) which contains the unique identification number, sample date and time, any preservatives, and test codes. The Sample Custodian then ensures that the samples are placed in proper storage at ELS. Samples are placed in a refrigerated environment as required. Internal reports, such as forecast, worklists and holding time reports, are generated from the LIMS on a routine basis to determine the work schedule and for sample tracking.

All work performed on each sample is documented in the LIMS or logbooks as described above. It is expected that all digits in a reported result be known definitely, except for the last digit, which may be in doubt. Therefore, when reporting final data, the proper number of significant figures is used. A maximum of three significant figures is reported for analyses. Results are not reported when detected lower than the documented sensitivity of an instrument/method, the established limit, or ELS management approved reliable quantitation limits. Under special circumstances, when results that are lower than normal detection limits are to be reported, the ELS Operations Manager / or Supervisors and the QAO must be notified and the limits recorded on the chain-of-custody record or the Case Narrative for notification on the Final Analysis Report. Once analytical data is generated by the instrument/analysis, the analyst reviews the data per method requirements. ELS utilizes QA/QC Case Narrative forms for proper documentation of any interference, failure to meet holding times, improper preservatives or containers, out-of-control quality data or other notations needed concerning the parameters analyzed. The analytical and QC data are then entered into the LIMS by the analyst or down loaded directly from certain analytical instruments, and the test code for that sample in the work order is automatically removed from the worklist.

The data package receives a secondary review by the Supervisors or another qualified data reviewer. Upon approval, the data reviewer signs the QA/QC Case Narrative form and approves the data in the LIMS. Once the data reviewer approves the data in the LIMS, the results may be reported to the client. Upon completion of all analyses for a sample and data review, the data is ready for reporting directly from LIMS. The Project Manager or the assigned Data Reviewer closely scrutinizes the COC record and Final Analysis Report. Raw data of suspicious results are critically reviewed and appropriate action is implemented. All analytical results are proprietary and must be approved and signed by the Project Manager or assigned Data Reviewer prior to reporting or releasing data to clients.

The ELS record control procedures ensure the following:
♦ A process for identifying, collecting, indexing, accessing, filing, storage, maintenance and disposal of all quality and technical records.
♦ All records (hard copy or electronic) are protected and remain confidential.
♦ All observations and calculations are recorded in a permanent manner (such as the LIMS, notebooks, work sheets, or magnetic media) at the time they are generated, including units of measurement in which observations are recorded or stated.
♦ Most analytical work performed is automatically recorded electronically at the time of analysis. Any hand-written records of sample preparations, extractions, digestion, etc. are properly documented in indelible permanent ink that may be photocopied in the notebook assigned for each procedure. The documentation includes the date, analyst signature or initials, procedures performed, and analytical method. Any unused portion of notebook pages are marked through with a "Z'" to fill in the page.
♦ Original records are uniquely identified and traceable to the analysis, sample or item to which they reference. The LIMS automatically records an electronic date and the user identification for entry, approval or corrections of data or results.
♦ Records are traceable, retrievable, legible and include sufficient information and explanation such that staff, other than those responsible for their generation can readily interpret them.
♦ Records contain sufficient information to permit identification of possible sources of error and to permit, where feasible and necessary, satisfactory repetition of the test under the original conditions. Records contain sufficient details of any significant departures from test specifications or other specified procedures including authorizations for such departures.
♦ Records are reviewed for data transcription or calculation errors and the reviews are documented.
♦ Records document the person or persons responsible for their creation and the edit of such creation. Records also document the person(s) reviewing data transcriptions and calculations and the date of their review.
♦ Corrections or amendments to test records are made in a manner that does not obliterate the original data and are signed or initialed and dated by the person responsible. Specifically, ELS notes corrections on hand-written records by drawing a single line through the error and entering the correct value or information, the individual's initials and the date.
♦ For electronic data in the LIMS, corrections or changes are automatically recorded with a notation for the change and an electronic stamp of the date and identification of the person making the change.
♦ ELS maintains hand-written initials and/or signatures of all staff for identification in documents or records such as logbooks, forms, or other hand-written documents and records.
♦ Test records are protected from loss, damage, misuse or deterioration and are retained for an appropriate period in a manner that permits retrieval when required. Test records that are created and/or retained on magnetic media (e.g., computer disks) or photographic media (e.g., microfiche) are stored in a manner which protects them from the hazards that erase such media. Provisions are made for the printing of such records when required. All of these activities are coordinated through the Records Office of LCRA.

Record control procedures associated with the LIMS are as follows:

Sample Login and Tracking
Computerized sample tracking and scheduling procedures begin with the log-in procedure upon receipt of the sample, and ends with a computer-generated final

report and invoice. Client and sample information is entered into the LIMS at the time of sample login. Analyses forecast, worklists and holding time reports are utilized to monitor the workload and for adherence to method holding times and requested turn-around times. Analytical results, including QC data are entered into the LIMS from the raw data (via instrumentation) for computer-generated FinalAnalysis Reports.

Electronic Data Storage

All electronic data is backed up to magnetic tape daily and maintained by the LCRA Information Technologies (IT) group at LCRA's main office complex located on Lake Austin Boulevard in Austin, Texas. This system performs a daily incremental backup and a weekly full backup. The tape backup performed by the IT group serves two main functions: one is to ensure a redundant system in case the ELS data system fails; the second is to ensure that off-site storage of tapes is maintained at the IT system location. All backup tapes are stored for six months (24 weeks). Raw instrument data is maintained by the Supervisors for each section and backed up on a compact computer disk.

Electronic Data Security

All electronic data is secured on both the Local Area Network (LAN) and LIMS. The system requires authorized access and tracks electronic transaction auditing as well as data review procedures.

Data Archiving and Records Retention

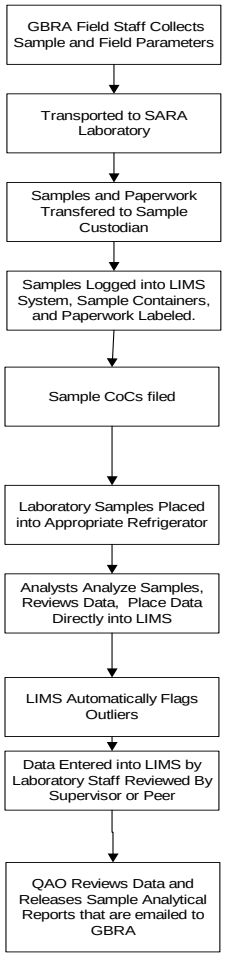
Electronic data is archived in accordance with the LCRA Corporate Records Retention schedule and ELS Records and Document Control procedures.

San Antonio River Authority Laboratory Services

Data Management Process

The figure below is a flow chart identifying how GBRA data moves through the SARA laboratory from the receipt of the sample(s) to the sending of the analytical report(s). Although the flow chart does not identify it, at any point in the review of data, the reviewer can send the data back up to the prior level for additional work, or documentation

Data Flow



Data Errors and Loss

Each step of the data generation by the SARA Regional Environmental Laboratory is reviewed by another analyst, supervisors and/or the QAO. Data is reviewed by a peer analyst prior to analysis validation. A supervisor checks the generation of data on a minimum of 10% basis. The QAO also conducts laboratory inspections (where traceability and calculations are checked) this includes

conducting surveillance to ensure proper method, SOP, chemicals and techniques are used in the generation of data, this is performed on a monthly basis. Required quality control and calculations are clearly shown in each analysis's SOP. Generalized procedures are covered by the Laboratories QM or General Laboratory SOPs. The Laboratory Supervisor and the QAO are provided with the CRP QAPP, so they are familiar with the program specific criteria. A system is in place that identifies non-conformance and implements corrective actions.

Wimberley Valley Watershed Association

WVWA maintains an Excel-based electronic database to store and retrieve water quality and flow data for Cypress Creek and the Blanco River. After the data is collected in the field, field data is entered (with data from the hard copy data from the SWQM data sheet) into the database. Once the data transfer is received from GBRA, staff check the values and compare them with the field data sheet values to ensure there were no data entry errors. Laboratory-processed chemistry data is imported into the WVWA database. Data analysis is processed by both Excel and SPSS software packages.

The WVWA database is housed within staff computers. Regular back up copies are made routinely and there is off-site storage of data.

Department of State Health Services (excerpt from Quality Manual)

POLICY

A. The result of each test performed is reported accurately, clearly, unambiguously, and objectively and complies with all specific instructions contained in the test method.

B. ICP and ICP-MS test results are reported without qualification if they are within the instrument's linear dynamic range and a representative sample was analyzed following the test method SOP requirements.

C. Test results for test methods other than ICP and ICP-MS are reported without qualification if the results are greater than the lowest calibration standard, lower than the highest calibration standard, and a representative sample was analyzed following the test method SOP requirements.

24.1 Test Reports

Policy

The Laboratory's report format has been designed to accommodate each type of test performed and to minimize the potential for misunderstanding or misuse.

Procedure

Each test report contains the following information (unless not required by the customer):

A. a title, such as Test Report or Test Results;

B. the name and address of the laboratory, and the phone number and name of a contact person;

C. unique identification of the test report, such as a serial number, on each page and a pagination system that ensures that each page is recognized as part of the test report and a clear identification of the end of the report, such as 3 of 10;

D. the name and address of the customer if applicable;

E. the identification of the test method used;

F. an unambiguous identification of the sample(s), including the customer identification code;

G. the date of sample receipt when it is critical to the validity and application of the results, date and time of sample collection, dates the tests were performed, the time of sample preparation and analysis if the required holding time for either activity is less than or equal to 72 hours;

H. the test results with QC failures identified, units of measurement, an indication of whether results are calculated on a dry weight or wet weight basis, and for Whole Effluent Toxicity, an identification of the statistical package used;

I. the name, function, and signature or an equivalent electronic identification of the person authorizing the test report, and the date of issue;

J. a statement to the effect that the results relate only to the samples; and

K. certification that the results are in compliance with the NELAC Standards, if accredited to be in compliance or provide reasons and/or justification if they do not comply.

24.2 Supplemental Test Report Information

When necessary for interpretation of the results or when requested by the customer, test reports may include the following additional information:

A. deviations from, additions to, or exclusions from the test method, information on specific test conditions, such as environmental conditions, and any non-standard conditions that may have affected the quality of the results, and any information on the use and definitions of data qualifiers;

B. a statement of compliance/non-compliance when requirements of the quality systems are not met, including identification of test results that did not meet NELAC sample acceptance requirements, such as holding time, preservation, etc.;

C. a statement on the estimated uncertainty of the measurement where applicable, and when requested by the customer;

D. additional information which may be required by specific methods or customer;

E. qualification of results with values outside the working range; and

F. for test reports that contain the results of sampling, the following is provided if necessary for the interpretation of the results:

1. the date of sampling;

2. unambiguous identification of the material sampled;

3. the locations of the sampling, including diagrams, sketches, or photographs;

4. details of any environmental conditions during sampling that may affect the interpretations of the test results;

5. any standard or other specification for the sampling method or procedure, and deviations, additions to or exclusions from the specification concerned.

24.3 Environmental Testing Obtained from Subcontractors

A. Test results obtained from test performed by subcontractors are clearly identified on the test report by subcontractor name and/or accreditation number.

B. The test results from subcontractors are reported in writing or electronically. A copy of the subcontractors report is be made available to the customer if requested.

24.3 Electronic Transmission of Results

All test results transmitted by telephone, fax, telex, e-mail, or other electronic means comply with the requirements of this *Quality Manual* and associated procedures to protect the confidentiality and proprietary rights of the customer.

24.5 Amendments to Test Reports

Policy

Amendments to a test report after it has been issued are made only in the form of another document or data transfer. All supplemental reports meet all the requirements for the initial report and the requirements of this *Quality Manual*.

Procedure

A. Amended test reports include a statement that the report is supplemental to a test report with identification number given.

B. When it is necessary to issue a new report, the new report is uniquely identified and contains a reference to the original that it replaces.

ATTACHMENT 1

Example Letter to Document Adherence to the QAPP

TO: (name)
(organization)

FROM: (name)
(organization)

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

(address)

I acknowledge receipt of the "QAPP Title, Revision Date". I understand the document(s) describe quality assurance, quality control, data management and reporting, and other technical activities that must be implemented to ensure the results of work performed will satisfy stated performance criteria.

_____

Signature Date