

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

The measurement performance specifications to support the project purpose for a minimum data set are specified in Table A7.1 and in the text following.

**Table 2 A7.1 Measurement Performance Specifications for Field and Laboratory Measurements for:** U.S. International Boundary and Water Commission, Big Bend National Park, City of Laredo Environmental Engineering, Rio Grande International Study Center, Sul Ross, U.T. Brownsville, Sabal Palm Sanctuary, and U. T. El Paso (samples analyzed by Environmental Testing and Consulting, Inc.).

**Field Parameters**

Parameter	UNITS	MATRIX	METHOD	PARAMETER Code	AWRL	Limit of Quantitation (LOQ)	LOQ CHECK STANDARD %Rec	PRECISION (RPD of LCS/LCS dup)	BIAS (% Rec of LCS)	Laboratory
pH	SU	water	EPA 150.1 & TCEQ-SWQM SOP, V1	00400	NA*	NA	NA	NA	NA	Field
DO	mg/L	water	EPA 360.1& TCEQ-SWQM SOP, V1	00300	NA*	NA	NA	NA	NA	Field
Specific conductance	µS/cm	water	EPA 120.1 & TCEQ-SWQM SOP, V1	00094	NA*	NA	NA	NA	NA	Field
Air temperature	centigrade	air	TCEQ-SWQM SOP, V1	00020	NA*	NA	NA	NA	NA	Field
Water temperature	centigrade	water	EPA 170.1 & TCEQ-SWQM SOP, V1	00010	NA*	NA	NA	NA	NA	Field
Secchi depth	meters	water	TCEQ-SWQM SOP, V1	00078	NA*	NA	NA	NA	NA	Field
Days since last significant rainfall	days	NA	TCEQ-SWQM SOP, V1	72053	NA*	NA	NA	NA	NA	Field
Flow	cfs	water	TCEQ-SWQM SOP, V1	00061	NA*	NA	NA	NA	NA	Field
Flow estimate	cfs	water	TCEQ-SWQM SOP, V1	74069	NA*	NA	NA	NA	NA	Field
Turbidity	NTU	water	SM 2130- B	82078	NA*	NA	NA	NA	NA	Field
Flow method	1-gage 2-electric 3-mechanical 4-weir/flume 5-doppler	water	TCEQ-SWQM SOP, V1	89835	NA*	NA	NA	NA	NA	Field
Flow severity	1-no flow 2-low flow 3-normal flow 4-flood 5- high 6- dry	water	TCEQ-SWQM SOP, V1	01351	NA*	NA	NA	NA	NA	Field

Stream width	meters	water	TCEQ-SWQM SOP, V1	89861	NA*	NA	NA	NA	NA	Field
Water depth	meters	water	TCEQ-SWQM SOP, V1	82903	0.1	NA	NA	NA	NA	Field
Present Weather	1 - clear 2 - partly cloudy 3 - cloudy 4 - rain 5 - other	NA	Field Observation	89966	NA*	NA	NA	NA	NA	Field
Wind intensity	1 - calm 2 - slight 3 - moderate 4 - strong	air	Field Observation	89965	NA*	NA	NA	NA	NA	Field
Wind direction	1 - North 2 - South 3 - East 4 - West 5 - NE 6 - SE 7 - NW 8 - SW	air	Field Observation	89010	NA*	NA	NA	NA	NA	Field

\* AWRLs have not been developed for these parameters

### Conventional Parameters

Parameter	UNITS	MATRIX	METHOD	PARAMETER Code	AWRL	Limit of Quantitation (LOQ)	LOQ CHECK STANDARD %Rec	PRECISION (RPD of LCS/LCS dup)	BIAS (% Rec of LCS)	Laboratory
TDS, dried at 180° C	mg/L	water	EPA 160.1, SM2540C	70300	10	2	70-130	20	80-120	ETC
Chloride	mg/L	water	EPA 300.0	00940	5	2	70-130	20	80-120	ETC
TSS	mg/L	water	EPA 160.2, SM2540D	00530	4	2	70-130	20	80-120	ETC
VSS	mg/L	water	EPA 160.4	00535	4	2	70-130	20	80-120	ETC
Sulfate	mg/L	water	EPA 300.0	00945	5	1	70-130	20	80-120	ETC
TOC	mg/L	water	SM5310B, EPA 415.1	00680	2	1	70-130	20	80-120	ETC
Ammonia-N, total	mg/L	water	SM4500 NH3D, SM4500 NH3F, EPA 350.3	00610	0.1	0.1	70-130	20	80-120	ETC
T - Phosphorous-P	mg/L	water	SM 4500-P E	00665	0.06	0.05	70-130	20	80-120	ETC
Chlorophyll-a, spectrophotometric acid method	µg/L	water	SM 10200-H	32211	3	3	70-130	20	80-120	ETC
Pheophytin-a, spectrophotometric acid method	µg/L	water	EPA 446.0	32218	3	3	70-130	20	80-120	ETC
Fluoride	mg/L	water	EPA 300.0	00951	0.5	0.1	70-130	20	80-120	ETC
Bromide	mg/L	water	EPA 300.0	71870	0.5	0.5	70-130	20	80-120	ETC
BOD5 Day- 20°C	mg/L	water	SM 5210 B	00310	2	2	70-130	20	80-120	ETC
T. Alkalinity as CaCO <sub>3</sub>	mg/L	water	SM 2320-B	00410	20	20	70-130	20	80-120	ETC
Nitrate+Nitrite-N	mg/L	water	EPA 300.0	00630	0.05	0.05	70-130	20	80-120	ETC
Calcium	mg/L	water	EPA 200.7	00916	0.5	0.1	70-130	20	80-120	ETC
Magnesium	mg/L	water	EPA 200.7	00927	0.5	0.1	70-130	20	80-120	ETC
Potassium	mg/L	water	EPA 200.7	00937	0.2	0.1	70-130	20	80-120	ETC
Sodium	mg/L	water	EPA 200.7	00929	NA	0.5	70-130	20	80-120	ETC
Hardness, Total as CaCO <sub>3</sub>	mg/L	water	SM2340B, EPA 130.2	00900	5	1	70-130	20	80-120	ETC
E. coli, Colilert, IDEXX Method	MPN/100 mL	water	SM 9223-B****	31699	1	1	NA	.5*****	NA	ETC
Holding time, E. coli IDEXX Colilert	hours	water	NA	31704	1	NA	NA	NA	NA	ETC

- \* Reporting to be consistent with SWQM guidance and based on measurement capability.
- \*\*\*\* E.coli samples analyzed by SM 9223-B should always be processed as soon as possible and within 8 hours. When transport conditions necessitate delays in delivery longer than 6 hours, the holding time may be extended and samples must be processed as soon as possible and within 48 hours. Quality Control Guidelines. This criterion applies to bacteriological duplicates with concentrations >10 MPN/100mL or >10 organisms/100mL.
- \*\*\*\* Based on a 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 >10 MPN/100mL or >10 organisms/100mL.

**References for Table A7.1:**

TCEQ NELAP - Recognized Laboratory Fields of Accreditation for ETC. Certificate T104704180- 09A TX, Issue Date 4/29/2009.  
 United States Environmental Protection Agency (USEPA) "Methods for Chemical Analysis of Water and Wastes," Manual #EPA-600/4-79-020  
 TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2008 (RG-415).  
 TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data, 2007 (RG-416)

**Dissolved Metals in Water**

Parameter	UNITS	MATRIX	METHOD	PARAMETER Code	AWRL	Limit of Quantitation (LOQ)	LOQ CHECK STANDARD %Rec	PRECISION (RPD of LCS/LCS dup)	BIAS (% Rec of LCS)	Laboratory
Aluminum	µg/L	water	EPA 200.8	01106	200	100	70-130	20	80-120	ETC
Antimony	µg/L	water	EPA 200.8	01095	NA	1	70-130	20	80-120	ETC
Arsenic	µg/L	water	EPA 200.8	01000	5	2	70-130	20	80-120	ETC
Barium	µg/L	water	EPA 200.8	01005	1000	10	70-130	20	80-120	ETC
Beryllium	µg/L	water	EPA 200.8	01010	2	2	70-130	20	80-120	ETC
Boron	µg/L	water	EPA 200.7	01020	NA	10	70-130	20	80-120	ETC
Cadmium	µg/L	water	EPA 200.8	01025	0.3	0.3	70-130	20	80-120	ETC
Chromium	µg/L	water	EPA 200.8	01030	10	5	70-130	20	80-120	ETC
Copper	µg/L	water	EPA 200.8	01040	3	2	70-130	20	80-120	ETC
Iron	µg/L	water	EPA 200.8	01046	NA	100	70-130	20	80-120	ETC
Lead	µg/L	water	EPA 200.8	01049	1	1	70-130	20	80-120	ETC
Manganese	µg/L	water	EPA 200.8	01056	NA	10	70-130	20	80-120	ETC
Nickel	µg/L	water	EPA 200.8	01065	10	10	70-130	20	80-120	ETC
Selenium	µg/L	water	EPA 200.8	01145	NA	2	70-130	20	80-120	ETC
Silver	µg/L	water	EPA 200.8	01075	0.5	0.5	70-130	20	80-120	ETC
Thallium	µg/L	water	EPA 200.8	01057	1	1	70-130	20	80-120	ETC
Zinc	µg/L	water	EPA 200.8	01090	5	5	70-130	20	80-120	ETC

**Total Metals in Water**

Parameter	UNITS	MATRIX	METHOD	PARAMETER Code	AWRL	Limit of Quantitation (LOQ)	LOQ CHECK STANDARD %Rec	PRECISION (RPD of LCS/LCS dup)	BIAS (% Rec of LCS)	Laboratory
Iron	µg/L	water	EPA 200.8, EPA 200.7	01045	300	100	70-130	20	80-120	ETC
Manganese	µg/L	water	EPA 200.8, EPA 200.7	01055	50	10	70-130	20	80-120	ETC
Selenium	µg/L	water	EPA 200.8, EPA 200.7	01147	2	2	70-130	20	80-120	ETC

**Total Metals in Sediment**

Parameter	UNITS	MATRIX	METHOD	PARAMETER Code	AWRL	Limit of Quantitation (LOQ)	LOQ CHECK STANDARD %Rec	PRECISION (RPD of LCS/LCS dup)	BIAS (% Rec of LCS)	Laboratory
Aluminum	mg/kg	sediment	EPA 6020	01108	n/a*	20	60-140	20	60-140	ETC
Aluminum	mg/kg	sediment	EPA 6010	01108	n/a*	20	60-140	20	60-140	ETC
Antimony	mg/kg	sediment	EPA 6020	01098	12.5	12.5	60-140	20	60-140	ETC

Antimony	mg/kg	sediment	EPA 6010	01098	12.5	12.5	60-140	20	60-140	ETC
Arsenic	mg/kg	sediment	EPA 6020	01003	16.5	5	60-140	20	60-140	ETC
Arsenic	mg/kg	sediment	EPA 6010	01003	16.5	5	60-140	20	60-140	ETC
Barium	mg/kg	sediment	EPA 6020	01008	n/a*	5	60-140	20	60-140	ETC
Barium	mg/kg	sediment	EPA 6010	01008	n/a*	5	60-140	20	60-140	ETC
Cadmium	mg/kg	sediment	EPA 6020	01028	2.49	0.2	60-140	20	60-140	ETC
Cadmium	mg/kg	sediment	EPA 6010	01028	2.49	0.2	60-140	20	60-140	ETC
Chromium	mg/kg	sediment	EPA 6020	01029	55.5	5	60-140	20	60-140	ETC
Chromium	mg/kg	sediment	EPA 6010	01029	55.5	5	60-140	20	60-140	ETC
Copper	mg/kg	sediment	EPA 6020	01043	74.5	5	60-140	20	60-140	ETC
Copper	mg/kg	sediment	EPA 6010	01043	74.5	5	60-140	20	60-140	ETC
Lead	mg/kg	sediment	EPA 6020	01052	64	5	60-140	20	60-140	ETC
Lead	mg/kg	sediment	EPA 6010	01052	64	5	60-140	20	60-140	ETC
Mercury	Mg/kg	Sediment	EPA 7471	71921	0.355	0.02	70-130	30	60-140	ETC
Nickel	mg/kg	sediment	EPA 6020	01068	24.3	5	60-140	20	60-140	ETC
Nickel	mg/kg	sediment	EPA 6010	01068	24.3	5	60-140	20	60-140	ETC
Selenium	mg/kg	sediment	EPA 6020	01148	n/a*	1	60-140	20	60-140	ETC
Selenium	mg/kg	sediment	EPA 6010	01148	n/a*	1	60-140	20	60-140	ETC
Silver	mg/kg	sediment	EPA 6020	01078	1.1	0.5	60-140	20	60-140	ETC
Silver	mg/kg	sediment	EPA 6010	01078	1.1	0.5	60-140	20	60-140	ETC
Zinc	mg/kg	sediment	EPA 6020	01093	205	10	60-140	20	60-140	ETC
Zinc	mg/kg	sediment	EPA 6010	01093	205	10	60-140	20	60-140	ETC

\* AWRLs have not been developed for these parameters.

All soil samples in this table are screened by SW846 6010B method for low-level metals, which are rerun under SW846 6020

### Organics in Sediment

Parameter	UNITS	MATRIX	METHOD	PARAMETER Code	AWRL	Limit of Quantitation (LOQ)	LOQ CHECK STANDARD %Rec	PRECISION (RPD of LCS/LCS dup)	BIAS (% Rec of LCS)	Laboratory
DDT	µg/kg	sediment	EPA 8081	39373	23	2	60-140	20	60-140	ETC
DDD	µg/kg	sediment	EPA 8081	39363	15.65	2	60-140	20	60-140	ETC
DDE	µg/kg	sediment	EPA 8081	39368	3.91	2	60-140	20	60-140	ETC
Aldrin	µg/kg	sediment	EPA 8081	39333	40	2	60-140	20	60-140	ETC
Chlordane (Tech Mix and Metabs)	µg/kg	sediment	EPA 8081	39351	2.4	2	60-140	20	60-140	ETC
Endrin	µg/kg	sediment	EPA 8081	39393	103.5	2	60-140	20	60-140	ETC
Heptachlor	µg/kg	sediment	EPA 8081	39413	n/a	2	60-140	20	60-140	ETC
Methoxychlor	µg/kg	sediment	EPA 8081	39481	n/a	2	60-140	20	60-140	ETC
Mirex	µg/kg	sediment	EPA 8081	79800	650	2	60-140	20	60-140	ETC
Dieldrin	µg/kg	sediment	EPA 8081	39383	2.15	2	60-140	20	60-140	ETC
Hexachlorobenzene	µg/kg	sediment	EPA 8081	39701	120	2	60-140	20	60-140	ETC
Aroclor 1016	µg/kg	sediment	EPA 8082	39514	265	35	60-140	20	60-140	ETC
Aroclor 1248	µg/kg	sediment	EPA 8082	39503	750	35	60-140	20	60-140	ETC
Aroclor 1254	µg/kg	Sediment	EPA 8082	39507	170	35	60-140	20	60-140	ETC
Aroclor 1260	µg/kg	Sediment	EPA 8082	39511	120	35	60-140	20	60-140	ETC
Endosulfan I	µg/kg	sediment	EPA 8081	34364	n/a	1	60-140	20	60-140	ETC
Demeton	µg/kg	sediment	EPA 8270	82400	n/a	40	60-140	20	60-140	ETC
Guthion/ Azinphos-methyl	µg/kg	sediment	EPA 8270	39581	n/a	40	60-140	20	60-140	ETC
Malathion	µg/kg	sediment	EPA 8270	39531	n/a	40	60-140	20	60-140	ETC
Parathion Ethyl	µg/kg	sediment	EPA 8270	39541	n/a	40	60-140	20	60-140	ETC
2,4-D	µg/kg	sediment	EPA 8151	39731	n/a	40	60-140	20	60-140	ETC
2,4,5-T	µg/kg	sediment	EPA 8151	39741	n/a	9	60-140	20	60-140	ETC
Silvex	µg/kg	sediment	EPA 8151	39761	n/a	7	60-140	20	60-140	ETC
Fluorene	µg/kg	sediment	EPA 8270C	34384	268	66.7	60-140	20	60-140	ETC
Fluoranthene	µg/kg	sediment	EPA 8270C	34379	1115	66.7	60-140	20	60-140	ETC
Benzo(a)pyrene	µg/kg	sediment	EPA 8270C	34250	725	66.7	60-140	20	60-140	ETC
Napthalene	µg/kg	sediment	EPA 8270C	34445	280.5	66.7	60-140	20	60-140	ETC
Benzene	µg/kg	sediment	EPA 8260B	34237	22,505	1	60-140	20	60-140	ETC
Toluene	µg/kg	sediment	EPA 8260B	34483	2,830	5	60-140	20	60-140	ETC
Ethylbenzene	µg/kg	sediment	EPA 8260B	34374	1,965	1	60-140	20	60-140	ETC

**References for Table A7.1:**

TCEQ SOP, V1 - TCEQ SWQM Procedures, Volume 1: Physical & Chemical Monitoring Methods for Water, Sediment, & Tissue, 2008 (RG-415).  
 TCEQ, SWQM QAPP, January 2008, Revision 12.  
 United States International Boundary and Water Commission "Field Manual for Hydrologic Technicians," November 1998.  
 United States International Boundary and Water Commission "Collection and Field Analysis of Water Quality Sample," August 1997.  
 Title 40 of the Code of Federal Regulations, Parts 136 or 141.  
 United States Environmental Protection Agency (EPA) "Methods For Chemical Analysis of Water and Wastes", Manual #EPA-600/4-79-020.  
 United States Environmental Protection Agency (EPA) "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Manual #EPA-SW-846.  
 CRP AWRL List, <http://www.tceq.state.tx.us/assets/public/compliance/monops/crp/QA/awrlmaster.pdf>

**Organics in Water**

Parameter	UNITS	MATRIX	METHOD	PARAMETER Code	AWRL	Limit of Quantitation (LOQ)	LOQ CHECK STANDARD %Rec	PRECISION (RPD of LCS/LCS dup)	BIAS (% Rec of LCS)	Laboratory
Benzene in wtr sample GC-MS, Hexadecone Extr.	µg/L	water	EPA 624	34030	2.5	1	60-140	20	60-140	ETC
Toluene in wtr sample GC-MS, Hexadecone Extr.	µg/L	water	EPA 624	34010	N/A	5	60-140	20	60-140	ETC
Ethylbenzene	µg/L	water	EPA 624	34371	N/A	2	60-140	20	60-140	ETC
Fluorene	µg/L	water	EPA 625	34381	5.5	0.02	60-140	20	60-140	ETC
Fluoranthene	µg/L	water	EPA 625	34376	3	0.02	60-140	20	60-140	ETC
Acenaphthylene	µg/L	water	EPA 625	34200	5	0.02	60-140	20	60-140	ETC
Napthalene	µg/L	water	EPA 625	34696	250	0.02	60-140	20	60-140	ETC

**Table 3 A7.2 Measurement Performance Specifications for Field and Laboratory Measurements for: Brownsville PUB**

Parameter	UNITS	MATRIX	METHOD	PARAMETER Code	AWRL	Limit of Quantitation (LOQ)	LOQ CHECK STANDARD %Rec	PRECISION (RPD of LCS/LCS dup)	BIAS (% Rec of LCS)	Laboratory
Ammonia, N	mg/L	water	EPA 350.3	00610	0.1	0.1	70-130	20	80-120	BPUB
BOD	mg/L	water	SM 5210B	00310	2	2	70-130	20	80-120	BPUB
E. Coli, Colilert, IDEXX Method	MPN/100mL	water	SM9223B	31699	1	1	NA	0.5	NA	BPUB
TDS	mg/L	water	SM 2540C	70300	10	10	80-120	25	75-125	BPUB
TSS	mg/L	water	EPA 160.2	00530	4	2	70-130	20	80-120	BPUB
VSS	mg/L	water	EPA 160.4	00535	4	2	70-130	20	80-120	BPUB

**References for Table A7.2:**

Quality Control lab documents from Brownsville PUB (BPUB) and NELAP certification.  
 TCEQ, SWQM QAPP, January 2008, Revision 12.

**Table 4 A7.3 Measurement Performance Specifications for Field and Laboratory Measurements for: City of Laredo Laboratory**

Parameter	UNITS	MATRIX	METHOD	PARAMETER Code	AWRL	Limit of Quantitation (LOQ)	LOQ CHECK STANDARD %Rec	PRECISION (RPD of LCS/LCS dup)	BIAS (% Rec of LCS)	Laboratory
E. Coli, Colilert, IDEXX Method	MPN/100mL	water	SM9223B	31699	1	1	NA	0.5	NA	Laredo
Specific Conductance	µS/cm	water	EPA 120.1 & TCEQ-SWQM	00094	NA*	NA	NA	NA	NA	Field

			SOP, V1							
Air temperature	centigrade	air	TCEQ-SWQM SOP, V1	00020	NA*	NA	NA	NA	NA	Field
Water temperature	centigrade	water	EPA 170.1 & TCEQ-SWQM SOP, V1	00010	NA*	NA	NA	NA	NA	Field
Days since last significant rainfall	days	NA	TCEQ-SWQM SOP, V1	72053	NA*	NA	NA	NA	NA	Field
Flow	cfs	water	TCEQ-SWQM SOP, V1	00061	NA*	NA	NA	NA	NA	Field
Flow method	1-gage 2-electric 3-mechanical 4-weir/flume 5-doppler	water	TCEQ-SWQM SOP, V1	89835	NA*	NA	NA	NA	NA	Field
Flow severity	1-no flow 2-low flow 3-normal flow 4-flood 5- high 6- dry	water	TCEQ-SWQM SOP, V1	01351	NA*	NA	NA	NA	NA	Field
Present Weather	1- clear 2- partly cloudy 3 - cloudy 4 - rain 5- other	NA	Field Observation	89966	NA*	NA	NA	NA	NA	Field
Wind intensity	1 - calm 2 - slight 3 - moderate 4 - strong	air	Field Observation	89965	NA*	NA	NA	NA	NA	Field
Wind direction	1 - North 2 - South 3 - East 4 - West 5 - NE 6 - SE 7 - NW 8 - SW	air	Field Observation	89010	NA*	NA	NA	NA	NA	Field

\* AWRLs have not been developed for these parameters

### 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. A full listing of AWRLs can be found at <http://www.tceq.state.tx.us/compliance/monitoring/crp/qa/index.html>. The limit of quantitation (LOQ) 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 analytical batch of CRP Samples analyzed.**

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