

**U.S. International Boundary and Water Commission, Big Bend National Park, City of Laredo
 Environmental Engineering, Rio Grande International Study Center, U.T. Brownsville, Sabal Palm
 Sanctuary, and U. T. El Paso (samples analyzed by Environmental Testing and Consulting, Inc.).**

Table A7.1 Measurement Performance Specifications for Field and Laboratory Measurements

Parameter	UNITS	MATRIX	METHOD	STORET 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
Conductivity	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
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
Weather	1- clear 2 - cloudy 3 - overcast 4 - rain	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	air	Field Observation	89010	NA*	NA	NA	NA	NA	Field

Parameter	UNITS	MATRIX	METHOD	STORET Code	AWRL	Limit of Quantitation (LOQ)	LOQ CHECK STANDARD %Rec	PRECISION (RPD of LCS/LCS dup)	BIAS (% Rec of LCS)	Laboratory
TDS	mg/L	water	EPA 160.1	70300	10	2	70-130	20	80-120	ETC
Chloride	mg/L	water	EPA 300.0R2.1	00940	5	2	70-130	20	80-120	ETC
TSS	mg/L	water	EPA 160.2	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 300.0R2.1	00945	5	1	70-130	20	80-120	ETC
TOC	mg/L	water	EPA 415.1	00680	2	1	70-130	20	80-120	ETC
Ammonia-N	mg/L	water	EPA 350.3	00610	0.1	0.1	70-130	20	80-120	ETC
T - Phosphorous-P	mg/L	water	SM 4500-P	00665	0.06	0.05	70-130	20	80-120	ETC
O-Phosphate-P	mg/L	water	EPA 300.0R2.1	00671	0.04	0.025	70-130	20	80-120	ETC
Field filtered Chlorophyll-a	µg/L	water	SM 10200-H	32211	3	3	70-130	20	80-120	ETC
Pheophytin	µg/L	water	EPA 446.0	32218	3	3	70-130	20	80-120	ETC
Fluoride	mg/L	water	EPA 300.0R2.1	00951	0.5	0.1	70-130	20	80-120	ETC
Bromide	mg/L	water	EPA 300.0R2.1	71870	0.5	0.5	70-130	20	80-120	ETC
BOD5	mg/L	water	SM 5210 B	00310	2	2	70-130	20	80-120	ETC
Nitrate -N	mg/L	water	EPA 300.0	00630	0.05	0.04	70-130	20	80-120	ETC
Oil and Grease	G/L	water	EPA 1664	00556	5	5	70-130	20	80-120	ETC
Turbidity	NTU	water	SM 2130-B	82079	0.5	0.5	70-130	20	80-120	ETC

* Reporting to be consistent with SWQM guidance and based on measurement capability. An AWRL for this parameter has not been developed by the TCEQ.

Dissolved Metals in Water

Parameter	UNITS	MATRIX	METHOD	STORET 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	0.08	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	300	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	50	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	2	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

* Reporting to be consistent with SWQM guidance and based on measurement capability. An AWRL for this parameter has not been developed by the TCEQ.

Total Metals in Water

Parameter	UNITS	MATRIX	METHOD	STORET 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	01045	300	100	70-130	20	80-120	ETC
Manganese	µg/L	water	EPA 200.8	01055	50	10	70-130	20	80-120	ETC
Selenium	µg/L	water	EPA 200.8	01147	2	2	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	0.5	0.1	70-130	20	80-120	ETC
Hardness, Total as CaCO3	mg/L	water	EPA 130.2	00900	5	1	70-130	20	80-120	ETC

Total Metals in Sediment

Parameter	UNITS	MATRIX	METHOD	STORET 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	50	20	60-140	20	60-140	ETC
Aluminum	mg/kg	sediment	EPA 6010B	01108	50	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 6010B	01098	12.5	12.5	60-140	20	60-140	ETC
Arsenic	mg/kg	sediment	EPA 6020	01003	7	5	60-140	20	60-140	ETC
Arsenic	mg/kg	sediment	EPA 6010B	01003	7	5	60-140	20	60-140	ETC
Barium	mg/kg	sediment	EPA 6020	01008	200	5	60-140	20	60-140	ETC
Barium	mg/kg	sediment	EPA 6010B	01008	200	5	60-140	20	60-140	ETC
Cadmium	mg/kg	sediment	EPA 6020	01028	0.6	0.2	60-140	20	60-140	ETC
Cadmium	mg/kg	sediment	EPA 6010B	01028	0.6	0.2	60-140	20	60-140	ETC
Chromium	mg/kg	sediment	EPA 6020	01029	21	5	60-140	20	60-140	ETC
Chromium	mg/kg	sediment	EPA 6010B	01029	21	5	60-140	20	60-140	ETC
Copper	mg/kg	sediment	EPA 6020	01043	14	5	60-140	20	60-140	ETC
Copper	mg/kg	sediment	EPA 6010B	01043	14	5	60-140	20	60-140	ETC
Lead	mg/kg	sediment	EPA 6020	01052	20	5	60-140	20	60-140	ETC
Lead	mg/kg	sediment	EPA 6010B	01052	20	5	60-140	20	60-140	ETC
Nickel	mg/kg	sediment	EPA 6020	01068	15	5	60-140	20	60-140	ETC
Nickel	mg/kg	sediment	EPA 6010B	01068	15	5	60-140	20	60-140	ETC
Selenium	mg/kg	sediment	EPA 6020	01148	1.0	1	60-140	20	60-140	ETC
Selenium	mg/kg	sediment	EPA 6010B	01148	1.0	1	60-140	20	60-140	ETC
Silver	mg/kg	sediment	EPA 6020	01078	0.5	0.5	60-140	20	60-140	ETC
Silver	mg/kg	sediment	EPA 6010B	01078	0.5	0.5	60-140	20	60-140	ETC
Zinc	mg/kg	sediment	EPA 6020	01093	64	10	60-140	20	60-140	ETC
Zinc	mg/kg	sediment	EPA 6010B	01093	64	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	STORET Code	AWRL	Limit of Quantitation (LOQ)	LOQ CHECK STANDARD %Rec	PRECISION (RPD of LCS/LCS dup)	BIAS (% Rec of LCS)	Laboratory
DDT,DDD,DDE	µg/kg	sediment	EPA 8081A	39373,39363,39368	11	2	60-140	20	60-140	ETC
Aldrin	µg/kg	sediment	EPA 8081A	39333	6	2	60-140	20	60-140	ETC
Chlordane alpha	µg/kg	sediment	EPA 8081A	39351	9	9	60-140	20	60-140	ETC
Endrin	µg/kg	sediment	EPA 8081A	39393	10	2	60-140	20	60-140	ETC
Heptachlor	µg/kg	sediment	EPA 8081A	39413	6	2	60-140	20	60-140	ETC
Methoxychlor	µg/kg	sediment	EPA 8081A	39481	12	2	60-140	20	60-140	ETC
Mirex	µg/kg	sediment	EPA 8081A	79800	3	2	60-140	20	60-140	ETC
Toxaphene	µg/kg	sediment	EPA 8081A	39403	100	100	60-140	20	60-140	ETC
Dieldrin	µg/kg	sediment	EPA 8081A	39383	6	2	60-140	20	60-140	ETC
Hexachlorobenzene	µg/kg	sediment	EPA 8081A	39701	470	2	60-140	20	60-140	ETC
Total PCBs	µg/kg	sediment	EPA 8082	39519	70	35	60-140	20	60-140	ETC
Endosulfan I	µg/kg	sediment	EPA 8081A	34364	1	1	60-140	20	60-140	ETC
Demeton	µg/kg	sediment	EPA 8270C	82400	100	40	60-140	20	60-140	ETC
Diazinon	µg/kg	sediment	EPA 8270C	39571	50	40	60-140	20	60-140	ETC
Dursban	µg/kg	sediment	EPA 8270C	81404	40	2	60-140	20	60-140	ETC
Guthion	µg/kg	sediment	EPA 8270C	39581	60	40	60-140	20	60-140	ETC
Malathion	µg/kg	sediment	EPA 8270C	39531	40	40	60-140	20	60-140	ETC
Parathion Ethyl	µg/kg	sediment	EPA 8270C	39541	40	40	60-140	20	60-140	ETC
2,4-D	µg/kg	sediment	EPA 8151A	39731	40	40	60-140	20	60-140	ETC
2,4,5-T	µg/kg	sediment	EPA 8151A	39741	9	9	60-140	20	60-140	ETC
Silvex	µg/kg	sediment	EPA 8151A	39761	7	7	60-140	20	60-140	ETC

References for Table A7.1:

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

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