

**AMENDMENT # 4 TO THE H-GAC
CLEAN RIVERS PROGRAM FY 2012/2013 QAPP**

**PREPARED BY THE HOUSTON-GALVESTON AREA COUNCIL
IN COOPERATION WITH THE
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ)**

QUESTIONS CONCERNING THIS QAPP SHOULD BE DIRECTED TO:

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EFFECTIVE: IMMEDIATELY UPON APPROVAL BY ALL PARTIES

FINAL SIGNATURE ACQUIRED: 11/9/12

Justification: The H-GAC FY2012-2013 Regional CRP QAPP is being amended to change the method citation for certain lab parameters. The change affects only the partners serviced by Eastex Environmental Lab, the City of Houston – Health & Human Services Lab, and the City of Houston – Water Quality Control Lab.

Detail of Changes: List each section in which a change is proposed and provide a description of the change(s) in the table below.

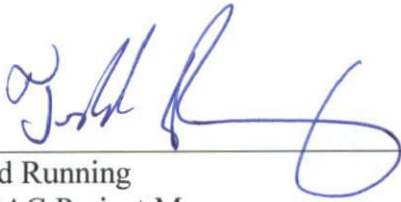
Section/Figure/Table	Page(s)	Change	Justification
Table A7.1a – Measurement Performance Specifications for H-GAC	Appendix A	Replace methods of citation for both bacteria tests. <i>E. coli</i> is changing from SM9223-B to Colilert-18. Enterococcus is changing from ASTM D-6503 to Enterolert.	Eastex Lab sent an e-mail that they were changing the method of citation for analyzing bacteria. Their NELAP accreditation will be renewed on Nov. 1 2012, but they will maintain both citations until the QAPP amendment is approved.
Table A7.1a and g – Measurement Performance Specifications for H-GAC and EIH	Appendix A	Remove asterisk from total hardness parameter row on conventional worksheet.	The asterisk was left in both tables in error.
Table A7.1a, f, g, and h – Measurement Performance Specifications for H-GAC, SJRA-W, EIH and PWE.	Appendix A	Replace SM9223-B with Colilert-18 in footnote of Convent&Bact_W worksheet.	Corrected referenced method in footnote of A7.1 tables for H-GAC, SJRA-W, EIH and PWE only.
Table A7.1c – Measurement Performance Specifications for HHS	Appendix A	Replace method of citation for ammonia parameter.	The lab’s ammonia SOP reference has changed from EPA 350.1 to SM 4500-NH ₃ H.
Table A7.1c – Measurement Performance Specifications for HHS	Appendix A	Replace name of lab on ‘Conventional& Bacteriological_W’ worksheet.	The City of Houston HHS lab moved from Braeswood Blvd. to Holcombe Blvd. Subsequently, the reference to the lab has changed as well.
Table A7.1d & e – Measurement Performance Specifications for WQC and SJRA-LC	Appendix A	Replace method of citations for total nitrate nitrogen, chloride, sulfate parameters.	The lab’s SOP references for these three parameters changed from EPA 300.1 Rev. 2.1 (1993) to EPA 300.0.
Table A7.1d & e – Measurement Performance Specifications for WQC and SJRA-LC.	Appendix A	Remove footnote No.4 referring to Hardness parameter.	Hardness was removed from WQC list of parameters in a previous amendment but the reference was overlooked.

Table A7.1f – Measurement Performance Specifications for SJRA- W	Appendix A	Replace methods of citation for both bacteria tests. <i>E. coli</i> is changing from SM9223-B to Colilert- 18. Enterococcus is changing from ASTM D-6503 to Enterolert.	Eastex Lab sent an e-mail that they were changing the method of citation for analyzing bacteria. Their NELAP accreditation will be renewed on Nov. 1 2012, but they will maintain both citations until the QAPP amendment is approved.
Table A7.1f – Measurement Performance Specifications for SJRA- W	Appendix A	Remove parameter Total Hardness (my/L as CaCO3) from table- including footnote referencing the same.	Total Hardness will only be analyzed when the metals are collected – which is two times per year.
Table A7.1g – Measurement Performance Specifications for EIH	Appendix A	Replace methods of citation for both bacteria tests. <i>E. coli</i> is changing from SM9223-B to Colilert- 18. Enterococcus is changing from ASTM D-6503 to Enterolert.	Eastex Lab sent an e-mail that they were changing the method of citation for analyzing bacteria. Their NELAP accreditation will be renewed on Nov. 1 2012, but they will maintain both citations until the QAPP amendment is approved.
Table A7.1h – Measurement Performance Specifications for PWE	Appendix A	Replace method of citation for bacteria test. <i>E. coli</i> should be changed from SM9223-B to Colilert-18 since HHS became contract lab.	The method citation change was accidentally left out of the list of changes in Amendment #3 when HCFCD/PWE initiated their contract with the City of Houston – HHS Lab instead of Hygeia.
Table A7.1h – Measurement Performance Specifications for PWE	Appendix A	Insert missing ‘1’ in table title for PWE.	‘Fixed’ table titles for Field and Conventional&Bacteriological_W worksheets. Inserted the ‘1’ where missing.
Table A7.1h – Measurement Performance Specifications for PWE	Appendix A	Remove foot notes ** and *** in table for field parameters.	Removed because they were unnecessary.
Table A7.1h – Measurement Performance Specifications for PWE	Appendix A	Replace the value of the AWRL for Enterococci on the Conventional worksheet.	Changed number in cell from 10 to 1 as required. All worksheets for other partners had the AWRL for Enterococci listed as 1.

Distribution: QAPP Amendments/Revisions to Appendices will be distributed to all personnel on the distribution list maintained by the Houston-Galveston Area Council.

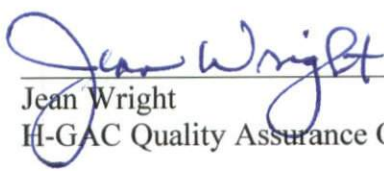
These changes will be incorporated into the QAPP document and TCEQ, H-GAC, and the local partners will acknowledge and accept these changes by signing this amendment.

HOUSTON-GALVESTON AREA COUNCIL (H-GAC)



Todd Running
H-GAC Project Manager

11/1/12
Date



Jean Wright
H-GAC Quality Assurance Officer

11/1/12
Date

MAILROOM

2012 NOV -5 AM 8:48

CITY OF HOUSTON, HEALTH AND HUMAN SERVICES (HHS)



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Arturo Blanco
HHS CRP Project Manager

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Lisa Groves
HHS Field Quality Assurance Officer

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11/1/12

Dr. Odatt Rajan
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Emina Marjanovich
HHS Lab Inorganic Chemistry Section Technical Supervisor

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11/1/2012

Linda Holman
HHS Lab Microbiology Section Technical Supervisor



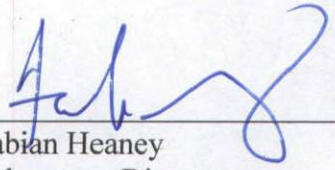
11/1/2012

Cyndie Boulé
HHS Lab Quality Assurance Officer

Date

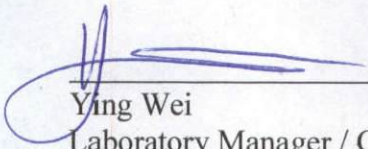
COMMUNITY AND
ENVIRONMENTAL DEPT.
2012 NOV -5 AM 9:48

CITY OF HOUSTON, DEPARTMENT OF WATER QUALITY CONTROL (WQC)



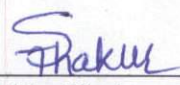
Fabian Heaney
Laboratory Director

10-31-2012
Date



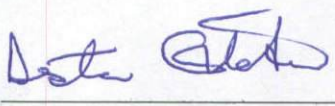
Ying Wei
Laboratory Manager / CRP Project Manager

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Date



Shubha Thakur
Laboratory Quality Assurance Officer

10/31/12
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Desta Takie
Field Quality Assurance Officer

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SAN JACINTO RIVER AUTHORITY - LAKE CONROE DIVISION (SJRA-LC)

Randy Acreman *11-2-12*

Randy Acreman Date
SJRA-L CRP Project Manager & Field Quality Assurance Officer


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SAN JACINTO RIVER AUTHORITY - WOODLANDS DIVISION (SJRA-W)

2012 NOV -8 AM 8:58

 11/2/2012

Zafar Ahmed Date
SJRA-W CRP Project Manager

 11/2/2012

Max Holt Date
SJRA-W CRP Field QAO

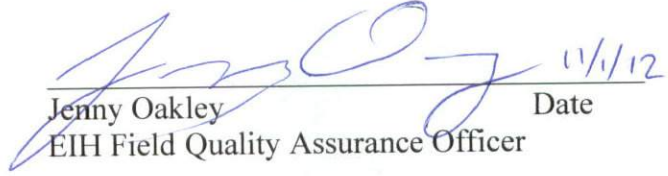
ENVIRONMENTAL INSTITUTE OF HOUSTON, UNIVERSITY OF HOUSTON CLEAR LAKE (EIH)



Dr. George Guillen
EIH CRP Project Manager

11/1/12

Date



Jenny Oakley
EIH Field Quality Assurance Officer

11/1/12

Date

2012 NOV -5 AM 8:48

MAILROOM

HARRIS COUNTY FLOOD CONTROL DISTRICT (HCFCF)

Jonathan Holley 10/31/12
Jonathan Holley Date
HCFCF CRP Project Manager, QAO,
& Coordinator of Laboratory Services

Robert E. Snoza II 10/31/12
Robert Snoza Date
HCFCF Data Manager


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2012 NOV -2 AM 7:56

CITY OF HOUSTON, DEPARTMENT OF PUBLIC WORKS AND ENGINEERING (PWE)

 11-1-2012
Date
Dorene Hancock
PWE CRP Project Manager

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Guyreth Williams
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Richard Chapin
PWE Data Manager

EASTEX ENVIRONMENTAL LABORATORY

MAILROOM

NOV -5 AM 9:04


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Pam Hickman Date
Eastex Lab Manager

Dan Bowen 11/2/12
Daniel Bowen Date
Eastex Quality Assurance Officer

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ)


Allison Fischer, CRP Project Manager 11-8-2012
Date


Allison Fischer, CRP Project QAS 11-8-2012
Date


Patricia Wise, CRP Work Leader 11/8/2012
Date



Daniel R. Burke, CRP Lead QAS 11/9/2012
Date

TABLE A7.1a Measurement Performance Specifications for Houston-Galveston Area Council

Field Parameters										
Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE)	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	NA*	NA	NA	NA	NA	Field
FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)	cfs	water	TCEQ SOP V1	00061	NA*	NA	NA	NA	NA	Field
TRANSPARENCY, SECCHI DISC (METERS)	meters	water	TCEQ SOP V1	00078	NA*	NA	NA	NA	NA	Field
SPECIFIC CONDUCTANCE, FIELD (uS/CM @ 25C)	us/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA*	NA	NA	NA	NA	Field
OXYGEN, DISSOLVED (MG/L)	mg/L	water	SM 4500-O G and TCEQ SOP, V1	00300	NA*	NA	NA	NA	NA	Field
PH (STANDARD UNITS)	s.u	water	EPA 150.1 and TCEQ SOP, V1	00400	NA*	NA	NA	NA	NA	Field
SALINITY - PARTS PER THOUSAND	PPT	water	SM 2520 and TCEQ SOP, V1	00480	NA*	NA	NA	NA	NA	Field
FLOW SEVERITY:1=No Flow, 2=Low, 3=Normal, 4=Flood, 5=High, 6=Dry	NU	water	TCEQ SOP V1	01351	NA*	NA	NA	NA	NA	Field
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	NA*	NA	NA	NA	NA	Field
STREAM FLOW ESTIMATE (CFS)	cfs	Water	TCEQ SOP, V1	74069	NA*	NA	NA	NA	NA	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	meters	water	TCEQ SOP V2	82903	NA*	NA	NA	NA	NA	Field
FLOW MTH 1=GAGE 2=ELEC 3=MECH 4=WEIR/FLU 5=DOPPL	NU	other	TCEQ SOP V1	89835	NA*	NA	NA	NA	NA	Field
WIND INTENSITY (1=CALM, 2=SLIGHT, 3=MOD., 4=STRONG)	NU	other	NA	89965	NA	NA	NA	NA	NA	Field
PRESENT WEATHER (1=CLEAR, 2=PTCLDY, 3=CLDY, 4=RAIN, 5=OTHER)	NU	other	NA	89966	NA	NA	NA	NA	NA	Field
WATER SURFACE (1=CALM, 2=RIPPLE, 3=WAVE, 4=WHITECAP)	NU	water	NA	89968	NA	NA	NA	NA	NA	Field
TIDE STAGE 1=LOW, 2=FALLING, 3=SLACK, 4=RISING, 5=HI	NU	water	NA	89972	NA	NA	NA	NA	NA	Field
WATER COLOR (1=BROWNISH, 2=REDDISH, 3=GREENISH, 4=BLACKISH, 5=CLEAR, 6=OTHER)	NU	water	NA	89969	NA	NA	NA	NA	NA	Field
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGG, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER)	NU	water	NA	89971	NA	NA	NA	NA	NA	Field
WATER CLARITY (1=EXCELLENT, 2=GOOD, 3=FAIR, 4=POOR)	NU	water	NA	20424	NA	NA	NA	NA	NA	Field
TURBIDITY, OBSERVED (1=LOW, 2=MEDIUM, 3=HIGH)	NU	water	NA	88842	NA	NA	NA	NA	NA	Field

TABLE A7.1a Measurement Performance Specifications for Houston-Galveston Area Council										
Field Parameters										
PRIMARY CONTACT, OBSERVED ACTIVITY (# OF PEOPLE OBSERVED) 1-10, >10	# of people observed	Other	N/A Calculation	89978	NA	NA	NA	NA	NA	Field
EVIDENCE OF PRIMARY CONTACT RECREATION (1-OBSERVED, 0=NOT OBSERVED)	NU	Other	N/A Calculation	89979	NA	NA	NA	NA	NA	Field
* Reporting to be consistent with SWQM guidance and based on measurement capability.										
References:										
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. (Note: The 21st edition may be cited if it becomes available.)										
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)										
TCEQ Interim Routine Surface Water Quality Monitoring Guidance During Drought, October 2011										

**TABLE A7.1a Measurement Performance Specifications for Houston-Galveston Area Council
Conventional and Bacteriological Parameters in Water**

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
RESIDUE, TOTAL NONFILTRABLE (MG/L) [TSS]	mg/L	water	SM 2540 D	00530	4	1	NA	NA	NA	Eastex
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	SM4500NH3-D & G	00610	0.1	0.1	70-130	20	80-120	Eastex
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	SM 4500-NH3 C *	00625	0.2	0.2	70-130	20	80-120	Eastex
NITRITE PLUS NITRATE, TOTAL 1 DET. (MG/L AS N)	mg/L	water	SM 4500-NO3 E & F	00630	0.05	0.02	70-130	20	80-120	Eastex
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	SM 4500-P E	00665	0.06	0.02	70-130	20	80-120	Eastex
CHLORIDE (MG/L AS CL)	mg/L	water	SM 4500 Cl-C	00940	5	5	70-130	20	80-120	Eastex
SULFATE (MG/L AS SO4)	mg/L	water	ASTM D516	00945	5	5	70-130	20	80-120	Eastex
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/100 mL	water	Colilert-18	31699	1	1	NA	0.50**	NA	Eastex
E.COLI, COLILERT, IDEXX, HOLDING TIME ***	hours	water	NA	31704	NA	NA	NA	NA	NA	Eastex
ENTEROCOCCI, ENTEROLERT, IDEXX, (MPN/100 ML) ****	MPN/100 mL	water	Enterolert	31701	1	1	NA	0.50**	NA	Eastex
CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	ug/L	water	EPA 446.0	32211	3	3	NA	20	80-120	Eastex
ORTHOPHOSPHATE PHOSPHORUS, DISS, MG/L, FLDFILT <15MIN	mg/L	water	SM 4500-P E & F	00671	0.04	0.04	70-130	20	80-120	Eastex
HARDNESS, TOTAL (MG/L AS CaCO3)	mg/L	water	SM 2340 C	00900	5	5	NA	20	80-120	Eastex
TURBIDITY, LAB NEPHELOMETRIC TURBIDITY UNITS, NTU	NTU	water	SM 2130B	82079	0.5	0.5	NA	NA	NA	Eastex

* Eastex is accredited for SM 4500-NH3 C but TCEQ does not accredit the prep method SM 4500- Norg C which is the digestion step.
 ** This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.
 *** *E.coli* samples analyzed by Colilert-18 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.
 **** Enterococcus samples should be diluted 1:10 for all waters.

References:
 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. (Note: The 21st edition may be cited if it becomes available.)
 TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2008 (RG-415).

TABLE A7.1a Measurement Performance Specifications for Houston-Galveston Area Council											
24 Hour Parameters in Water											
Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of	Bias %Rec. of LCS	Lab	
TEMPERATURE, WATER (DEGREES CENTGRADE), 24HR AVG	DEG C	Water	TCEQ SOP, V1	00209	NA	NA	NA	NA	NA	field	
WATER TEMPERATURE, DEGREES CENTIGRADE, 24HR MAX	DEG C	Water	TCEQ SOP, V1	00210	NA	NA	NA	NA	NA	field	
TEMPERATURE, WATER (DEGREES CENTIGRADE) 24HR MIN	DEG C	Water	TCEQ SOP, V1	00211	NA	NA	NA	NA	NA	field	
SPECIFIC CONDUCTANCE, uS/CM, FIELD, 24HR AVG	uS/cm	Water	TCEQ SOP, V1	00212	NA	NA	NA	NA	NA	field	
SPECIFIC CONDUCTANCE, uS/CM, FIELD, 24HR MAX	uS/cm	Water	TCEQ SOP, V1	00213	NA	NA	NA	NA	NA	field	
SPECIFIC CONDUCTANCE, uS/CM, FIELD, 24HR MIN	uS/cm	Water	TCEQ SOP, V1	00214	NA	NA	NA	NA	NA	field	
PH, S.U., 24HR MAXIMUM VALUE	std. units	Water	TCEQ SOP, V1	00215	NA	NA	NA	NA	NA	field	
PH, S.U., 24HR, MINIMUM VALUE	std. units	Water	TCEQ SOP, V1	00216	NA	NA	NA	NA	NA	field	
SALINITY, 24-HR, MAXIMUM, PPT	ppt	Water	TCEQ SOP, V1	00217	NA	NA	NA	NA	NA	field	
SALINITY, 24-HR, AVERAGE, PPT	ppt	Water	TCEQ SOP, V1	00218	NA	NA	NA	NA	NA	field	
SALINITY, 24-HR, MINIMUM, PPT	ppt	Water	TCEQ SOP, V1	00219	NA	NA	NA	NA	NA	field	
SALINITY, # OF MEASUREMENTS IN 24-HRS	NU	Water	TCEQ SOP, V1	00220	NA	NA	NA	NA	NA	field	
WATER TEMPERATURE, # OF MEASUREMENTS IN 24-HRS	NU	Water	TCEQ SOP, V1	00221	NA	NA	NA	NA	NA	field	
SPECIFIC CONDUCTANCE, # OF MEASUREMENTS IN 24-HR	NU	Water	TCEQ SOP, V1	00222	NA	NA	NA	NA	NA	field	
pH, # OF MEASUREMENTS IN 24-HRS	NU	Water	TCEQ SOP, V1	00223	NA	NA	NA	NA	NA	field	
DISSOLVED OXYGEN, 24-HOUR MIN. (MG/L) MIN. 4 MEA	mg/l	Water	TCEQ SOP, V1	89855	NA	NA	NA	NA	NA	field	
DISSOLVED OXYGEN, 24-HOUR MAX. (MG/L) MIN. 4 MEA	mg/l	Water	TCEQ SOP, V1	89856	NA	NA	NA	NA	NA	field	
DISSOLVED OXYGEN, 24-HOUR AVG. (MG/L) MIN. 4 MEA	mg/l	Water	TCEQ SOP, V1	89857	NA	NA	NA	NA	NA	field	
DISSOLVED OXYGEN, # OF MEASUREMENTS IN 24-HRS	NU	Water	TCEQ SOP, V1	89858	NA	NA	NA	NA	NA	field	
References: 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. (Note: The 21st edition may be cited if it becomes available.) TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2008 (RG-415).											

TABLE A7.1a Measurement Performance Specification for Houston-Galveston Area Council

Drought Field Parameters

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample % Recovery	Precision (RPD of LCS/LCSD)	Bias % Recovery of LCS	Lab
DAYS SINCE PRECIPITATION EVENT	DAYS	other	TCEQ SOP V1	72053	NA	NA	NA	NA	NA	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	M	water	TCEQ SOP V2	82903	NA*	NA	NA	NA	NA	Field
MAXIMUM POOL WIDTH AT TIME OF STUDY (METERS)	M	other	TCEQ SOP, V2	89864	NA*	NA	NA	NA	NA	Field
MAXIMUM POOL DEPTH AT TIME OF STUDY (METERS)	M	other	TCEQ SOP, V2	89865	NA*	NA	NA	NA	NA	Field
POOL LENGTH, METERS***	M	other	TCEQ SOP, V2	89869	NA*	NA	NA	NA	NA	Field
% POOL COVERAGE IN 500 METER REACH***	%	other	TCEQ SOP V2	89870	NA*	NA	NA	NA	NA	Field

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

** As published by the Texas Water Development Board on their website

<http://wild.twdb.state.tx.us/ims/resinfo/BushBurton/lakeStatus.asp?select=3&slbasin=2>

*** To be routinely reported when collecting data from perennial pools.

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #BPA-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. (Note: The 21st edition may be cited if it becomes available.)

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)

TCEQ Interim Routine Surface Water Quality Monitoring Guidance During Drought, October 2011

Reservoir stage data are collected every day from the United States Geological Survey (USGS), International Boundary and Water Commission (IBWC) and the United States Army Corps of Engineers (USACE) websites. These data are preliminary and subject to revision. The Texas Water Development Board (TWDB) derives reservoir storage (in acre-feet) from these stage data (elevation in feet above mean sea level), by using the latest rating curve datasets available. These data are published at the TWDB website at

<http://wild.twdb.state.tx.us/ims/resinfo/BushBurton/lakeStatus.asp?select=3&slbasin=2>. The web application uses real time gaged observations 7 AM reading each day (or closest reading available) from 119 major reservoirs to approximate daily storage for each reservoir, as well as daily total storage for water planning regions, river basins and the state of Texas. These instantaneous data are updated to mean daily data for all previous days. These data will be submitted to the TCEQ under parameter code 00052 Reservoir Stage and parameter code 00053 Reservoir Percent Full.

TABLE A7.1c - Measurement Performance Specifications for City of Houston, Health & Human Services
Field Parameters

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE)	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	NA*	NA	NA	NA	NA	Field
FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)	cfs	water	TCEQ SOP V1	00061	NA*	NA	NA	NA	NA	Field
TRANSPARENCY, SECCHI DISC (METERS)	meters	water	TCEQ SOP V1	00078	NA*	NA	NA	NA	NA	Field
SPECIFIC CONDUCTANCE, FIELD (uS/CM @ 25C)	us/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA*	NA	NA	NA	NA	Field
OXYGEN, DISSOLVED (MG/L)	mg/L	water	SM 4500-O G and TCEQ SOP, V1	00300	NA*	NA	NA	NA	NA	Field
PH (STANDARD UNITS)	s.u	water	EPA 150.1 and TCEQ SOP, V1	00400	NA*	NA	NA	NA	NA	Field
SALINITY - PARTS PER THOUSAND	PPT	water	SM 2520 and TCEQ SOP, V1	00480	NA*	NA	NA	NA	NA	Field
FLOW SEVERITY: 1=No Flow, 2=Low, 3=Normal, 4=Flood, 5=High, 6=Dry	NU	water	TCEQ SOP V1	01351	NA*	NA	NA	NA	NA	Field
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	NA*	NA	NA	NA	NA	Field
STREAM FLOW ESTIMATE (CFS)	cfs	Water	TCEQ SOP, V1	74069	NA*	NA	NA	NA	NA	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	meters	water	TCEQ SOP V2	82903	NA*	NA	NA	NA	NA	Field
FLOW MTH 1=GAGE 2=ELEC 3=MECH 4=WEIR/FLU 5=DOPPL	NU	other	TCEQ SOP V1	89835	NA*	NA	NA	NA	NA	Field
WIND INTENSITY (1=CALM, 2=SLIGHT, 3=MOD., 4=STRONG)	NU	other	NA	89965	NA	NA	NA	NA	NA	Field
PRESENT WEATHER (1=CLEAR, 2=PTCLDY, 3=CLDY, 4=RAIN, 5=OTHER)	NU	other	NA	89966	NA	NA	NA	NA	NA	Field
WATER SURFACE(1=CALM, 2=RIPPLE, 3=WAVE, 4=WHITECAP)	NU	water	NA	89968	NA	NA	NA	NA	NA	Field
TIDE STAGE 1=LOW, 2=FALLING, 3=SLACK, 4=RISING, 5=HI	NU	water	NA	89972	NA	NA	NA	NA	NA	Field
WATER COLOR (1=BROWNISH, 2=REDDISH, 3=GREENISH, 4=BLACKISH, 5=CLEAR, 6=OTHER)	NU	water	NA	89969	NA	NA	NA	NA	NA	Field
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGG, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER)	NU	water	NA	89971	NA	NA	NA	NA	NA	Field
PRIMARY CONTACT, OBSERVED ACTIVITY (# OF PEOPLE OBSERVED) 1-10, >10	# of people observed	Other	N/A Calculation	89978	NA	NA	NA	NA	NA	Field
EVIDENCE OF PRIMARY CONTACT RECREATION (1-OBSERVED, 0=NOT OBSERVED)	NU	Other	N/A Calculation	89979	NA	NA	NA	NA	NA	Field

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

TABLE A7.1c - Measurement Performance Specifications for City of Houston, Health & Human Services
Field Parameters

References:

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. (Note: The 21st edition may be cited if it becomes available.)

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)
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TCEQ Interim Routine Surface Water Quality Monitoring Guidance During Drought, October 2011

**TABLE A7.1c - Measurement Performance Specifications for City of Houston, Health & Human Services
Conventional and Bacteriological Parameters in Water**

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
RESIDUE, TOTAL NONFILTRABLE (MG/L) [TSS]	mg/L	water	SM 2540 D	00530	4	4	NA	NA	NA	Holcombe
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	SM 4500-NH ₃ H	00610	0.1	0.1	70-130	20	80-120	Holcombe
NITRATE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00620	0.05	0.02	70-130	20	80-120	Holcombe
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	SM 4500-NH ₃ C *	00625	0.2	0.2	70-130	20	80-120	Eastex
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	EPA 365.1	00665	0.06	0.02	70-130	20	80-120	Holcombe
CHLORIDE (MG/L AS CL)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00940	5	5	70-130	20	80-120	Holcombe
SULFATE (MG/L AS SO ₄)	mg/L	water	EPA 300.0, Rev. 2.1 (1993)	00945	5	5	70-130	20	80-120	Holcombe
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/100 mL	water	Colilert - 18	31699	1	1	NA	0.50**	NA	Holcombe
E. COLI, COLILERT, IDEXX, HOLDING TIME ***	hours	water	NA	31704	NA	NA	NA	NA	NA	Holcombe
ENTEROCOCCI, ENTEROLERT, IDEXX, (MPN/100 ML) ****	MPN/100 mL	water	Enterolert	31701	1	1	NA	0.50**	NA	Holcombe

* Eastex is accredited for SM 4500-NH₃ C but TCEQ does not accredit the prep method SM 4500- Norg C which is the digestion step.

** This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.

*** *E.coli* samples analyzed by Colilert-18 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.

**** Enterococcus samples should be diluted 1:10 for all waters.

References:

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. (Note: The 21st edition may be cited if it becomes available.)
 TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2008 (RG-415).

**TABLE A7.1c Measurement Performance Specification for City of Houston, Health & Human Services
Drought Field Parameters**

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample % Recovery	Precision (RPD of LCS/LCSD)	Bias % Recovery of LCS	Lab
DAYS SINCE PRECIPITATION EVENT	DAYS	other	TCEQ SOP V1	72053	NA	NA	NA	NA	NA	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	M	water	TCEQ SOP V2	82903	NA*	NA	NA	NA	NA	Field
MAXIMUM POOL WIDTH AT TIME OF STUDY (METERS)	M	other	TCEQ SOP, V2	89864	NA*	NA	NA	NA	NA	Field
MAXIMUM POOL DEPTH AT TIME OF STUDY (METERS)	M	other	TCEQ SOP, V2	89865	NA*	NA	NA	NA	NA	Field
POOL LENGTH, METERS***	M	other	TCEQ SOP, V2	89869	NA*	NA	NA	NA	NA	Field
% POOL COVERAGE IN 500 METER REACH***	%	other	TCEQ SOP V2	89870	NA*	NA	NA	NA	NA	Field

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

** As published by the Texas Water Development Board on their website

<http://wiid.twdb.state.tx.us/ims/resinfo/BushButton/lakeStatus.asp?selcat=3&slbasin=2>

*** To be routinely reported when collecting data from perennial pools.

References:

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. (Note: The 21st edition may be cited if it becomes available.)

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)

TCEQ Interim Routine Surface Water Quality Monitoring Guidance During Drought, October 2011

Reservoir stage data are collected every day from the United States Geological Survey (USGS), International Boundary and Water Commission (IBWC), and the United States Army Corps of Engineers (USACE) websites. These data are preliminary and subject to revision. The Texas Water Development Board (TWDB) derives reservoir storage (in acre-feet) from these stage data (elevation in feet above mean sea level), by using the latest rating curve datasets available. These data are published at the TWDB website at <http://wiid.twdb.state.tx.us/ims/resinfo/BushButton/lakeStatus.asp?selcat=3&slbasin=2>. The web application uses real time gaged observations 7 AM reading each day (or closest reading available) from 119 major reservoirs to approximate daily storage for each reservoir, as well as daily total storage for water planning regions, river basins and the state of Texas. These instantaneous data are updated to mean daily data for all previous days. These data will be submitted to the TCEQ under parameter code 00052 Reservoir Stage and parameter code 00053 Reservoir Percent Full.

TABLE A7.1d - Measurement Performance Specifications for City of Houston - Water Quality Control

Field Parameters										
Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE)	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	NA*	NA	NA	NA	NA	Field
FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)	cfs	water	TCEQ SOP V1	00061	NA*	NA	NA	NA	NA	Field
TRANSPARENCY, SECCHI DISC (METERS)	meters	water	TCEQ SOP V1	00078	NA*	NA	NA	NA	NA	Field
SPECIFIC CONDUCTANCE, FIELD (uS/CM @ 25C)	us/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA*	NA	NA	NA	NA	Field
OXYGEN, DISSOLVED (MG/L)	mg/L	water	SM 4500-O G and TCEQ SOP, V1	00300	NA*	NA	NA	NA	NA	Field
PH (STANDARD UNITS)	s.u	water	EPA 150.1 and TCEQ SOP, V1	00400	NA*	NA	NA	NA	NA	Field
FLOW SEVERITY: 1=No Flow, 2=Low, 3=Normal, 4=Flood, 5=High, 6=Dry	NU	water	TCEQ SOP V1	01351	NA*	NA	NA	NA	NA	Field
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	NA*	NA	NA	NA	NA	Field
STREAM FLOW ESTIMATE (CFS)	cfs	Water	TCEQ SOP, V1	74069	NA*	NA	NA	NA	NA	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	meters	water	TCEQ SOP V2	82903	NA*	NA	NA	NA	NA	Field
FLOW MTH 1=GAGE 2=ELEC 3=MECH 4=WEIR/FLU 5=DOPPL	NU	other	TCEQ SOP V1	89835	NA*	NA	NA	NA	NA	Field
WIND INTENSITY (1=CALM, 2=SLIGHT, 3=MOD., 4=STRONG)	NU	other	NA	89965	NA	NA	NA	NA	NA	Field
PRESENT WEATHER (1=CLEAR, 2=PTCLDY, 3=CLDY, 4=RAIN, 5=OTHER)	NU	other	NA	89966	NA	NA	NA	NA	NA	Field
WATER SURFACE (1=CALM, 2=RIPPLE, 3=WAVE, 4=WHITECAP)	NU	water	NA	89968	NA	NA	NA	NA	NA	Field
WATER COLOR (1=BROWNISH, 2=REDDISH, 3=GREENISH, 4=BLACKISH, 5=CLEAR, 6=OTHER)	NU	water	NA	89969	NA	NA	NA	NA	NA	Field
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGG, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER)	NU	water	NA	89971	NA	NA	NA	NA	NA	Field
TURBIDITY, OBSERVED (1=LOW, 2=MEDIUM, 3=HIGH)	NU	water	NA	88842	NA	NA	NA	NA	NA	Field

TABLE A7.1d - Measurement Performance Specifications for City of Houston - Water Quality Control

Field Parameters

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
PRIMARY CONTACT, OBSERVED ACTIVITY (# OF PEOPLE OBSERVED) 1-10, >10	# of people observed	Other	N/A Calculation	89978	NA	NA	NA	NA	NA	Field
EVIDENCE OF PRIMARY CONTACT RECREATION (1-OBSERVED, 0=NOT OBSERVED)	NU	Other	N/A Calculation	89979	NA	NA	NA	NA	NA	Field

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

** As published by the Texas Water Development Board on their website <http://wiid.twdb.state.tx.us/ims/resinfo/BushButton/lakeStatus.asp?selcat=3&slbasin=2>

*** To be routinely reported when collecting data from perennial pools.

References:

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. (Note: The 21st edition may be cited if it becomes available.)

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)

TCEQ Interim Routine Surface Water Quality Monitoring Guidance During Drought, October 2011

**TABLE A7.1d - Measurement Performance Specifications for City of Houston - Water Quality Control
Conventional and Bacteriological Parameters in Water**

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
RESIDUE, TOTAL NONFILTRABLE (MG/L) [TSS]	mg/L	water	SM 2540 D	00530	4	4	NA	NA	NA	WQC
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	EPA 350.3	00610	0.1	0.1	70-130	20	80-120	WQC
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	SM 4500-NH ₃ C *	00625	0.2	0.2	70-130	20	80-120	Eastex
NITRATE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0	00620	0.05	0.04	70-130	20	80-120	WQC
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	EPA 365.3	00665	0.06	0.02	70-130	20	80-120	WQC
CHLORIDE (MG/L AS CL)	mg/L	water	EPA 300.0	00940	5	5	70-130	20	80-120	WQC
SULFATE (MG/L AS SO ₄)	mg/L	water	EPA 300.0	00945	5	5	70-130	20	80-120	WQC
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/100 mL	water	SM 9223-B	31699	1	1	NA	0.50**	NA	WQC
E. COLI, COLILERT, IDEXX, HOLDING TIME ***	hours	water	NA	31704	NA	NA	NA	NA	NA	WQC
ENTEROCOCCI, ENTEROLERT, IDEXX, (MPN/100 ML) ****	MPN/100 mL	water	Enterolert	31701	1	1	NA	0.50**	NA	WQC
CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	ug/L	water	EPA 446.0	32211	3	3	NA	20	80-120	Eastex
ALKALINITY, TOTAL (MG/L AS CaCO ₃)	mg/L	water	SM 2320B	00410	20	20	NA	20	NA	WQC

* Eastex is accredited for SM 4500-NH₃ C but TCEQ does not accredit the prep method SM4500-Norg C which is the digestion step.

** This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.

*** *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.

**** Enterococcus samples should be diluted 1:10 for all waters.

References:

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. (Note: The 21st edition may be cited if it becomes available.)

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2008 (RG-415).

TABLE A7.1d Measurement Performance Specification for City of Houston - Water Quality Control

Drought Field Parameters

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample % Recovery	Precision (RPD of LCS/LCSD)	Bias % Recovery of LCS	Lab
DAYS SINCE PRECIPITATION EVENT	DAYS	other	TCEQ SOP V1	72053	NA	NA	NA	NA	NA	Field
RESERVOIR STAGE (feet above mean sea level)**	FEET ABOVE MSL	water	TWDB	00052	NA	NA	NA	NA	NA	Field
RESERVOIR PERCENT FULL**	% RESERVOIR CAPACITY	water	TWDB	00053	NA*	NA	NA	NA	NA	Field
RESERVOIR ACCESS NOT POSSIBLE, LEVEL TOO LOW, ENTER 1 IF REPORTING	NS	other	TCEQ DROUGHT GUIDANCE	00051	NA*	NA	NA	NA	NA	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	M	water	TCEQ SOP V2	82903	NA*	NA	NA	NA	NA	Field
MAXIMUM POOL WIDTH AT TIME OF STUDY (METERS)	M	other	TCEQ SOP, V2	89864	NA*	NA	NA	NA	NA	Field
MAXIMUM POOL DEPTH AT TIME OF STUDY (METERS)	M	other	TCEQ SOP, V2	89865	NA*	NA	NA	NA	NA	Field
POOL LENGTH, METERS***	M	other	TCEQ SOP, V2	89869	NA*	NA	NA	NA	NA	Field
% POOL COVERAGE IN 500 METER REACH***	%	other	TCEQ SOP V2	89870	NA*	NA	NA	NA	NA	Field

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

** As published by the Texas Water Development Board on their website
<http://wiid.twdb.state.tx.us/ims/resinfo/BushButton/lakeStatus.asp?selcat=3&slbasin=2>

*** To be routinely reported when collecting data from perennial pools.

References:

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. (Note: The 21st edition may be cited if it becomes available.)

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)

TCEQ Interim Routine Surface Water Quality Monitoring Guidance During Drought, October 2011

Reservoir stage data are collected every day from the United States Geological Survey (USGS), International Boundary and Water Commission (IBWC), and the United States Army Corps of Engineers (USACE) websites. These data are preliminary and subject to revision. The Texas Water Development Board (TWDB) derives reservoir storage (in acre-feet) from these stage data (elevation in feet above mean sea level), by using the latest rating curve datasets available. These data are published at the TWDB website at <http://wiid.twdb.state.tx.us/ims/resinfo/BushButton/lakeStatus.asp?selcat=3&slbasin=2>. The web application uses real time gaged observations 7 AM reading each day (or closest reading available) from 119 major reservoirs to approximate daily storage for each reservoir, as well as daily total storage for water planning regions, river basins and the state of Texas. These instantaneous data are updated to mean daily data for all previous days. These data will be submitted to the TCEQ under parameter code 00052 Reservoir Stage and parameter code 00053 Reservoir Percent Full

TABLE A7.1e - Measurement Performance Specifications for San Jacinto River Authority - Lake Conroe Division

Field Parameters										
Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE)	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	NA*	NA	NA	NA	NA	Field
TRANSPARENCY, SECCHI DISC (METERS)	meters	water	TCEQ SOP V1	00078	NA*	NA	NA	NA	NA	Field
SPECIFIC CONDUCTANCE, FIELD (uS/CM @ 25C)	us/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA*	NA	NA	NA	NA	Field
OXYGEN, DISSOLVED (MG/L)	mg/L	water	SM 4500-O G and TCEQ SOP, V1	00300	NA*	NA	NA	NA	NA	Field
PH (STANDARD UNITS)	s.u	water	EPA 150.1 and TCEQ SOP, V1	00400	NA*	NA	NA	NA	NA	Field
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	NA*	NA	NA	NA	NA	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	meters	water	TCEQ SOP V2	82903	NA*	NA	NA	NA	NA	Field
WIND INTENSITY (1=CALM, 2=SLIGHT, 3=MOD., 4=STRONG)	NU	other	NA	89965	NA	NA	NA	NA	NA	Field
PRESENT WEATHER (1=CLEAR, 2=PTCLDY, 3=CLDY, 4=RAIN, 5=OTHER)	NU	other	NA	89966	NA	NA	NA	NA	NA	Field
WATER SURFACE (1=CALM, 2=RIPPLE, 3=WAVE, 4=WHITECAP)	NU	water	NA	89968	NA	NA	NA	NA	NA	Field
WATER COLOR (1=BROWNISH, 2=REDDISH, 3=GREENISH, 4=BLACKISH, 5=CLEAR, 6=OTHER)	NU	water	NA	89969	NA	NA	NA	NA	NA	Field
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGG, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER)	NU	water	NA	89971	NA	NA	NA	NA	NA	Field
PRIMARY CONTACT, OBSERVED ACTIVITY (# OF PEOPLE OBSERVED) 1-10, >10	# of people observed	Other	N/A Calculation	89978	NA	NA	NA	NA	NA	Field
EVIDENCE OF PRIMARY CONTACT RECREATION (1-OBSERVED, 0=NOT OBSERVED)	NU	Other	N/A Calculation	89979	NA	NA	NA	NA	NA	Field

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

References:

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. (Note: The 21st edition may be cited if it becomes available.)

TABLE A7.1e - Measurement Performance Specifications for San Jacinto River Authority - Lake Conroe Division

Field Parameters										
Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
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)										
TCEQ Interim Routine Surface Water Quality Monitoring Guidance During Drought, October 2011										

TABLE A7.1e - Measurement Performance Specifications for San Jacinto River Authority - Lake Conroe Division

Conventional and Bacteriological Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
RESIDUE, TOTAL NONFILTRABLE (MG/L) [TSS]	mg/L	water	SM 2540 D	00530	4	4	NA	NA	NA	WQC
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	EPA 350.3	00610	0.1	0.1	70-130	20	80-120	WQC
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	SM 4500-NH3 C*	00625	0.2	0.2	70-130	20	80-120	Eastex
NITRATE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0	00620	0.05	0.04	70-130	20	80-120	WQC
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	EPA 365.3	00665	0.06	0.02	70-130	20	80-120	WQC
CHLORIDE (MG/L AS CL)	mg/L	water	EPA 300.0	00940	5	5	70-130	20	80-120	WQC
SULFATE (MG/L AS SO4)	mg/L	water	EPA 300.0	00945	5	5	70-130	20	80-120	WQC
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/100 mL	water	SM 9223-B***	31699	1	1	NA	0.50**	NA	WQC
E.COLI, COLILERT, IDEXX, HOLDING TIME ***	hours	water	NA	31704	NA	NA	NA	NA	NA	WQC
CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	ug/L	water	EPA 446.0	32211	3	3	NA	20	80-120	Eastex
ALKALINITY, TOTAL (MG/L AS CaCO3)	mg/L	water	SM 2320B	00410	20	20	NA	20	NA	WQC

* Eastex is accredited for SM 4500-NH3 C but TCEQ does not accredit the prep method SM 4500- Norg C which is the digestion step.
 ** This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.
 *** 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.

References:
 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. (Note: The 21st edition may be cited if it becomes available.)
 TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2008 (RC-415).

TABLE A7.1e Measurement Performance Specification for San Jacinto River Authority - Lake Conroe Division

Drought Field Parameters

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample % Recovery	Precision (RPD of LCS/LCSD)	Bias % Recovery of LCS	Lab
DAYS SINCE PRECIPITATION EVENT	DAYS	other	TCEQ SOP V1	72053	NA	NA	NA	NA	NA	Field
RESERVOIR STAGE (feet above mean sea level)**	FEET ABOVE MSL	water	TWDB	00052	NA	NA	NA	NA	NA	Field
RESERVOIR PERCENT FULL**	% RESERVOIR CAPACITY	water	TWDB	00053	NA*	NA	NA	NA	NA	Field
RESERVOIR ACCESS NOT POSSIBLE, LEVEL TOO LOW, ENTER 1 IF REPORTING	NS	other	TCEQ DROUGHT GUIDANCE	00051	NA*	NA	NA	NA	NA	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	M	water	TCEQ SOP V2	82903	NA*	NA	NA	NA	NA	Field

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

** As published by the Texas Water Development Board on their website <http://wiid.twdb.state.tx.us/ims/resinfo/BushButton/lakeStatus.asp?selcat=3&slbasin=2>

*** To be routinely reported when collecting data from perennial pools.

References:

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. (Note: The 21st edition may be cited if it becomes available.)

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)

TCEQ Interim Routine Surface Water Quality Monitoring Guidance During Drought, October 2011

Reservoir stage data are collected every day from the United States Geological Survey (USGS), International Boundary and Water Commission (IBWC), and the United States Army Corps of Engineers (USACE) websites. These data are preliminary and subject to revision. The Texas Water Development Board (TWDB) derives reservoir storage (in acre-feet) from these stage data (elevation in feet above mean sea level), by using the latest rating curve datasets available. These data are published at the TWDB website at <http://wiid.twdb.state.tx.us/ims/resinfo/BushButton/lakeStatus.asp?selcat=3&slbasin=2>. The web application uses real time gaged observations 7 AM reading each day (or closest reading available) from 119 major reservoirs to approximate daily storage for each reservoir, as well as daily total storage for water planning regions, river basins and the state of Texas. These instantaneous data are updated to mean daily data for all previous days. These data will be submitted to the TCEQ under parameter code 00052 Reservoir Stage and parameter code 00053 Reservoir Percent Full

TABLE A7.1f - Measurement Performance Specifications for San Jacinto River Authority - Woodlands Division
Field Parameters

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE)	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	NA*	NA	NA	NA	NA	Field
FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)	cfs	water	TCEQ SOP V1	00061	NA*	NA	NA	NA	NA	Field
TRANSPARENCY, SECCHI DISC (METERS)	meters	water	TCEQ SOP V1	00078	NA*	NA	NA	NA	NA	Field
SPECIFIC CONDUCTANCE, FIELD (uS/CM @ 25C)	us/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA*	NA	NA	NA	NA	Field
OXYGEN, DISSOLVED (MG/L)	mg/L	water	SM 4500-O G and TCEQ SOP, V1	00300	NA*	NA	NA	NA	NA	Field
PH (STANDARD UNITS)	s.u	water	EPA 150.1 and TCEQ SOP, V1	00400	NA*	NA	NA	NA	NA	Field
FLOW SEVERITY: 1=No Flow, 2=Low, 3=Normal, 4=Flood, 5=High, 6=Dry	NU	water	TCEQ SOP V1	01351	NA*	NA	NA	NA	NA	Field
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	NA*	NA	NA	NA	NA	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	meters	water	TCEQ SOP V2	82903	NA*	NA	NA	NA	NA	Field
FLOW MTH 1=GAGE 2=ELEC 3=MECH 4=WEIR/FLU 5=DOPPL	NU	other	TCEQ SOP V1	89835	NA*	NA	NA	NA	NA	Field
PRESENT WEATHER (1=CLEAR, 2=PTCLDY, 3=CLDY, 4=RAIN, 5=OTHER)	NU	other	NA	89966	NA	NA	NA	NA	NA	Field
WATER COLOR (1=BROWNISH, 2=REDDISH, 3=GREENISH, 4=BLACKISH, 5=CLEAR, 6=OTHER)	NU	water	NA	89969	NA	NA	NA	NA	NA	Field
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGG, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER)	NU	water	NA	89971	NA	NA	NA	NA	NA	Field
PRIMARY CONTACT, OBSERVED ACTIVITY (# OF PEOPLE OBSERVED) 1-10, >10	# of people observed	Other	N/A Calculation	89978	NA	NA	NA	NA	NA	Field
EVIDENCE OF PRIMARY CONTACT RECREATION (1-OBSERVED, 0=NOT OBSERVED)	NU	Other	N/A Calculation	89979	NA	NA	NA	NA	NA	Field

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

References:

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. (Note: The 21st edition may be cited if it becomes available.)

TABLE A7.1f - Measurement Performance Specifications for San Jacinto River Authority - Woodlands Division

Field Parameters										
Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
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)										
TCEQ Interim Routine Surface Water Quality Monitoring Guidance During Drought, October 2011										

**TABLE A7.1f - Measurement Performance Specifications for San Jacinto River Authority - Woodlands Division
Conventional and Bacteriological Parameters in Water**

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
RESIDUE, TOTAL NONFILTRABLE (MG/L) [TSS]	mg/L	water	SM 2540 D	00530	4	1	NA	NA	NA	Eastex
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	SM4500 NH ₃ -D & G	00610	0.1	0.1	70-130	20	80-120	Eastex
NITRITE PLUS NITRATE, TOTAL 1 DET. (MG/L AS N)	mg/L	water	SM 4500-NO ₃ E & F	00630	0.05	0.02	70-130	20	80-120	Eastex
NITRATE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	SM 4500-NO ₃ E & F	00620	0.05	0.02	70-130	20	80-120	Eastex
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	SM 4500-NH ₃ C *	00625	0.2	0.2	70-130	20	80-120	Eastex
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	SM4500 - PE	00665	0.06	0.02	70-130	20	80-120	Eastex
CHLORIDE (MG/L AS CL)	mg/L	water	SM 4500-Cl C	00940	5	5	70-130	20	80-120	Eastex
SULFATE (MG/L AS SO ₄)	mg/L	water	ASTM D 516	00945	5	5	70-130	20	80-120	Eastex
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/100 mL	water	Colilert-18	31699	1	1	NA	0.50**	NA	Eastex
E.COLI, COLILERT, IDEXX, HOLDING TIME ***	hours	water	NA	31704	NA	NA	NA	NA	NA	Eastex
ENTEROCOCCI, ENTEROLERT, IDEXX, (MPN/100 ML) ****	MPN/100 mL	water	Enterolert	31701	1	1	NA	0.50**	NA	Eastex
CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	ug/L	water	EPA 446.0	32211	3	3	NA	20	80-120	Eastex

* Eastex is accredited for SM 4500-NH₃ C but TCEQ does not accredit the prep method SM 4500- Norg C which is the digestion step.

** This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.

*** *E.coli* samples analyzed by Colilert-18 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.

**** Enterococcus samples should be diluted 1:10 for all waters.

References:

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. (Note: The 21st edition may be cited if it becomes available.)
 TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2008 (RG-415).

TABLE A7.1f - Measurement Performance Specifications for San Jacinto River Authority - Woodlands Division
Metals in Water

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
COPPER, TOTAL (UG/L AS CU)	µg/L	water	EPA 200.7	01042	NA	10	70-130	20	80-120	Eastex
SELENIUM, TOTAL (UG/L AS SE)	ug/L	water	EPA 200.7	01147	2	2	70-130	20	80-120	Eastex
HARDNESS, TOTAL (MG/L AS CaCO3)*	mg/L	water	SM 2340 C	00900	5	5	NA	20	80-120	Eastex

*Hardness is not used for regulatory purposes but is used to assess metals in water at inland sites (estuarine sites do not require hardness analysis).

References:

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. (Note: The 21st edition may be cited if it becomes available.)
 TCEQ SOP, VI - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2008 (RG-415).

TABLE A7.1f Measurement Performance Specification for San Jacinto River Authority - Woodlands Division

Drought Field Parameters

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample % Recovery	Precision (RPD of LCS/LCSD)	Bias % Recovery of LCS	Lab
EVENT	DAYS	other	TCEQ SOP V1	72053	NA	NA	NA	NA	NA	Field
RESEVOIR STAGE (feet above mean sea level)**	FEET ABOVE MSL	water	TWDB	00052	NA	NA	NA	NA	NA	Field
RESEVOIR PERCENT FULL**	% RESEVOIR CAPACITY	water	TWDB	00053	NA*	NA	NA	NA	NA	Field
RESEVOIR ACCESS NOT POSSIBLE, LEVEL TOO LOW, ENTER 1 IF REPORTING	NS	other	TCEQ DROUGHT GUIDANCE	00051	NA*	NA	NA	NA	NA	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	M	water	TCEQ SOP V2	82903	NA*	NA	NA	NA	NA	Field
MAXIMUM POOL WIDTH AT TIME OF STUDY (METERS)	M	other	TCEQ SOP, V2	89864	NA*	NA	NA	NA	NA	Field
MAXIMUM POOL DEPTH AT TIME OF STUDY (METERS)	M	other	TCEQ SOP, V2	89865	NA*	NA	NA	NA	NA	Field
POOL LENGTH, METERS***	M	other	TCEQ SOP, V2	89869	NA*	NA	NA	NA	NA	Field
% POOL COVERAGE IN 500 METER REACH***	%	other	TCEQ SOP V2	89870	NA*	NA	NA	NA	NA	Field

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

** As published by the Texas Water Development Board on their website <http://wild.twdb.state.tx.us/tms/resinfo/bushbutton/lakeStatus.asp?selcat=3&sbasin=2>

*** To be routinely reported when collecting data from perennial pools.

References:

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. (Note: The 21st edition may be cited if it becomes available.)

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).

TCEQ Intern Routine Surface Water Quality Monitoring Guidance During Drought, October 2011

Reservoir stage data are collected every day from the United States Geological Survey (USGS), International Boundary and Water Commission (IBWC), and the United States Army Corps of Engineers (USACE) websites. These data are preliminary and subject to revision. The Texas Water Development Board (TWDB) derives reservoir storage (in acre-feet) from these stage data (elevation in feet above mean sea level), by using the latest rating curve datasets available. These data are published at the TWDB website at <http://wild.twdb.state.tx.us/tms/resinfo/bushbutton/lakeStatus.asp?selcat=3&sbasin=2>. The web application uses real time gaged observations /AM reading each day (or closest reading available) from 119 major reservoirs to approximate daily storage for each reservoir, as well as daily total storage for water planning regions, river basins and the state of Texas. These instantaneous data are updated to mean daily data for all previous days. These data will be submitted to the TCEQ under parameter code 00052 Reservoir Stage and parameter code 00053 Reservoir Percent Full.

TABLE A7.1g - Measurement Performance Specifications for Environmental Institute of Houston - University of Houston - Clear Lake

Field Parameters										
Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE)	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	NA*	NA	NA	NA	NA	Field
FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)	cfs	water	TCEQ SOP V1	00061	NA*	NA	NA	NA	NA	Field
TRANSPARENCY, SECCHI DISC (METERS)	meters	water	TCEQ SOP V1	00078	NA*	NA	NA	NA	NA	Field
SPECIFIC CONDUCTANCE, FIELD (uS/CM @ 25C)	us/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA*	NA	NA	NA	NA	Field
OXYGEN, DISSOLVED (MG/L)	mg/L	water	SM 4500-O G and TCEQ SOP, V1	00300	NA*	NA	NA	NA	NA	Field
PH (STANDARD UNITS)	s.u	water	EPA 150.1 and TCEQ SOP, V1	00400	NA*	NA	NA	NA	NA	Field
SALINITY - PARTS PER THOUSAND	PPT	water	SM 2520 and TCEQ SOP, V1	00480	NA*	NA	NA	NA	NA	Field
FLOW SEVERITY: 1=No Flow, 2=Low, 3=Normal, 4=Flood, 5=High, 6=Dry	NU	water	TCEQ SOP V1	01351	NA*	NA	NA	NA	NA	Field
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	NA*	NA	NA	NA	NA	Field
STREAM FLOW ESTIMATE (CFS)	cfs	Water	TCEQ SOP, V1	74069	NA*	NA	NA	NA	NA	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	meters	water	TCEQ SOP V2	82903	NA*	NA	NA	NA	NA	Field
FLOW MTH 1=GAGE 2=ELEC 3=MECH 4=WEIR/FLU 5=DOPPL	NU	other	TCEQ SOP V1	89835	NA*	NA	NA	NA	NA	Field
WIND INTENSITY (1=CALM, 2=SLIGHT, 3=MOD., 4=STRONG)	NU	other	NA	89965	NA	NA	NA	NA	NA	Field
PRESENT WEATHER (1=CLEAR, 2=PTCLDY, 3=CLDY, 4=RAIN, 5=OTHER)	NU	other	NA	89966	NA	NA	NA	NA	NA	Field
WATER SURFACE (1=CALM, 2=RIPPLE, 3=WAVE, 4=WHITECAP)	NU	water	NA	89968	NA	NA	NA	NA	NA	Field
WATER COLOR (1=BROWNISH, 2=REDDISH, 3=GREENISH, 4=BLACKISH, 5=CLEAR, 6=OTHER)	NU	water	NA	89969	NA	NA	NA	NA	NA	Field
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGG, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER)	NU	water	NA	89971	NA	NA	NA	NA	NA	Field
TIDE STAGE 1=LOW, 2=FALLING, 3=SLACK, 4=RISING, 5=HI	NU	water	NA	89972	NA	NA	NA	NA	NA	Field
PRIMARY CONTACT, OBSERVED ACTIVITY (# OF PEOPLE OBSERVED) 1-10, >10	# of people observed	Other	N/A Calculation	89978	NA	NA	NA	NA	NA	Field
EVIDENCE OF PRIMARY CONTACT RECREATION (1-OBSERVED, 0=NOT OBSERVED)	NU	Other	N/A Calculation	89979	NA	NA	NA	NA	NA	Field

TABLE A7.1g - Measurement Performance Specifications for Environmental Institute of Houston - University of Houston - Clear Lake

Field Parameters									
* Reporting to be consistent with SWQM guidance and based on measurement capability.									
References:									
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. (Note: The 21st edition may be cited if it becomes available.)									
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)									
TCEQ Interim Routine Surface Water Quality Monitoring Guidance During Drought, October 2011									

TABLE A7.1g - Measurement Performance Specifications for Environmental Institute of Houston - University of Houston - Clear Lake

Conventional and Bacteriological Parameters in Water										
Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
RESIDUE, TOTAL NONFILTRABLE (MG/L) [TSS]	mg/L	water	SM 2540 D	00530	4	1	NA	NA	NA	Eastex
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	SM 4500 NH ₃ -D & G	00610	0.1	0.1	70-130	20	80-120	Eastex
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	SM 4500-NH ₃ C *	00625	0.2	0.2	70-130	20	80-120	Eastex
NITRITE PLUS NITRATE, TOTAL 1 DET. (MG/L AS N)	mg/L	water	SM 4500-NO ₃ E & F	00630	0.05	0.02	70-130	20	80-120	Eastex
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	SM 4500-P E	00665	0.06	0.02	70-130	20	80-120	Eastex
CHLORIDE (MG/L AS CL)	mg/L	water	SM 4500 Cl-C	00940	5	5	70-130	20	80-120	Eastex
SULFATE (MG/L AS SO ₄)	mg/L	water	ASTM D516	00945	5	5	70-130	20	80-120	Eastex
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/100 mL	water	Colilert-18	31699	1	1	NA	0.50*	NA	Eastex
E.COLI, COLILERT, IDEXX, HOLDING TIME ***	hours	water	NA	31704	NA	NA	NA	NA	NA	Eastex
ENTEROCOCCI, ENTEROLERT, IDEXX, (MPN/100 ML) ****	MPN/100 mL	water	Enterolert	31701	1	1	NA	0.50*	NA	Eastex
CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	ug/L	water	EPA 446.0	32211	3	3	NA	20	80-120	Eastex
ORTHOPHOSPHATE PHOSPHORUS, DISS, MG/L, FLDFILT <15MIN	mg/L	water	SM 4500-P E & F	00671	0.04	0.04	70-130	20	80-120	Eastex
HARDNESS, TOTAL (MG/L AS CaCO ₃)	mg/L	water	SM 2340 C	00900	5	5	NA	20	80-120	Eastex
TURBIDITY, LAB NEPHELOMETRIC TURBIDITY UNITS, NTU	NTU	water	SM 2130B	82079	0.5	0.5	NA	NA	NA	Eastex

* Eastex is accredited for SM 4500-NH₃ C but TCEQ does not accredit the prep method SM 4500- Norg C which is the digestion step.
 ** This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.
 *** *E.coli* samples analyzed by Colilert-18 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.
 **** Enterococcus samples should be diluted 1:10 for all waters.

References:
 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. (Note: The 21st edition may be cited if it becomes available.)
 TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2008 (RG-415).

TABLE A7.1g Measurement Performance Specification for Environmental Institute of Houston - University of Houston - Clear Lake

Drought Field Parameters

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample % Recovery	Precision (RPD of LCS/LCSD)	Bias % Recovery of LCS	Lab
DAYS SINCE PRECIPITATION EVENT	DAYS	other	TCEQ SOP V1	72053	NA	NA	NA	NA	NA	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	M	water	TCEQ SOP V2	82903	NA*	NA	NA	NA	NA	Field
MAXIMUM POOL WIDTH AT TIME OF STUDY (METERS)	M	other	TCEQ SOP, V2	89864	NA*	NA	NA	NA	NA	Field
MAXIMUM POOL DEPTH AT TIME OF STUDY (METERS)	M	other	TCEQ SOP, V2	89865	NA*	NA	NA	NA	NA	Field
POOL LENGTH, METERS***	M	other	TCEQ SOP, V2	89869	NA*	NA	NA	NA	NA	Field
% POOL COVERAGE IN 500 METER REACH***	%	other	TCEQ SOP V2	89870	NA*	NA	NA	NA	NA	Field

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

** As published by the Texas Water Development Board on their website <http://wiid.twdb.state.tx.us/ims/resinfo/BushButton/lakeStatus.asp?selcat=3&slbasin=2>

*** To be routinely reported when collecting data from perennial pools.

References:

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. (Note: The 21st edition may be cited if it becomes available.)

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2008 (RG-415).

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TCEQ Interim Routine Surface Water Quality Monitoring Guidance During Drought, October 2011

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TABLE A7.1h Measurement Performance Specifications for Harris County Flood Control District & City of Houston Public Works and Engineering

Field Parameters										
Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE)	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	NA*	NA	NA	NA	NA	Field
FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)	cfs	water	TCEQ SOP V1	00061	NA*	NA	NA	NA	NA	Field
TRANSPARENCY, SECCHI DISC (METERS)	meters	water	TCEQ SOP V1	00078	NA*	NA	NA	NA	NA	Field
SPECIFIC CONDUCTANCE, FIELD (uS/CM @ 25C)	us/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA*	NA	NA	NA	NA	Field
OXYGEN, DISSOLVED (MG/L)	mg/L	water	SM 4500-O G and TCEQ SOP, V1	00300	NA*	NA	NA	NA	NA	Field
PH (STANDARD UNITS)	s.u	water	EPA 150.1 and TCEQ SOP, V1	00400	NA*	NA	NA	NA	NA	Field
FLOW SEVERITY:1=No Flow, 2=Low, 3=Normal, 4=Flood, 5=High, 6=Dry	NU	water	TCEQ SOP V1	01351	NA*	NA	NA	NA	NA	Field
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	NA*	NA	NA	NA	NA	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	meters	water	TCEQ SOP V2	82903	NA*	NA	NA	NA	NA	Field
FLOW MTH 1=GAGE 2=ELEC 3=MECH 4=WEIR/FLU 5=DOPPL	NU	other	TCEQ SOP V1	89835	NA*	NA	NA	NA	NA	Field
WIND INTENSITY (1=CALM, 2=SLIGHT, 3=MOD., 4=STRONG)	NU	other	NA	89965	NA	NA	NA	NA	NA	Field
PRESENT WEATHER (1=CLEAR, 2=PTCLDY, 3=CLDY, 4=RAIN, 5=OTHER)	NU	other	NA	89966	NA	NA	NA	NA	NA	Field
WATER SURFACE (1=CALM, 2=RIPPLE, 3=WAVE, 4=WHITECAP)	NU	water	NA	89968	NA	NA	NA	NA	NA	Field
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGG, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER)	NU	water	NA	89971	NA	NA	NA	NA	NA	Field
WATER COLOR (1=BROWNISH, 2=REDDISH, 3=GREENISH, 4=BLACKISH, 5=CLEAR, 6=OTHER)	NU	water	NA	89969	NA	NA	NA	NA	NA	Field
PRIMARY CONTACT, OBSERVED ACTIVITY (# OF PEOPLE OBSERVED) 1-10, >10	# of people observed	Other	N/A Calculation	89978	NA	NA	NA	NA	NA	Field
EVIDENCE OF PRIMARY CONTACT RECREATION (1-OBSERVED, 0=NOT OBSERVED)	NU	Other	N/A Calculation	89979	NA	NA	NA	NA	NA	Field

TABLE A7.1h Measurement Performance Specifications for Harris County Flood Control District & City of Houston Public Works and Engineering

Field Parameters									
<p>* Reporting to be consistent with SWQM guidance and based on measurement capability.</p> <p>References: 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. (Note: The 21st edition may be cited if it becomes available.) 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)</p>									

TABLE A7.1h Measurement Performance Specifications for Harris County Flood Control District & City of Houston Public Works and Engineering

Conventional and Bacteriological Parameters in Water											
Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab	
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML ***	MPN/100 mL	water	Colilert-18	31699	1	1	NA	0.50*	NA	Holcombe	
E.COLI, COLILERT, IDEXX, HOLDING TIME	hours	water	NA	31704	NA	NA	NA	NA	NA	Holcombe	
ENTEROCOCCI, ENTEROLERT, IDEXX, (MPN/100 ML)****	MPN/100 mL	water	Enterolert	31701	1	1	NA	0.50*	NA	Holcombe	
<p>** This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.</p> <p>*** <i>E.coli</i> samples analyzed by Colilert-18 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.</p> <p>****Enterococcus samples should be diluted 1:10 for all waters</p>											
References:											
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. (Note: The 21st edition may be cited if it becomes available.)											
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TCEQ Interim Routine Surface Water Quality Monitoring Guidance During Drought, October 2011											

TABLE A7.1h Measurement Performance Specification for Harris County Flood Control District & City of Houston Public Works and Engineering

Drought Field Parameters

Parameter	Units	Matrix	Method	Parameter Code	AWRL	LOQ	LOQ Check Sample % Recovery	Precision (RPD of LCS/LCSD)	Bias % Recovery of LCS	Lab
DAYS SINCE PRECIPITATION EVENT	DAYS	other	TCEQ SOP V1	72053	NA	NA	NA	NA	NA	Field
RESERVOIR STAGE (feet above mean sea level)**	FEET ABOVE MSL	water	TWDB	00052	NA	NA	NA	NA	NA	Field
RESERVOIR PERCENT FULL**	% RESERVOIR CAPACITY	water	TWDB	00053	NA*	NA	NA	NA	NA	Field
RESERVOIR ACCESS NOT POSSIBLE, LEVEL TOO LOW, ENTER 1 IF REPORTING	NS	other	TCEQ DROUGHT GUIDANCE	00051	NA*	NA	NA	NA	NA	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	M	water	TCEQ SOP V2	82903	NA*	NA	NA	NA	NA	Field
MAXIMUM POOL WIDTH AT TIME OF STUDY (METERS)	M	other	TCEQ SOP, V2	89864	NA*	NA	NA	NA	NA	Field
MAXIMUM POOL DEPTH AT TIME OF STUDY (METERS)	M	other	TCEQ SOP, V2	89865	NA*	NA	NA	NA	NA	Field
POOL LENGTH, METERS***	M	other	TCEQ SOP, V2	89869	NA*	NA	NA	NA	NA	Field
% POOL COVERAGE IN 500 METER REACH***	%	other	TCEQ SOP V2	89870	NA*	NA	NA	NA	NA	Field

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

** As published by the Texas Water Development Board on their website <http://wiid.twdb.state.tx.us/ims/resinfo/BushButton/lakeStatus.asp?selcat=3&slbasin=2>

*** To be routinely reported when collecting data from perennial pools.

References:

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