CLEAN RIVERS PROGRAM

MONITORING EFFICIENCIES ANALYSIS

Houston-Galveston Area Council

This report was prepared as part of a special study conducted by the Houston-Galveston Area Council under the FY 2018 - 2021 Clean Rivers Program Contract.

TCEQ CONTRACT NO. 582-18-80290

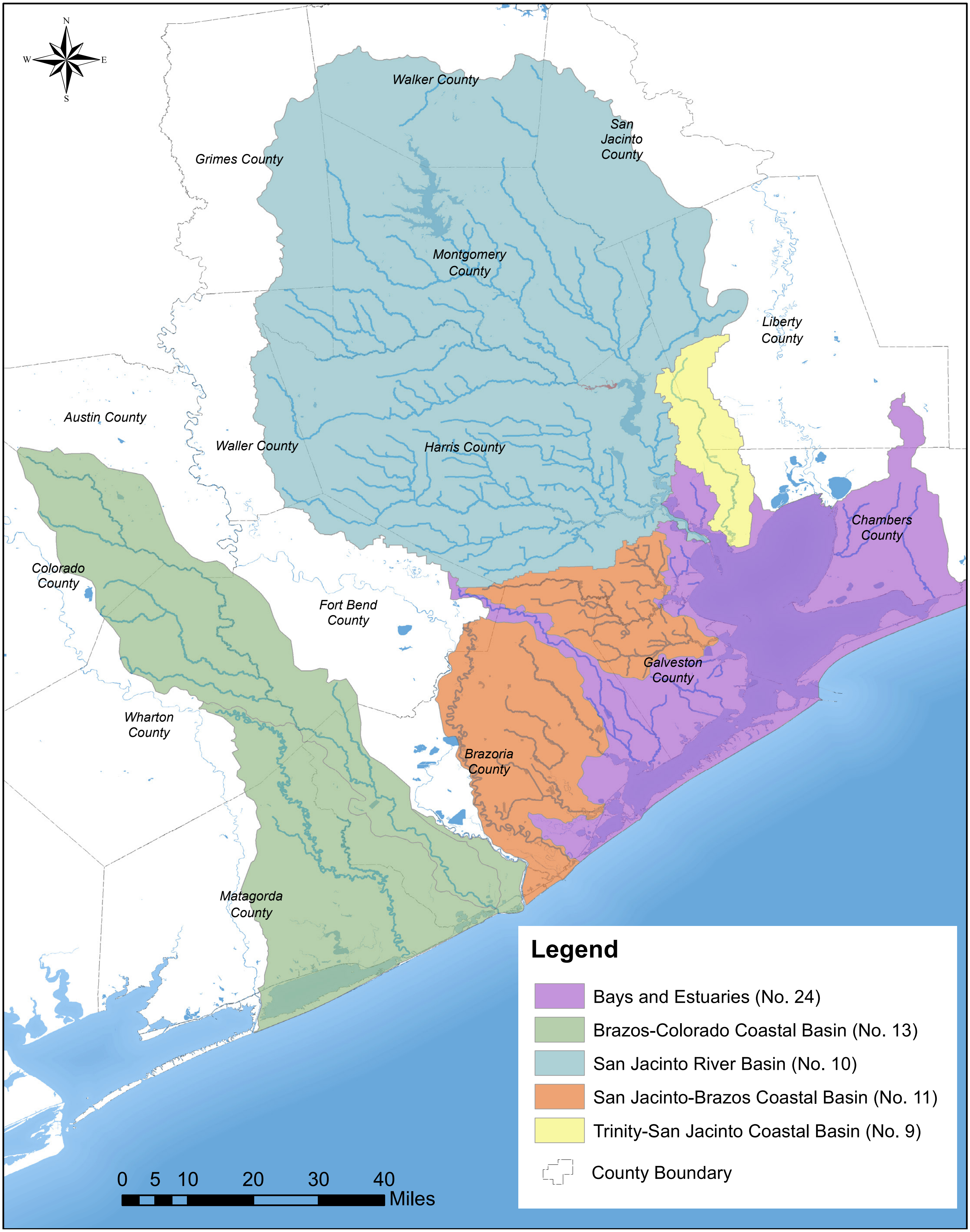
INTRODUCTION

The Texas Clean Rivers Program (CRP) is a partnership between the Texas Commission on Environmental Quality (TCEQ) and regional water authorities to provide monitoring and assessment of ambient water quality in Texas. The program works to identify key issues and develop management strategies statewide.

The Houston-Galveston Area Council (H-GAC) is designated as the lead agency responsible for regional water quality assessment for the Houston-Galveston region. This area includes the San Jacinto River Basin, Trinity-San Jacinto Coastal Basin, San Jacinto-Brazos Coastal Basin, Brazos-Colorado Coastal Basin, and Bays and Estuaries (Map 1). H-GAC oversees all aspects of Clean Rivers Program monitoring in these basins.

In Fiscal Years (FY) 2020 - 2021, H-GAC conducted a Monitoring Efficiencies Analysis of its program to identify areas where the program could be improved or made to be more efficient, with a goal of using any identified cost savings to fund special studies projects in future contract periods.

MAP 1: H-GAC's Clean Rivers Program Basins



PROJECT OVERVIEW

PROJECT PURPOSE

The purpose of the Monitoring Efficiencies Analysis was to examine the monitoring and data management components of H-GAC's Clean Rivers Program and look for ways to increase efficiencies in the program. This special project evaluated the monitoring activities, data review and submission, and training and equipment needs of H-GAC's regional partners and contractors to determine areas where the program can be made more efficient. In evaluating these activities, careful attention was taken to make sure that the Clean Rivers Program's primary objectives were met.

This analysis looked at areas such as monitoring locations, frequencies, and parameters to ensure that TCEQ's data needs were being met. The analysis focused on bacteria as the primary parameter of interest, followed by dissolved oxygen and nutrients, as these are the parameters for which there are the most regional water quality impairments or concerns.

Any cost savings from efficiencies found in the program will be used to fund future special studies and targeted monitoring.

Primary Objectives of the Clean Rivers Program:

- Provide quality-assured data to TCEQ for use in water quality decision making,
- Identify and evaluate water quality issues,
- Promote cooperative watershed planning,
- Inform and engage stakeholders,
- Maintain effective use of public funds, and
- Adapt the program to emerging water quality issues.

DATA NEEDS FOR ASSESSMENT

TCEQ has specific data requirements that must be met in order to complete their assessment of water quality for the Texas Integrated Report. For the Monitoring Efficiencies Analysis project, historical and current water quality data were evaluated to assure that TCEQ's data needs were being met. Any recommendations for changes to monitoring locations, frequencies, parameters, etc., carefully considered TCEQ's data needs.

TCEQ Data Needs for Assessment:

- Minimum of ten samples over seven years (20 samples required for bacteria)
- Flow Severity (at minimum) for bacteria assessment (Flow Measurement preferred)
- Flow Measurement required for dissolved oxygen assessment
- Data should be spread out over at least two years
- Data should be spread out temporally throughout the year
- Stations need to be representative of the AU
- Some AUs have site-specific criteria

PROJECT APPROACH

The initial approach for this project was to determine if there are monitoring stations, stream segments, or assessment units (AUs) where there is duplication of effort. This includes multiple entities performing water quality monitoring at the same station, or multiple stations within the same AU. In cases where there are multiple partners or multiple stations, H-GAC also evaluated the reason each entity is performing monitoring to determine the rationale for the duplication.

PROJECT AREA

For the Monitoring Efficiencies Analysis study, H-GAC evaluated monitoring activities in the basins currently monitored in its Clean Rivers Program region (Table 1).

TABLE 1: River Basins in the Houston-Galveston Region

Basin Number	Basin Name
09	Trinity-San Jacinto Coastal
10	San Jacinto River
11	San Jacinto-Brazos Coastal
13	Brazos-Colorado Coastal
24	Bays and Estuaries

In order to evaluate activities within the region, H-GAC's Water Resources program staff focused on areas where monitoring is directly funded by the Clean Rivers Program. However, areas that are not directly funded through the program were also analyzed so that recommendations can be offered to partners who may be interested in determining where efficiencies can be made within their programs. Areas vital to current watershed projects, such as watershed protection plans and total maximum daily load projects, were not included in the analyses. Areas that may change year-to-year due to random monitoring on certain transects (such as in much of the Bays and Estuaries) were also not included. A list of the included segments is found in Table 2.

TABLE 2: List of Stream Segments Evaluated

Seg ID	Segment Name	Seg ID	Segment ID
0901	Cedar Bayou Tidal	1017	White Oak Bayou Above Tidal
0902	Cedar Bayou Above Tidal	1103	Dickinson Bayou Tidal
1001	San Jacinto River Tidal	1104	Dickinson Bayou Above Tidal
1002	Lake Houston	1105	Bastrop Bayou Tidal
1003	East Fork San Jacinto River	1107	Chocolate Bayou Tidal
1004	West Fork San Jacinto River	1108	Chocolate Bayou Above Tidal
1006	Houston Ship Channel Tidal	1109	Oyster Creek Tidal
1007	Houston Ship Channel/Buffalo Bayou Tidal	1110	Oyster Creek Above Tidal
1009	Cypress Creek	1113	Armand Bayou Tidal
1010	Caney Creek	1301	San Bernard River Tidal
1011	Peach Creek	1302	San Bernard River Above Tidal
1013	Buffalo Bayou Tidal	1304	Caney Creek Tidal
1014	Buffalo Bayou Above Tidal	1305	Caney Creek Above Tidal
1015	Lake Creek	2431	Moses Lake
1016	Greens Bayou Above Tidal		

MONITORING ENTITIES

H-GAC staff evaluated activities for the monitoring entities listed in Table 3. This evaluation included the number of stations, the frequency of sampling, parameters sampled, and the rationale or goals behind their monitoring activities.

TABLE 3: Clean Rivers Program Collecting Entities in the Houston-Galveston Region

Monitoring Entity	CE Code*	Collecting Entity Name
EIH	UI	University of Houston Clear Lake – Environmental Institute of Houston
HCPC	HC	Harris County Pollution Control
HDW	HW	Houston Water Quality Control (Houston Drinking Water)
H-GAC	HG	Houston-Galveston Area Council
HHD	HH	Houston Health & Human Services (Houston Health Department)
SJRA	SJ	San Jacinto River Authority
TCEQ R12	FO	Texas Commission on Environmental Quality Region 12
TRIES	TF	Texas Research Institute for Environmental Studies – SHSU
USGS	GS	United States Geological Survey

* Two digit Collecting Entity (CE) code as defined in the *Data Management Reference Guide (DMRG)*


FlowTracker
HANDHELD ADV
SonTek

EFFICIENCIES ANALYSIS

The goal of H-GAC's Monitoring Efficiencies Analysis project was to identify any areas where monitoring efficiencies could be achieved in H-GAC's Clean Rivers Program. This included an evaluation of various aspects of the agency's water quality monitoring program, such as location and frequency of monitoring, parameters being monitored, and TCEQ's data needs for assessment. We also examined the processes in place to collect and record data in the field, as well as the submission of that data to H-GAC (and subsequently to TCEQ).

This section of the report is divided into five major sections, with each section highlighting the methods, results, and a discussion of each area examined as part of the Monitoring Efficiencies Analysis special study.

In conducting the Monitoring Efficiencies Analysis, H-GAC staff examined five general areas:

Monitoring Stations and Frequencies

Analysis of Historical Monitoring Data

Field Data Collection and Documentation

Data Submission and Processing

Partner/Contractor Questionnaire

MONITORING STATIONS AND FREQUENCIES

Methods

Monitoring stations in each basin evaluated for this study were selected from the FY 2021 Coordinated Monitoring Schedule (CMS).

The number of monitoring stations and monitoring frequency are shown in Table 4. The locations of monitoring stations evaluated for this study are shown in Map 2 (next page).

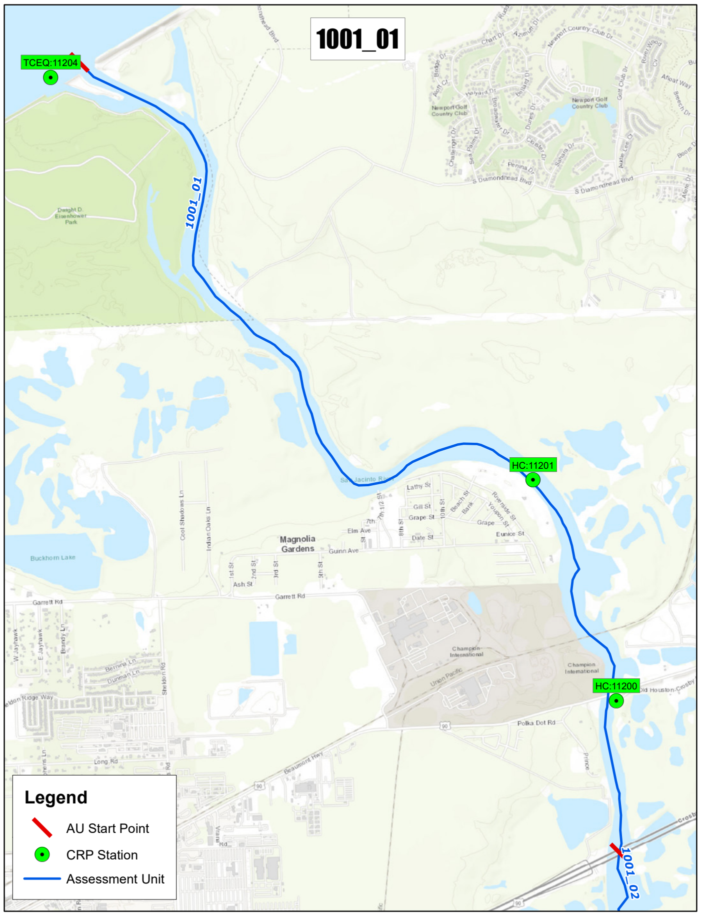
TABLE 4: Monitoring Stations and Frequency by Clean Rivers Program Partner or Contractor

Partner/Contractor	Monitoring Stations and Frequency
EIH	70 stations quarterly
HCPC	33 stations monthly/bimonthly
HDW	8 stations monthly; 13 stations bimonthly
H-GAC	20 stations quarterly
HHD	133 stations bimonthly
SJRA	10 stations monthly, 9 stations quarterly
TCEQ R12	125 stations quarterly
TRIES	10 stations quarterly

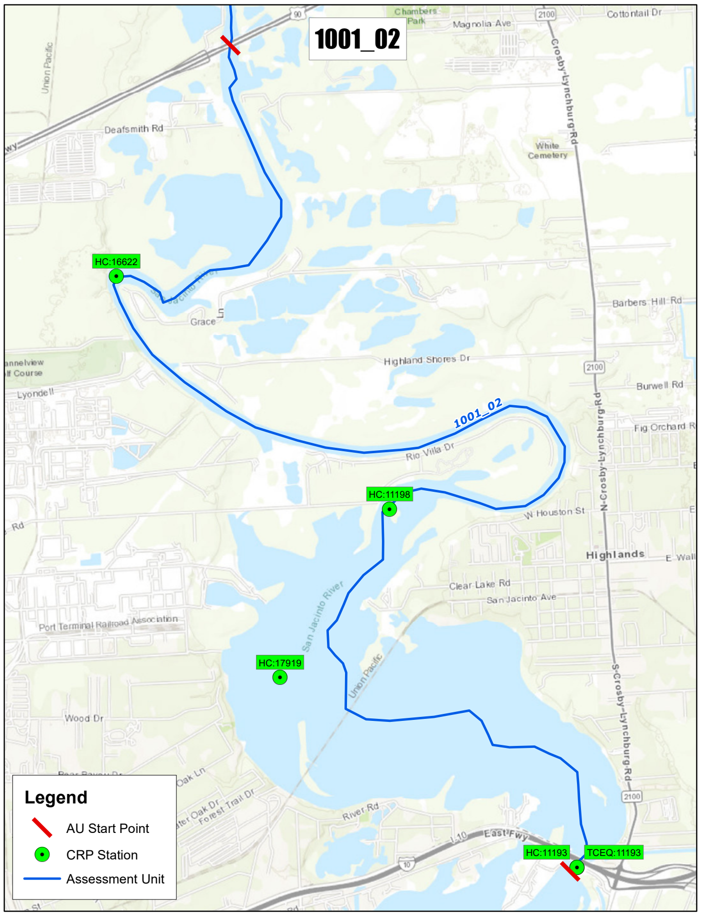
Results

As part of the monitoring station analysis, stations were mapped to determine if there were instances of multiple stations located within an AU. In cases where there are multiple stations in an AU, the parameters and frequencies of analyses were evaluated to determine if there was a justification for multiple stations. Tables 5a and 5b show the assessment units with multiple stations.

Monitoring stations were also evaluated for duplication of monitoring effort (i.e., multiple partners sampling at the same station). In cases where duplication was identified such as those shown in Maps 3 and 4, reasons for this duplication were evaluated. Table 6 shows the stations that are collected by multiple monitoring entities.



MAP 3: Duplicate Monitoring Stations in AU 1001_01



MAP 4: Duplicate Monitoring Stations in AU 1001_02

MAP 2: Monitoring Stations in the Houston-Galveston Region

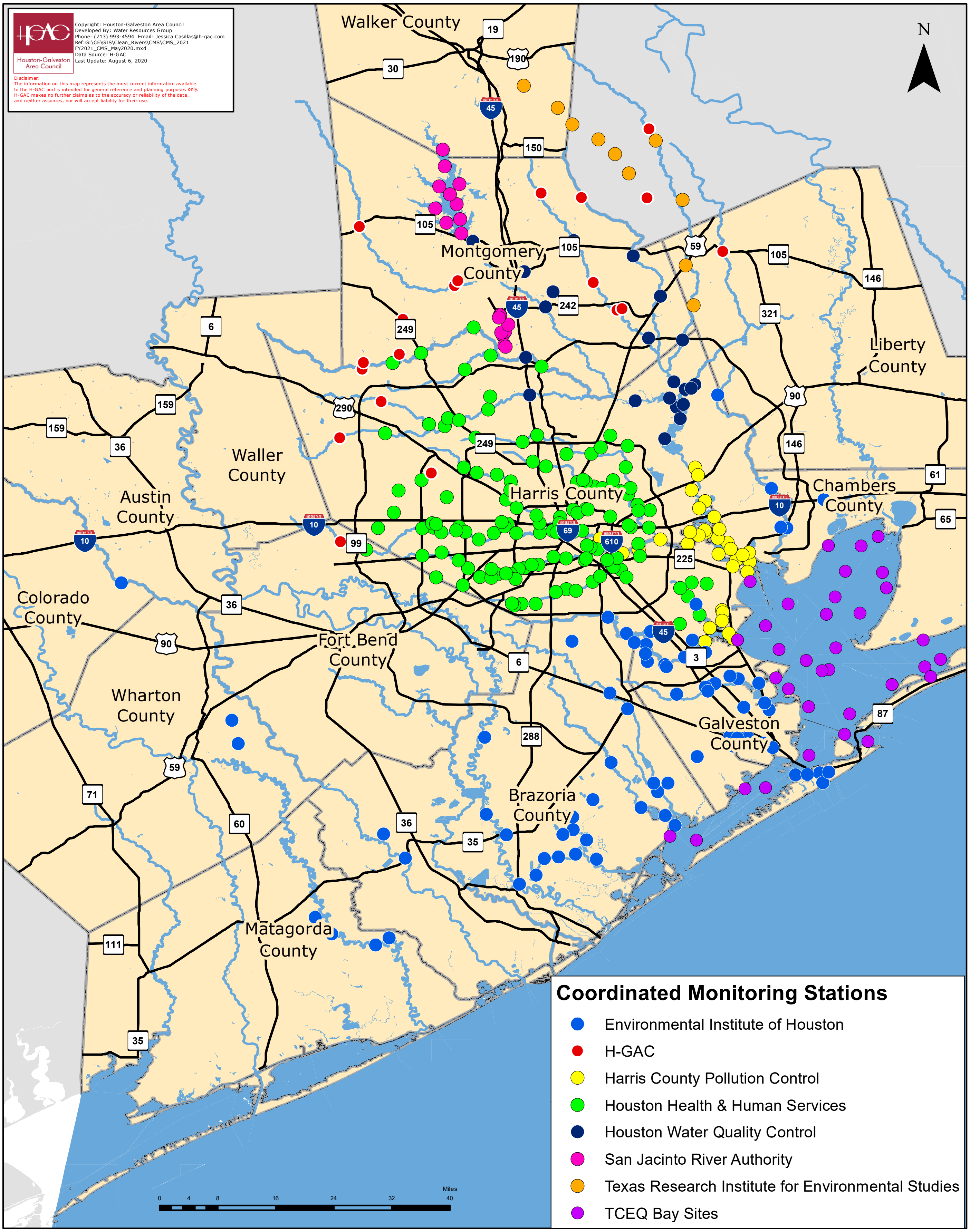


TABLE 5a: Duplicate Stations Analysis - Multiple Stations Per Assessment Unit

Segment	AU	Segment Type	Number of Stations	Environmental Institute of Houston	Harris County Pollution Control	Houston Drinking Water
0901	0901_01	Tidal Stream	2	11115		
0902	0902_01	Freshwater Stream	3	11118, 11123		
1001	1001_01	Tidal Stream	2		11201, 11200	
1001	1001_02	Tidal Stream	5		11193, 11198, 17919, 16622	
1002	1002_01	Reservoir	4			11212, 18760, 11187, 222
1002	1002_02	Reservoir	2			11211, 18667
1002	1002_06	Reservoir	3			20782
1003	1003_01	Freshwater Stream	3			11235
1003	1003_02	Freshwater Stream	3			11238
1003	1003_03	Freshwater Stream	2			
1003A	1003A_01	Freshwater Stream	7			
1004	1004_02	Freshwater Stream	2			11251
1006	1006_01	Tidal Stream	3		11271, 16617	
1006	1006_02	Tidal Stream	2		11264	
1006	1006_03	Tidal Stream	4			
1006	1006_07	Tidal Stream	2		20797	
1006D	1006D_01	Freshwater Stream	4			
1006D	1006D_02	Freshwater Stream	3			
1006I	1006I_01	Freshwater Stream	2			
1007	1007_01	Tidal Stream	4			
1007	1007_02	Tidal Stream	3			
1007	1007_03	Tidal Stream	2			
1007	1007_04	Tidal Stream	4			
1007	1007_05	Tidal Stream	2			
1007	1007_07	Tidal Stream	4		11292	
1007B	1007B_01	Freshwater Stream	9			
1007C	1007C_01	Freshwater Stream	2			
1007D	1007D_01	Freshwater Stream	2			
1007D	1007D_02	Freshwater Stream	2			
1007D	1007D_03	Freshwater Stream	3			
1007K	1007K_01	Freshwater Stream	2			
1007R	1007R_03	Freshwater Stream	2			

g	Houston-Galveston Area Council	Houston Health Department	Texas Commission on Environmental Quality	Texas Research Institute for Environmental Studies	United States Geological Survey
			11111		
			11120		
			11193		
24					
			11213		11213
				11236	11235
				14242, 21939	
	17431			11237	
	21417			21933, 21934, 21935, 21936, 21937, 21938	
			11250		
			11271		
			11264		
		21008, 11279	16981, 18363		
			11272		
		15862, 15863, 11127, 15864			
		11126, 17491, 17490			
		16666, 16667			
		11283, 16620	11284, 11287		
		20736, 11302	11302		
		11298	18362		
		11306, 11309, 16479	11306		
			11299, 11300		
		15841	11296, 11292		
		11139, 11140, 15850, 15852, 15853, 15855, 11138, 15851, 15854			
		20211, 11169			
		11135, 17976			
		11133, 15876			
		15878, 11132, 15877			
		16650, 16651			
		11129, 15873			

TABLE 5b: Duplicate Stations Analysis- Multiple Stations Per Assessment Unit (Continued from Table 5a)

Segment	AU	Segment Type	Number of Stations	Environmental Institute of Houston	Harris County Pollution Control	Houston Drinking Water
1009	1009_01	Freshwater Stream	2			
1009	1009_02	Freshwater Stream	2			
1009	1009_03	Freshwater Stream	2			11328
1009E	1009E_01	Freshwater Stream	2			
1010	1010_02	Freshwater Stream	2			21465
1010	1010_04	Freshwater Stream	3			11334, 11334
1011	1011_01	Freshwater Stream	3			16625, 11337
1013	1013_01	Tidal Stream	4			
1013A	1013A_01	Freshwater Stream	2			
1014	1014_01	Freshwater Stream	11			
1014B	1014B_01	Freshwater Stream	2			
1014H	1014H_01	Freshwater Stream	2			
1016	1016_01	Freshwater Stream	2			
1016	1016_02	Freshwater Stream	2			
1016	1016_03	Freshwater Stream	3			
1017	1017_01	Freshwater Stream	2			
1017	1017_04	Freshwater Stream	3			
1103	1103_04	Tidal Stream	2	11462		
1005	1105_01	Tidal Stream	5	18502, 18503, 18504, 18505		
1005B	1105B_01	Tidal Stream	2	18048, 22012		
1107	1107_01	Tidal Stream	3	11478, 21178		
1109	1109_01	Tidal Stream	2	11486		
1110	1110_01	Freshwater Stream	2			
1113	1113_02	Tidal Stream	2			
1113	1113_03	Tidal Stream	2	22187		
1113A	1113A_01	Freshwater Stream	2			
1113B	1113B_01	Tidal Stream	2			
1301	1301_01	Tidal Stream	2	20460		
1302	1302_03	Freshwater Stream	2	16370		

g	Houston-Galveston Area Council	Houston Health Department	Texas Commission on Environmental Quality	Texas Research Institute for Environmental Studies	United States Geological Survey
	20457	11333			
		11332, 11331			
		11330			
	20456	14159			
	20453				
	20452				
	20454				
		11347, 11351, 11345, 15843			
		11148, 16648			
		11360, 11361, 11363, 11364, 15846, 20212, 11356, 11362, 15845	11354, 11362		
	11145	17492			
		21813, 11163			
		17495, 11376			
		11371, 13778			
		11370, 11369	11369		
		11396, 11394			
		11389	11387, 15828		
			11464		
			11475		
			11478		
			11485		
			11489, 11490		
		11503	11503		
			11505		
		11404, 11405			
		11408, 11409			
			12146		
			16373		

TABLE 6: Duplicate Stations Analysis - Multiple Partners Per Station

Segment	AU	Station ID	Station Description	Monitoring Entity
1001	1001_02	11193	SAN JACINTO RIVER TIDAL IMMEDIATELY DOWNSTREAM OF IH 10 BRIDGE EAST OF CHANNELVIEW	HC TCEQ
1003	1003_01	11235	EAST FORK SAN JACINTO RIVER AT FM 1485	HW USGS
1006	1006_01	11271	HOUSTON SHIP CHANNEL AT CONFLUENCE WITH GREENS BAYOU/CM 152	HC TCEQ
1006	1006_02	11264	HOUSTON SHIP CHANNEL AT SAN JACINTO PK WEST OF THE BATTLESHIP TX 317 M N AND 303 M W OF INTERSECTION OF BATTLEGROUND RD AND MARKER DR	HC TCEQ
1007	1007_02	11302	SIMS BAYOU TIDAL IMMEDIATELY DOWNSTREAM OF LAWNDALE AVENUE IN HOUSTON	HH TCEQ
1007	1007_04	11306	BRAYS BAYOU TIDAL AT 75TH STREET IN HOUSTON	HH TCEQ
1007	1007_07	11292	HSC/BUFFALO BAYOU IN TURNING BASIN 2.82 K UPSTREAM OF CONFLUENCE WITH BRAYS BAYOU 433 M S AND 182 M W OF INTERSECT OF SIGNET AND DORSETT	HC TCEQ
1010	1010_04	11334	CANEY CREEK IMMEDIATELY DOWNSTREAM OF FM 1485	HW TCEQ
1014	1014_01	11362	BUFFALO BAYOU IMMEDIATELY DOWNSTREAM OF DAIRY ASHFORD ROAD WEST OF HOUSTON	HH TCEQ
1016	1016_03	11369	GREENS BAYOU AT TIDWELL ROAD IN HARRIS CO	HH TCEQ
1107	1107_01	11478	CHOCOLATE BAYOU TIDAL FM 2004 BRIDGE SOUTH OF ALVIN	UI TCEQ
1113	1113_02	11503	ARMAND BAYOU TIDAL AT BAY AREA BLVD NORTH OF NASA AT MIDDLE OF MEDIAN BETWEEN 2 BRIDGES EASTERN SHORE	HH TCEQ

Monitoring Types

RT = Routine BF = Biased Flow CT = Continuous

Frequency (Times/ Year)	Monitoring Type	Field	Conventionals	Bacteria	Flow	24-Hour DO	Metals in Water	Metals in Sediment	Organics in Water	Organics in Sediment	Comments
12	RT	•	•	•							
4	RT	•	•	•							
6	RT	•	•	•	•						Flow from gage 8070200
12	RT	•	•	•	•	•	•		•		Gaging station plus low and high
10	BF	•	•	•	•	•	•		•		Gaging station plus targeted flow
365	CT	•			•	•					Gaging station with multiprobe
12	RT	•	•	•							
4	RT	•		•							
12	RT	•	•	•							
4	RT	•		•				•		•	
6	RT	•	•	•							Reduced frequency in FY2020
4	RT	•	•	•							
6	RT	•	•	•							Reduced frequency in FY2020
4	RT	•	•	•							
12	RT	•	•	•							
4	RT	•	•	•			•	•		•	
6	RT	•	•	•							
4	RT	•	•	•	•						
6	RT	•	•	•	•						
4	RT	•	•	•	•						Flow from gage 8073500; Reduced frequency in FY2020
6	RT	•	•	•							
4	RT	•	•	•	•						
4	RT	•	•	•							Added Chlorophyll-a in FY 2012
4	RT	•	•	•							
6	RT	•	•	•							Reduced frequency in FY 2020
4	RT	•	•	•							

Discussion

Over the past several years, H-GAC and partner agencies have worked closely to successfully identify and minimize duplication of effort. There are still some instances of monitoring overlap (see Maps 3 and 4), but in discussions with monitoring entities through our Technical Advisory Group and Coordinated Monitoring Meetings, we have determined that the involved entities have legitimate reasons for this duplication.

The most common reason that a station would be monitored by multiple partners is a difference in the parameters collected or the frequency of collection. For example, TCEQ may monitor a station to collect parameters such as metals in sediment or organics in water, while another agency collects only field and conventional parameters. TCEQ often collects for parameters such as TKN and Chlorophyll-*a*, while another agency may only collect those parameters at a reservoir site due to limited funding. TCEQ also has multiple stations that they collect on a rotational basis that may overlap.

In some cases, particularly where there are multiple stations located within the same assessment unit, the collecting entity has reasons for wanting to continue to conduct this sampling. These stations are often long-term historical monitoring locations, and the baseline data provided by these samples are important to their programs. In the case of TRIES, multiple stations listed for the same AU are actually on an unclassified tributary with a limited monitoring history, so the monitoring is necessary to better characterize the watershed. Some monitoring entities, such as Houston Health Department and Harris County Pollution Control, are monitoring in order to better identify and address point and nonpoint sources of pollution or issues that affect public health. Many of the entities submitting data to H-GAC are also self-funding their monitoring efforts, so the Clean Rivers Program is benefiting from the data but is not paying for this monitoring.

H-GAC's Clean Rivers Program partners and contractors were presented with the information in Tables 5 (a & b) and 6 to discuss these areas of overlap. Partners felt that current monitoring efforts were appropriate and that a reduction of sites was unnecessary.

ANALYSIS OF HISTORICAL MONITORING DATA

Methods

H-GAC Water Resources staff evaluated the available data in TCEQ's Surface Water Quality Monitoring Information System (SWQMIS) for monitoring stations within the region. This evaluation was made to assure that TCEQ's data needs were met for their water quality assessments. These data needs were determined through detailed and thorough discussions with TCEQ Project Managers, Basin Assessors, and regional monitoring staff that occurred at H-GAC's Coordinated Monitoring Meetings, Basin Steering Committee meetings, Technical Advisory Group meetings, and ongoing discussions between H-GAC and TCEQ staff. Priority field and laboratory parameters (by water body type) necessary or requested by TCEQ for the Integrated Report are listed in Table 7.

Water quality monitoring data collected during the period of 2012 - 2018 were downloaded from SWQMIS and analyzed. This analysis examined data by parameter and assessment unit. Results of this analysis were presented to the Clean Rivers Program Technical Advisory Group for review and discussion.

The monitoring data analysis considered several factors. A statistical analysis of the data (minimum, mean, median, maximum, geometric mean, and trends) was performed. The analysis evaluated the number of stations in the AUs, the parameters being collected, the number of samples collected, and the frequency of collection. Additionally, analysis included programmatic aspects, such as an evaluation of monitoring activities funded by the Clean Rivers Program through H-GAC. The full list of items in the analysis is shown in Appendix A.

TABLE 7: Priority Parameters by Water Body Type

Priority Parameters	Reservoir	River/ Stream	Tidal
Field Parameters			
Temperature	■	■	■
pH	■	■	■
Dissolved Oxygen	■	■	■
Conductance	■	■	■
Secchi Transparency	■	■	■
Flow		■	
Salinity			■
Laboratory Parameters			
Total Phosphorus	■	■	■
Total Kjeldahl Nitrogen (TKN)*	■	■	■
Nitrate/Nitrite-Nitrogen*	■	■	■
Ammonia-Nitrogen	■	■	■
Bacteria	■	■	■
Chlorophyll-*a*	■	□	□
Chloride	♦	♦	
Sulfate	♦	♦	
Hardness	◊	◊	◊
Alkalinity	◊	◊	◊
Total Dissolved Solids	◊	◊	◊

■ = Priority Parameter

□ = Preferred but not essential

♦ = Essential for AUs with chloride standards, optional for others

◊ = Requested by Standards Development, but not essential

* = Standards Development interested in Total Nitrogen (TKN + Nitrate + Nitrite)

Results

Because of the amount of data presented, the results of the historical monitoring data analysis are presented in Appendix A. This analysis was shared with the Technical Advisory Group for discussion.

Discussion

The available data was reviewed and discussed with the Technical Advisory Group and at the Coordinated Monitoring Meeting. These meetings included the TCEQ Basin Assessor and the TCEQ Clean Rivers Program Project Manager. Based on these discussions, the data being collected by Clean Rivers Program partners are meeting TCEQ's data needs. There is a request for additional TKN and Chlorophyll-*a* data, but additional sampling for these parameters is cost-prohibitive at the moment. A need for additional 24-hour dissolved oxygen monitoring was indicated for select assessment units.

FIELD DATA COLLECTION AND DOCUMENTATION

Methods

H-GAC staff evaluated the way that monitoring partners document field parameter data and looked for new methods to accomplish this task.

All partners and contractors complete Field Data Sheets as specified in the *H-GAC Multi-Basin Quality Assurance Project Plan*. These forms are tailored to the specific needs of each monitoring entity. Each partner has a form that is unique to their monitoring program (Figure 1).

H-GAC staff examined ways to develop a software solution to allow for more consistency in the way data is collected, documented, and reported. These potential solutions included standardized spreadsheets in Excel [based on an example provided by Trinity River Authority (TRA) (see Appendix B)] as well as a form-centric data gathering application developed in-house using the ArcGIS Survey123 platform.

Results

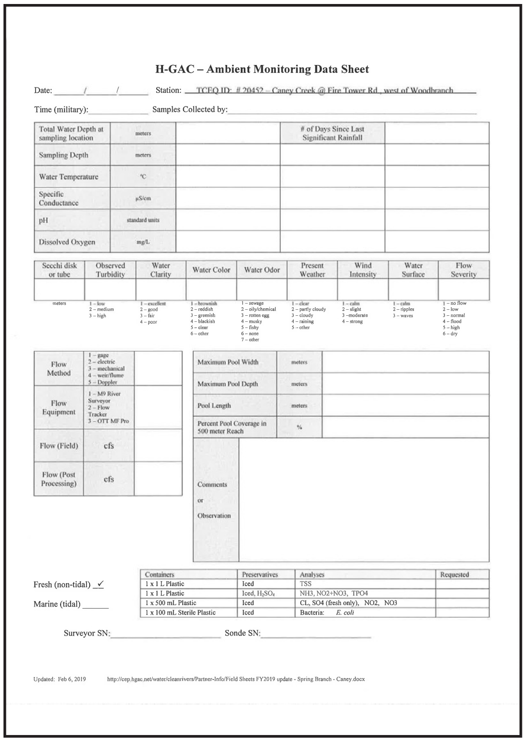
The use of multiple different formats of field sheets makes it more difficult for H-GAC to process the data received from partners. Following discussions with Clean Rivers Program staff from the Trinity River Authority, TRA provided H-GAC with a copy of the data entry spreadsheet used for their surface water quality monitoring activities. As a pilot project, H-GAC customized this spreadsheet for use by the San Jacinto River Authority. After SJRA spends time using the template and H-GAC has sufficient data to evaluate its effectiveness, the template will be made available to other partners.

The data entry template, in Microsoft Excel format, is a spreadsheet with multiple worksheets encompassing all data necessary not only to record the data, but to review and provide quality control/quality assurance (QA/QC) of the data. These worksheets include:

1. Instructions
2. Data Submittal Schedule
3. Data Review Checklist
4. Monitoring Schedule
5. Data Entry Form
6. Measurement Performance Specifications

An example copy of the spreadsheet showing the multiple worksheets is available in Appendix B.

FIGURE 1: Field Data Sheets for Monitoring Partners



H-GAC – Ambient Monitoring Data Sheet

Date: ____/____/____ Station: TCEQ ID: # 20452 – Caney Creek @ Fire Tower Rd., west of Woodbranch

Time (military): ____ Samples Collected by: ____

Total Water Depth at sampling location	meters		# of Days Since Last Significant Rainfall		
Sampling Depth	meters				
Water Temperature	°C				
Specific Conductance	µS/cm				
pH	standard units				
Dissolved Oxygen	mg/L				

Secchi disk or tube	Observed Turbidity	Water Clarity	Water Color	Water Odor	Present Weather	Wind Intensity	Water Surface	Flow Severity
meters	1 – low 2 – medium 3 – high	1 – excellent 2 – good 3 – fair 4 – poor	1 – brownish 2 – reddish 3 – greenish 4 – blackish 5 – clear 6 – other	1 – sewage 2 – oily/chemical 3 – rotten egg 4 – musky 5 – fishy 6 – none 7 – other	1 – clear 2 – partly cloudy 3 – cloudy 4 – raining 5 – other	1 – calm 2 – slight 3 –moderate 4 – strong	1 – calm 2 – ripples 3 – waves	1 – no flow 2 – low 3 – normal 4 – flood 5 – high 6 – dry

Flow Method	1 – gage 2 – electric 3 – mechanical 4 – weir/flume 5 – Doppler	
Flow Equipment	1 – M9 River Surveyor 2 – Flow Tracker 3 – OTT MF Pro	
Flow (Field)	cfs	
Flow (Post Processing)	cfs	

Maximum Pool Width	meters	
Maximum Pool Depth	meters	
Pool Length	meters	
Percent Pool Coverage in 500 meter Reach	%	
Comments or Observation		

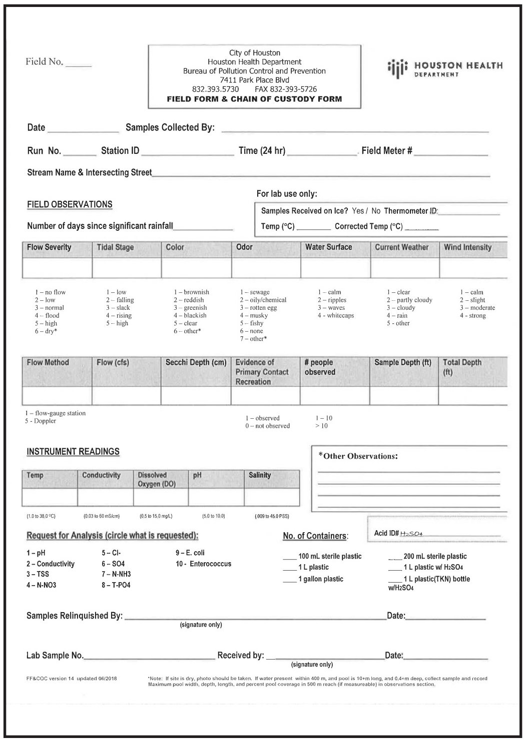
Fresh (non-tidal) ✓

Marine (tidal) ____

Containers	Preservatives	Analyses	Requested
1 x 1 L Plastic	Iced	TSS	
1 x 1 L Plastic	Iced, H_2SO_4	NH3, NO2+NO3, TPO4	
1 x 500 mL Plastic	Iced	CL, SO4 (fresh only), NO2, NO3	
1 x 100 mL Sterile Plastic	Iced	Bacteria: *E. coli*	

Surveyor SN: ____ Sonde SN: ____

Updated: Feb 6, 2019 http://cep.hgac.net/water/cleanrivers/Partner-Info/Field Sheets FY2019 update - Spring Branch - Caney.docx



Field No. ____

City of Houston
Houston Health Department
Bureau of Pollution Control and Prevention
7411 Park Place Blvd
832.393.5730 FAX 832-393-5726
FIELD FORM & CHAIN OF CUSTODY FORM

HOUSTON HEALTH DEPARTMENT

Date ____ Samples Collected By: ____

Run No. ____ Station ID ____ Time (24 hr) ____ Field Meter # ____

Stream Name & Intersecting Street ____

FIELD OBSERVATIONS

Number of days since significant rainfall ____

For lab use only:
Samples Received on Ice? Yes / No Thermometer ID: ____
Temp (°C) ____ Corrected Temp (°C) ____

Flow Severity	Tidal Stage	Color	Odor	Water Surface	Current Weather	Wind Intensity
1 – no flow 2 – low 3 – normal 4 – flood 5 – high 6 – dry*	1 – low 2 – falling 3 – slack 4 – rising 5 – high	1 – brownish 2 – reddish 3 – greenish 4 – blackish 5 – clear 6 – other*	1 – sewage 2 – oily/chemical 3 – rotten egg 4 – musky 5 – fishy 6 – none 7 – other*	1 – calm 2 – ripples 3 – waves 4 - whitecaps	1 – clear 2 – partly cloudy 3 – cloudy 4 – rain 5 - other	1 – calm 2 – slight 3 – moderate 4 - strong

Flow Method	Flow (cfs)	Secchi Depth (cm)	Evidence of Primary Contact Recreation	# people observed	Sample Depth (ft)	Total Depth (ft)
1 – flow-gauge station 5 - Doppler			1 – observed 0 – not observed	1 – 10 > 10		

INSTRUMENT READINGS

Temp	Conductivity	Dissolved Oxygen (DO)	pH	Salinity
(1.0 to 38.0 °C)	(0.03 to 60 mS/cm)	(0.5 to 15.0 mg/L)	(5.0 to 10.0)	(.009 to 45.0 PSS)

*Other Observations:

Request for Analysis (circle what is requested):

1 – pH
2 – Conductivity
3 – TSS
4 – N-NO3
5 – Cl-
6 – SO4
7 – N-NH3
8 – T-PO4
9 – E. coli
10 - Enterococcus

No. of Containers:

____ 100 mL sterile plastic
____ 1 L plastic
____ 1 gallon plastic
____ 200 mL sterile plastic
____ 1 L plastic w/ H2SO4
____ 1 L plastic(TKN) bottle w/H2SO4

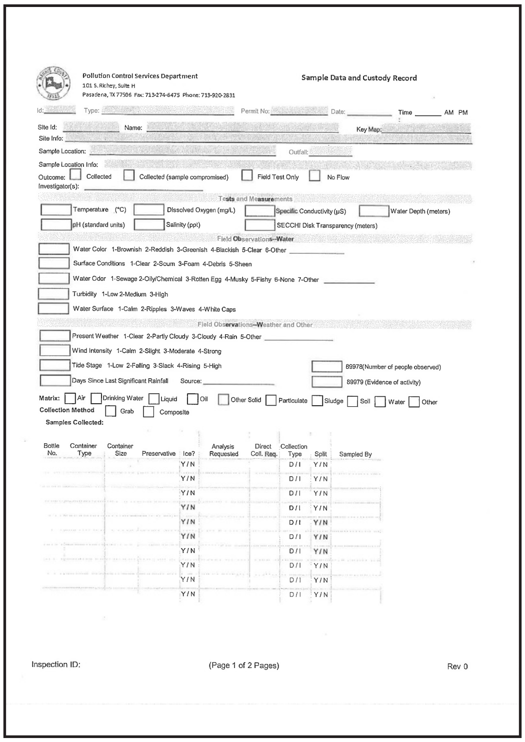
Acid ID# H2SO4

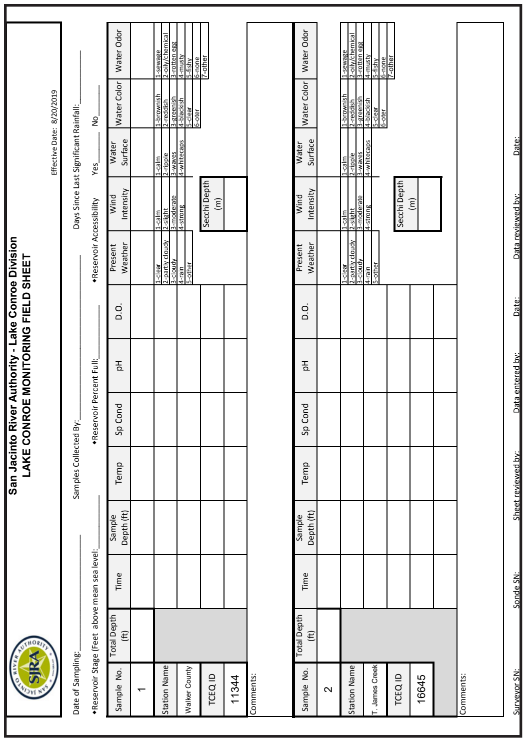
Samples Relinquished By: ____ (signature only) Date: ____

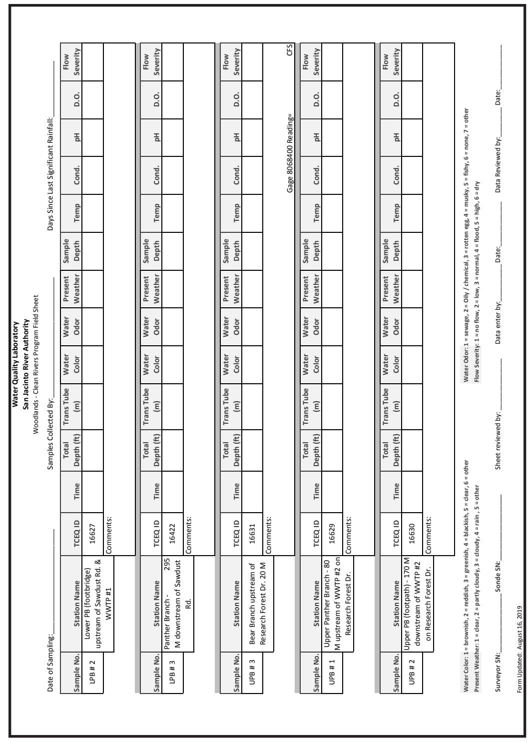
Lab Sample No. ____ Received by: ____ (signature only) Date: ____

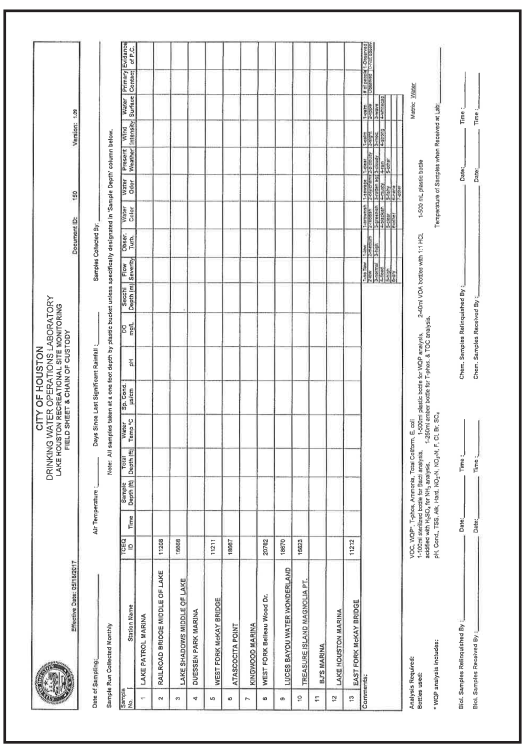
FF&COC version 14 updated 06/2018

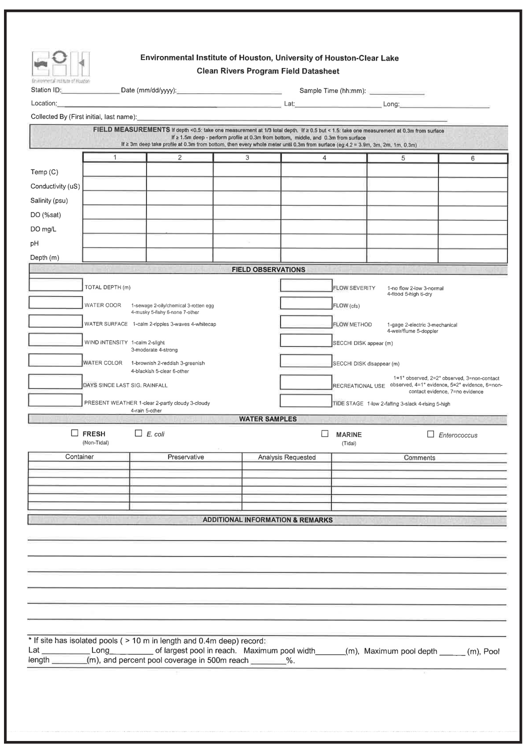
*Note: If site is dry, photo should be taken. If water present within 400 m, and pool is 10+m long, and 0.4+m deep, collect sample and record Maximum pool width, depth, length, and percent pool coverage in 500 m reach (if measureable) in observations section.

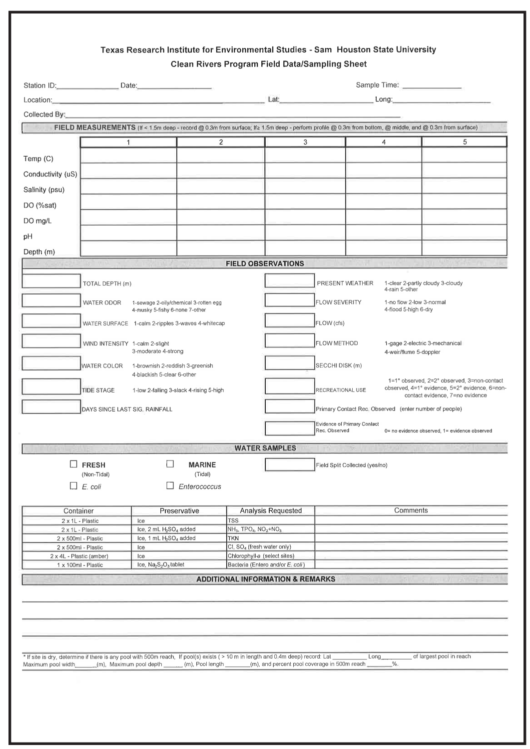

Pollution Control Services Department
Sample Data and Custody Record


San Jacinto River Authority - Lake Conroe Division
LAKE CONROE MONITORING FIELD SHEET


Water Quality Laboratory
San Jacinto River Authority
Woodlands - Clean Rivers Program Field Sheet


CITY OF HOUSTON
DRINKING WATER OPERATIONS LABORATORY
FIELD SHEET & CHAIN OF CUSTODY

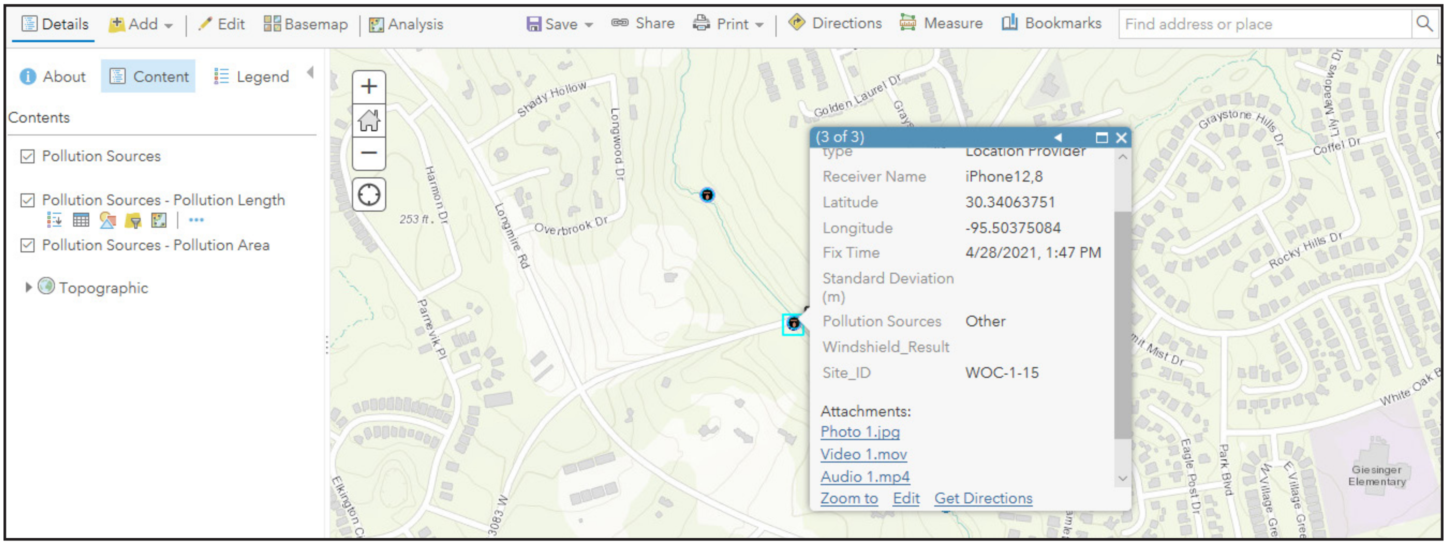

Environmental Institute of Houston, University of Houston-Clear Lake
Clean Rivers Program Field Datasheet


Texas Research Institute for Environmental Studies - Sam Houston State University
Clean Rivers Program Field Data/Sampling Sheet

In addition to the Excel spreadsheet solution, a form-centric application was developed in-house to record data in the field. This form, developed in *ArcGIS* Survey 123, was successfully used to capture data for H-GAC's Targeted Monitoring project.

The developed application is able to be used on a cell phone [Figure 2 (next page)], tablet, laptop, or PC [Figure 3 (below)]. By being accessible on a cell phone or tablet, this application offers an easily portable solution for recording data in the field. This form has required fields, meaning that data such as the Date/Time, Samples Collected By, and TCEQ Site ID must be completed before the field collector is able to move on and save the data. For quantitative data, internal logic restricts results by parameter (for example, pH results must be between 0 - 14 SU). For qualitative results, drop down choices limit responses to those listed in the *Surface Water Quality Monitoring (SWQM) Procedures Manual*. The application also offers mapping functions and the ability to attach and view photos, videos, and audio files.

FIGURE 3: PC Interface for the ArcGIS Survey 123 Application



Discussion

The current method of recording field measurements can be a cumbersome process for sample collectors. The handling of paperwork is also more complicated when you consider the types of protections in place due to COVID-19 and working in a remote environment that is not conducive to processing, transmitting, and storing large amounts of hardcopy records. Additionally, with each partner having a unique form for their Field Data Sheets, this makes processing the data on H-GAC's end more time-consuming and difficult. A consistent Excel spreadsheet could provide a solution that is very beneficial to the program. Upon completion of the pilot program with SJRA, the benefits and drawbacks will be evaluated and a decision will be made whether or not to extend the format to other program partners.

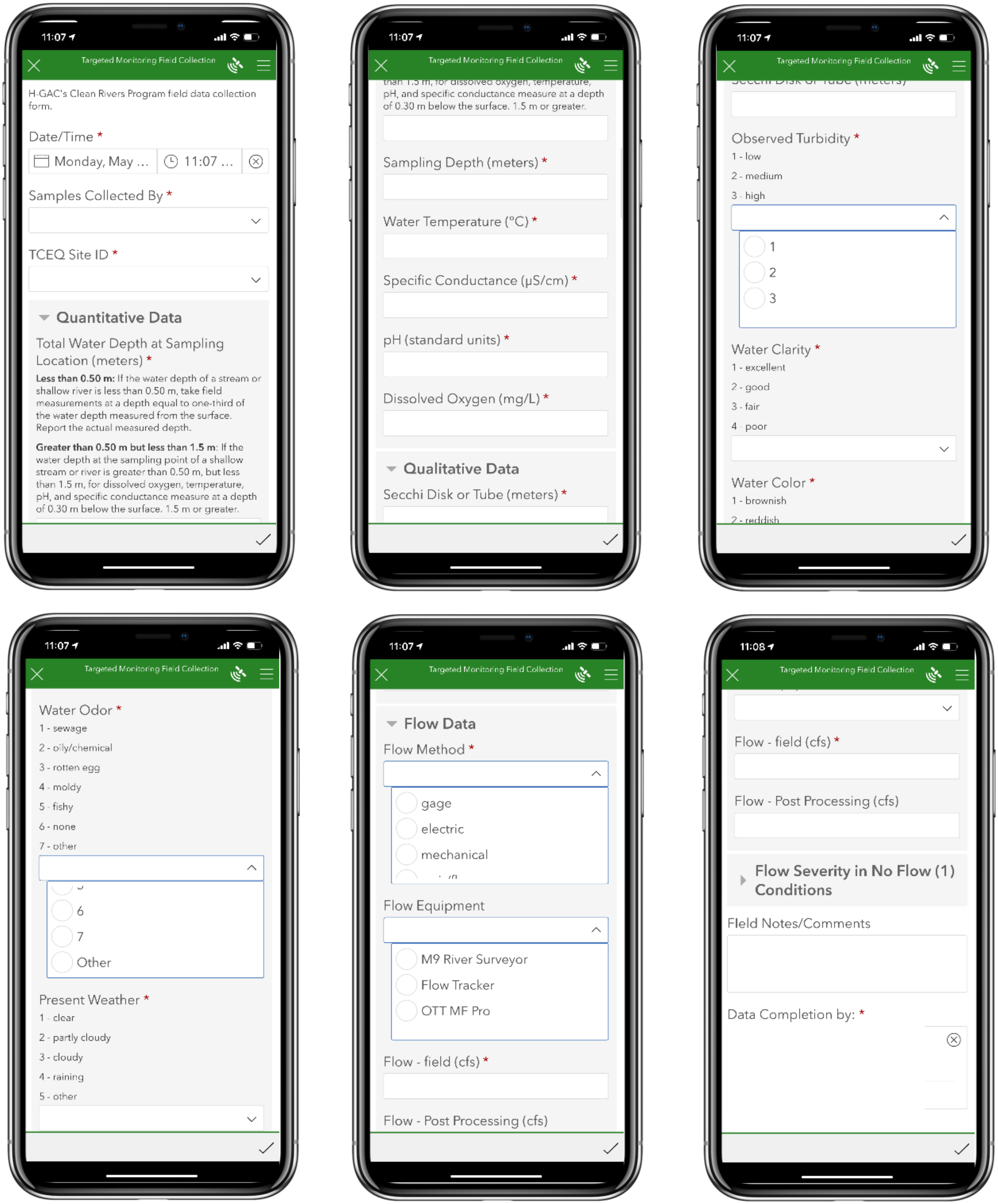
The ArcGIS Survey 123 application may also be a beneficial solution. In working with the Targeted Monitoring project, numerous aspects of the application were identified that may streamline field data collection.

Following this proof of concept, the application will be refined and may potentially be offered to partners for use with their field data collection activities.

Beneficial aspects of the application include:

- The ability to add field investigation findings via cell phone or tablet
- Field notes can be added to the maps to eliminate messy field sheets
- Links to reference manuals and resources (such as the SWQM manual) are embedded in the form
- The form allows the user to quickly review SWQM guidelines to correctly collect samples in certain conditions
- Can add multiple attachments and file types (image, video, audio)
- Can add pollution sources to the map while in the field
- Updates to the map are in real time (when cell service or wifi is available)
- If cell service or wifi is not available, the app will save the information and it can then be uploaded later when cell service or wifi is available.

FIGURE 2: ArcGIS Survey 123 Application Data Entry Screens



DATA SUBMISSION AND PROCESSING

Methods

The procedures used by each monitoring partner or contractor to submit data to H-GAC was evaluated to determine if there were ways to make the process more efficient by improving consistency. H-GAC also evaluated its own procedures for processing the data received from partners/contractors and the submission of that data to TCEQ's SWQMIS.

Results

In evaluating the way that data were received by partners and contractors, it was clear that there was no consistent procedure. For example, field data would be submitted as an Excel spreadsheet on one occasion and then as an Adobe PDF file on other occasions (Figure 4).

File naming conventions were examined as part of this analysis. There was little consistency in the way that different partners named files. In some cases, there were inconsistencies between monitoring events for the same partner. Also, the ways files were named caused files to sort in ways that are not necessarily conducive to efficient data processing. For example, naming files by the type of data (field data, flow data, etc.) caused all of the files to sort by data type (Figure 4). It is much easier for H-GAC staff to review and process the data when files are named by date since all files for a monitoring event will sort together (Figure 5).

FIGURE 4: Current Files With No Uniform Naming Convention

Name	Date modified	Type	Size
Field Data CRP April 2018 - HGAC Copy.x...	5/25/2018 11:01 AM	Microsoft Excel M...	49 KB
Field Data CRP April 2018.pdf	7/2/2018 2:51 PM	Adobe Acrobat D...	7,366 KB
Field Data CRP April 2019 - HGAC Copy.x...	5/20/2019 9:22 AM	Microsoft Excel M...	51 KB
Field Data CRP January 2018 - HGAC Cop...	2/12/2018 12:04 PM	Microsoft Excel M...	49 KB
Field Data CRP January 2019 - HGAC Cop...	5/20/2019 9:26 AM	Microsoft Excel M...	53 KB
Field Data CRP July 2018 - HGAC Copy.xl...	11/5/2018 3:46 PM	Microsoft Excel M...	50 KB
Field Data CRP November 2017 - HGAC ...	1/19/2018 10:47 AM	Microsoft Excel M...	51 KB
Field Data CRP October 2018 - HGAC Co...	1/7/2019 10:40 AM	Microsoft Excel M...	33,590 KB
Field Data EIH CRP January 2018.pdf	2/12/2018 2:13 PM	Adobe Acrobat D...	7,455 KB
Field Data EIH CRP July 2018.pdf	11/5/2018 3:46 PM	Adobe Acrobat D...	7,467 KB
Field Data EIH CRP October 2018.pdf	1/7/2019 10:39 AM	Adobe Acrobat D...	7,683 KB
Field Data November 2017.pdf	2/12/2018 2:06 PM	Adobe Acrobat D...	7,654 KB
Flow Data CRP April 2018.xlsx	5/25/2018 11:01 AM	Microsoft Excel W...	16 KB
Flow Data CRP January 2018.xlsx	2/12/2018 2:13 PM	Microsoft Excel W...	16 KB
Flow Data CRP July 2018.xlsx	11/5/2018 3:46 PM	Microsoft Excel W...	20 KB
Flow Data CRP November 2017.xlsx	1/19/2018 10:47 AM	Microsoft Excel W...	16 KB
Flow Data CRP October 2018.xlsx	1/7/2019 10:40 AM	Microsoft Excel W...	20 KB
Flow Data November 2017 Basin 11 & 13....	2/12/2018 2:06 PM	Adobe Acrobat D...	8,901 KB
Flow EIH CRP January 2018.pdf	2/12/2018 2:13 PM	Adobe Acrobat D...	9,738 KB
Flow EIH CRP July 2018.pdf	11/5/2018 3:47 PM	Adobe Acrobat D...	8,527 KB
Flow EIH CRP October 2018.pdf	1/7/2019 10:39 AM	Adobe Acrobat D...	9,991 KB

FIGURE 5: Example of Proposed New File Naming Convention

Name	Date modified	Type	Size
2020-02-18_24hrDO Field Data CRP February 2020.xlsx	2/9/2021 4:41 PM	Microsoft Excel W...	10 KB
2020-02-18_11490_Oyster Creek @ HWY 135.xlsx	2/9/2021 4:41 PM	Microsoft Excel W...	27 KB
2020-02-18_11490_Oyster Creek@ HWY 35.pdf	2/9/2021 4:41 PM	Adobe Acrobat D...	166 KB
2020-02-18_11493_Oyster Creek @ FM 1462.pdf	2/9/2021 4:41 PM	Adobe Acrobat D...	557 KB
2020-02-18_11493_Oyster Creek @ FM 1462.xlsx	2/9/2021 4:41 PM	Microsoft Excel W...	28 KB

Discussion

H-GAC identified numerous inefficiencies in the way that data is submitted and processed. This includes inconsistencies in the format that data is being submitted to H-GAC by partner agencies. For example, some partners submit Access database files, some submit Excel spreadsheets, and others submit hardcopies that have been scanned to PDF. Additionally, each partner has a different file naming convention, and sometimes partners even change the way files are named between submissions. These inconsistencies seemed to be most common with the field data. Laboratory data did not have the same level of inconsistency in the file naming convention, likely because most of the data deliverables are generated by a Laboratory Information Management System, which provides a standardized format.

The file naming conventions that have been used in the past are not ideal for efficient processing of data. While it may sometimes be convenient to have all the field data sorted together, it is generally more useful to have all of the data for a single submission to be sorted together, as this is how data is uploaded to TCEQ. Organizing by date, as shown in Figure 5, allows for sorting by sampling event. In the past, the date format used typically involved spelling out the month. This results in files being sorted in alphabetical order (April, August, December, etc.). Switching to a numeric date format makes finding data much more efficient, as the operating system automatically sorts the files in numerical order by year, then month, then day.

H-GAC is in the process of developing a unified and consistent file naming convention that it will be disseminating to partners and contractors. This naming convention will use numerical dates and a clear description of the type of data included. Although this is not necessarily the final format, an example of one such naming convention would be:

CE YYYY-MM-DD Data

Where	CE	=	Collecting Entity
	YYYY	=	4-digit Year
	MM	=	2-digit Month
	DD	=	2-digit Day
	Data	=	Data type (i.e., field sheets, flow, etc.)

Using this file naming convention, a sampling event collected by the Environmental Institute of Houston on September 3, 2021, would be submitted with the following files:

UI 2021-09-03 COCs
UI 2021-09-03 Field Sheets
UI 2021-09-03 Flow
UI 2021-09-03 Lab Results

Use of a consistent and standardized file naming convention would have numerous advantages for H-GAC staff when receiving, sorting, processing, and reviewing this data. For example, the two-digit collecting entity code (as defined in the *Data Management Reference Guide*) easily allows all files to be sorted first by collecting entity (UI, HG, HH, etc.). Once files are sorted into the appropriate folder based on the collecting entity, those files will automatically be sorted by date, so that all files related to a single sample event (or group of sampling events) are grouped together and can easily be located. This will greatly reduce the amount of time spent trying to locate files, as the uniform structure will provide consistency and help expedite data review. The grouping of files by date will also allow for the files to be more easily combined for data processing to create the Events and Results files necessary for upload of the data to SWQMIS.

PARTNER/CONTRACTOR QUESTIONNAIRE

Methods

As part of the Monitoring Efficiencies Analysis, each partner or contractor was asked to respond to a questionnaire regarding their monitoring programs. Questionnaires were sent to all partners/contractors in March 2020. A copy of the questionnaire is included below.

PARTNER QUESTIONNAIRE

1. Please describe your monitoring program (number of sites, frequency, parameters, etc.)
2. Why do you monitor the stations and/or parameters that you currently monitor?
3. How does participation in the Clean Rivers Program benefit your agency?
4. How do you feel the Clean Rivers Program benefits from your monitoring efforts?
5. Are there any monitoring activities that you are currently performing that you would like to discontinue (locations, parameters, frequency, etc.)? If so, why?
6. Are that any monitoring activities that you are not currently performing that you would like to add (locations, parameters, frequency, etc.)? If so, why?
7. What parameters (bacteria, nitrogen, phosphorus, total suspended solids, etc.) are your agency most interested in, and why?
8. What changes do you anticipate in your agency's monitoring program in the next year? 5 years? 10 years?
9. Are there any changes you'd like to see in the way H-GAC operates its Clean Rivers Program activities?
10. Are there any equipment or training needs that would help your agency better implement your monitoring program?

Results

Each partner/contractor submitted written responses to the questionnaire in April 2020 and the results were discussed at the Coordinated Monitoring Meeting that year.

These questionnaires provided information about each entity's monitoring program. This information included not only the number of monitoring stations and frequency of collection, but also assessed the parameters being collected (including any parameters that the partner would like to either add or discontinue for future project years).

H-GAC also assessed why each individual partner or contractor monitors the stations or parameters that are currently being monitored. This information was useful in evaluating any duplicate stations for overlap with different agencies.

H-GAC inquired about any changes that the partners expect over the next several years, as well as any changes that they would like to see with H-GAC's operation of the program.

Key findings by monitoring entity are included in Table 8. A consolidated response to the Questionnaire is in Appendix C. For the most part, H-GAC's monitoring partners want to maintain or increase current monitoring efforts, with no partners indicating a preference for a reduced monitoring regime. Partners also expressed interest in new monitoring equipment such as data sondes or flow measurement devices as a way to reduce repair and ongoing maintenance costs with the current equipment.

TABLE 8: Key Findings from Partner/Contractor Questionnaires

Partner/ Contractor	Key Findings
Environmental Institute of Houston	• Contracts to H-GAC to conduct monitoring at approximately 70 sites on a quarterly basis in Harris, Galveston, Matagorda, and Brazoria counties. • Their monitoring schedule is dependent on H-GAC's needs. • Performs occasional 24-hour DO and biological monitoring • Willing to add sites that H-GAC may need to have monitored
Harris County Pollution Control	• Partnership with H-GAC and CRP is to provide sound data to assist with making sure that our waterways are safe • Participation in CRP allows HCPC to monitor the impact of parameters on overall water quality • HCPC has the capability to assess sites in the Houston Ship Channel, San Jacinto River, Clear Lake, and side bays • Interested in adding collection for PCBs • Anticipates increasing capacity by adding new equipment (boat and laboratory equipment)
Houston Drinking Water	• Participate in CRP to support surface water plants and provide long-term baseline data • Participation allows for streamlining with other partners, QA/QC of data, and standardization of monitoring procedures • Interested in adding stations in the Trinity River due to expansion of drinking water facilities • Interested in parameters that affect drinking water quality (bacteria, nutrients, turbidity) • Would like additional training on conducting depth profiles
Houston-Galveston Area Council	• Conducts monitoring in areas where there are no active partners (mostly tributaries) • Looking for additional monitoring partners • Interested in acquiring new field monitoring equipment to reduce maintenance costs
Houston Health and Human Services	• Collects data from urban streams • Long term monitoring provides for extensive background data, including trends over time and seasonal effects • Additional staffing changes are expected over the next several years • Requested additional training opportunities • Planning to purchase additional monitoring equipment
San Jacinto River Authority	• Collects monthly sampling on Lake Conroe and quarterly monitoring in Lake Woodlands • Participation allows for monitoring water quality in Lake Conroe and sharing costs • Monitoring at Lake Woodlands allows for evaluation above and below two SJRA wastewater treatment facilities • SJRA is able to leverage CRP monitoring in promoting and discussing water quality in their water bodies, including recreational use and public water supply use • Would like to add flow monitoring at creek sites in The Woodlands • Would like to sample TKN and Chlorophyll-a at all sites
Texas Commission on Environmental Quality (Region 12)	• Collects samples at approximately 125 sites, including metals and organics at approximately 10-15 sites • TCEQ does not have the staffing capacity to collect at every site; CRP allows more data to be collected throughout the state • May need to reduce monitoring stations in the future due to staff reduction • Interested in collection of VOCs, SVOCs, PFAS, and organics (not collected by CRP partners)
Texas Research Institute for Environmental Studies	• Have an in-house laboratory to quickly and efficiently process samples • Participation provides for growth for TRIES through funding, training, and education programs • Allows for training of graduate students in SWQM procedures • Would like new flow monitoring equipment

SUMMARY

In FY 2020 and FY 2021, the Houston-Galveston Area Council examined aspects of its Clean Rivers Program to identify efficiencies that can be implemented for future project periods. This Monitoring Efficiencies Analysis examined not only the water quality monitoring activities associated with the program, but also the way that data is recorded and submitted to H-GAC by program partners and contractors. The goal of this project was to identify program efficiencies so that any potential cost savings can be used to fund future special study projects.

There were five major program areas assessed during the Monitoring Efficiencies Analysis. These areas were:

1. Monitoring Stations and Frequencies
2. Analysis of Historical Monitoring Data
3. Field Data Collection and Documentation
4. Data Submission and Processing
5. Partner/Contractor Questionnaire

One of the primary focuses of this study was to assure that TCEQ's data needs were being met by the program's current monitoring regime. While there were some areas where TCEQ would appreciate additional data for assessment (such as additional monitoring for TKN and Chlorophyll-*a*), the priority parameters requested by TCEQ's Assessment and Standards Development teams are being collected as necessary.

Program partners are satisfied with the current level of monitoring. While there are areas where some partners would like to increase monitoring (if funding was available), partners did not indicate a desire to reduce monitoring activities. This is also true for stations where there are multiple monitoring entities collecting samples, as these multiple partners have different monitoring priorities or are collecting different parameters of interest (such as metals and organics samples collected by the TCEQ regional offices).

Potential efficiencies were identified in the way that data were being processed and submitted to H-GAC for review, quality assurance/quality control, submission to TCEQ, and assessment and reporting. H-GAC, due to the size and scope of its monitoring program, processes a significant amount of water quality data. Data management is the area where the most useful efficiencies can be implemented, and future efforts will focus primarily on this area. As these efficiencies continue to be identified and solutions developed and implemented, these solutions will be shared with program partners through the Technical Advisory Group and Coordinated Monitoring Meetings.

MONITORING EFFICIENCIES ANALYSIS KEY FINDINGS

- TCEQ's data needs for assessment are being met.
- No major duplication of effort was identified.
- When duplication was identified, there were legitimate reasons (such as TCEQ collecting additional parameters).
- Current program partners did not want to reduce monitoring, even at stations where overlap was identified.
- Current methods of recording field data are cumbersome and can be improved by implementing technology-based solutions.
- A consistent file naming convention and file format would greatly improve the efficiency of processing monitoring data.
- New monitoring equipment (such as data sondes or flow measurement devices) could improve efficiencies by reducing the ongoing maintenance of older equipment.
- Additional training would be beneficial to program partners, especially those who have or who expect personnel turnover in their agencies.

APPENDICES

APPENDIX A - Historical Monitoring Data Analysis by Parameter and Assessment Unit

APPENDIX B - Field Data Spreadsheet

APPENDIX C - Clean Rivers Program Partners/Contractors Questionnaire Results (Consolidated)

APPENDIX A - Historical Monitoring Data Analysis by Parameter and Assessment Unit

TABLE A-1: Column Descriptors for Historical Monitoring Data Analysis

Item	Description
AU ID	This is the assessment unit assigned by TCEQ; all data in a given assessment unit is assumed to be representative of that stretch of water body, and is assessed for the biennial Integrated Report
SEGMENT NAME	The name given to the segment by TCEQ; the segment itself is defined in the Texas Administrative Code §§307.1 - 307.10
STATIONS IN AU	The number of monitoring stations on the current Coordinated Monitoring Schedule (CMS) in the assessment unit
IN BIG	Indicates in the AU is a part of the Bacteria Implementation Group (BIG
PAID SITES	The number of sampling sites that H-GAC collects or pays another CRP partner to collect
COLLECTORS	The organizations that collect samples in the AU (Current CMS)
PARAMETER	The parameter selected for analysis
GROUP	A category that includes parameters that bear on specific water body use designated by TCEQ (aquatic life or contact recreation/human health)
MINIMUM	The minimum value observed (2012 - 2018)
MEAN	The average value observed (2012 - 2018) [excludes bacteria - see geometric mean)
MEDIAN	The median value observed (2012 - 2018)
MAXIMUM	The maximum value observed (2012 - 2018)
BACTERIA GEOMETRIC MEAN	The geometric mean of bacteria results (2012 - 2018)
TREND	Trend (2012 - 2018). Based on Spearman Correlation. Trend = "Insufficient Data" if number of samples <20 Trend = "Stable" if p-value >0.05 and absolute value of correlation <0.1.
COLLECTORS IN AU (#)	The number of organizations collecting samples in the AU
SAMPLES	Samples available for trend analysis (2012 - 2018)
FREQUENCY PAST 7 YEARS	Average annual frequency of parameter collection in AU (2012 - 2018)
HG PAID	Indicates if H-GAC collects or pays for sampling by EIH or TRIES
HH PAID	Indicates that sampling by HH in this AU includes one of more stations that H-GAC pays City of Houston to collect.

AU ID	SEGMENT NAME	STATIONS IN AU	ANNUAL FREQUENCY IN AU	IN BIG	PAID SITES	COLLECTORS	PARAMETER	GROUP	MINIMUM	MEAN	MEDIAN	MAXIMUM	BACTERIA GEOMETRIC MEAN	TREND	COLLECTORS IN AU (#)	SAMPLES	FREQUENCY PAST 7 YEARS	HG PAID	HH PAID
0901_01	Cedar Bayou Tidal	3	12		2	FO UI	Enterococci	Bacteria	10		63	20000	89	Stable	2	80	11.4	Yes	
0901_01	Cedar Bayou Tidal	3	12		2	FO UI	Dissolved Oxygen	Dissolved Oxygen	3.4	6.72	6.2	14.5		Improving	2	91	13.0	Yes	
0901_01	Cedar Bayou Tidal	3	12		2	FO UI	Chlorophyll a	Nutrients/Chlorophyll	2.32	15.79	6	161		Stable	2	43	6.1	Yes	
0901_01	Cedar Bayou Tidal	3	12		2	FO UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.53	0.43	2.64		Stable	2	83	11.9	Yes	
0901_01	Cedar Bayou Tidal	3	12		2	FO UI	Total Nitrogen	Nutrients/Chlorophyll	0.435	2.38	1.885	14.77		Improving	2	72	10.3	Yes	
0901_01	Cedar Bayou Tidal	3	12		2	FO UI	Total Phosphorus	Nutrients/Chlorophyll	0.09	0.44	0.35	1.5		Stable	2	78	11.1	Yes	
0902_01	Cedar Bayou Above Tidal	3	12		2	FO UI	E. Coli	Bacteria	1		110	20000	131	Deteriorating	2	80	11.4	Yes	
0902_01	Cedar Bayou Above Tidal	3	12		2	FO UI	Dissolved Oxygen	Dissolved Oxygen	0.5	6.94	6.35	13.7		Improving	2	90	12.9	Yes	
0902_01	Cedar Bayou Above Tidal	3	12		2	FO UI	Chlorophyll a	Nutrients/Chlorophyll	0.43	5.38	3	47.3		Stable	2	44	6.3	Yes	
0902_01	Cedar Bayou Above Tidal	3	12		2	FO UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.34	0.19	2.97		Stable	2	81	11.6	Yes	
0902_01	Cedar Bayou Above Tidal	3	12		2	FO UI	Total Nitrogen	Nutrients/Chlorophyll	0.33	2.03	1.72	11.73		Stable	2	67	9.6	Yes	
0902_01	Cedar Bayou Above Tidal	3	12		2	FO UI	Total Phosphorus	Nutrients/Chlorophyll	0.04	0.41	0.24	2.2		Stable	2	77	11.0	Yes	
1002A_01	Tarkington Bayou	1	4		1	HG	E. Coli	Bacteria	8		115	1100	105	Stable	1	28	4.0	Yes	
1002A_01	Tarkington Bayou	1	4		1	HG	Dissolved Oxygen	Dissolved Oxygen	1.1	5.47	5.2	9.9		Stable	1	28	4.0	Yes	
1002A_01	Tarkington Bayou	1	4		1	HG	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.04	7.28	5.53	27.37		Stable	1	28	4.0	Yes	
1002A_01	Tarkington Bayou	1	4		1	HG	Total Nitrogen	Nutrients/Chlorophyll	1.25	10.07	9.745	30.37		Stable	1	28	4.0	Yes	
1002A_01	Tarkington Bayou	1	4		1	HG	Total Phosphorus	Nutrients/Chlorophyll	0.04	1.08	0.92	2.54		Stable	1	28	4.0	Yes	
1003A_01	Winters Bayou	5	20	Yes	5	HG TF	E. Coli	Bacteria	1		140	4400	121	Stable	2	47	6.7	Yes	
1003A_01	Winters Bayou	5	20	Yes	5	HG TF	Dissolved Oxygen	Dissolved Oxygen	0.8	7.10	7	10.7		Stable	2	57	8.1	Yes	
1003A_01	Winters Bayou	5	20	Yes	5	HG TF	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.38	0.115	4.2		Stable	2	58	8.3	Yes	
1003A_01	Winters Bayou	5	20	Yes	5	HG TF	Total Nitrogen	Nutrients/Chlorophyll	0.5	1.71	1.4	6.6		Stable	2	30	4.3	Yes	
1003A_01	Winters Bayou	5	20	Yes	5	HG TF	Total Phosphorus	Nutrients/Chlorophyll	0.03	0.24	0.1	1.92		Stable	2	58	8.3	Yes	
1003B_01	Nebletts Creek	1	4	Yes	1	TF	E. Coli	Bacteria	1		165	280	51	Insufficient Data	1	6	0.9	Yes	
1003B_01	Nebletts Creek	1	4	Yes	1	TF	Dissolved Oxygen	Dissolved Oxygen	7.4	8.63	8.3	10.8		Insufficient Data	1	9	1.3	Yes	
1003B_01	Nebletts Creek	1	4	Yes	1	TF	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.05	0.17	0.14	0.45		Insufficient Data	1	9	1.3	Yes	
1003B_01	Nebletts Creek	1	4	Yes	1	TF	Total Nitrogen	Nutrients/Chlorophyll	1.93	1.93	1.93	1.93		Insufficient Data	1	1	0.1	Yes	
1003B_01	Nebletts Creek	1	4	Yes	1	TF	Total Phosphorus	Nutrients/Chlorophyll	0.04	0.05	0.04	0.11		Insufficient Data	1	9	1.3	Yes	
1003C_01	Boswell Creek	1	4	Yes	1	TF	E. Coli	Bacteria	74		295	2000	336	Insufficient Data	1	4	0.6	Yes	
1003C_01	Boswell Creek	1	4	Yes	1	TF	Dissolved Oxygen	Dissolved Oxygen	5.7	8.09	8.6	9.8		Insufficient Data	1	7	1.0	Yes	
1003C_01	Boswell Creek	1	4	Yes	1	TF	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.05	0.22	0.05	1.24		Insufficient Data	1	7	1.0	Yes	
1003C_01	Boswell Creek	1	4	Yes	1	TF	Total Nitrogen	Nutrients/Chlorophyll	1.455	1.46	1.455	1.455		Insufficient Data	1	1	0.1	Yes	
1003C_01	Boswell Creek	1	4	Yes	1	TF	Total Phosphorus	Nutrients/Chlorophyll	0.04	0.08	0.04	0.18		Insufficient Data	1	7	1.0	Yes	
1003_01	East Fork San Jacinto River	2	10	Yes	1	HW TF	E. Coli	Bacteria	2		150	22000	201	Stable	2	47	6.7	Yes	
1003_01	East Fork San Jacinto River	2	10	Yes	1	HW TF	Dissolved Oxygen	Dissolved Oxygen	5.9	8.00	7.6	10.5		Stable	2	50	7.1	Yes	
1003_01	East Fork San Jacinto River	2	10	Yes	1	HW TF	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.04	0.27	0.17	4.7		Deteriorating	2	50	7.1	Yes	
1003_01	East Fork San Jacinto River	2	10	Yes	1	HW TF	Total Nitrogen	Nutrients/Chlorophyll	1.4	1.40	1.4	1.4		Insufficient Data	2	1	0.1	Yes	
1003_01	East Fork San Jacinto River	2	10	Yes	1	HW TF	Total Phosphorus	Nutrients/Chlorophyll	0.04	0.14	0.12	0.33		Stable	2	50	7.1	Yes	
1003_02	East Fork San Jacinto River	4	18	Yes	3	HW TF	E. Coli	Bacteria	24		130	10000	158	Stable	2	61	8.7	Yes	
1003_02	East Fork San Jacinto River	4	18	Yes	3	HW TF	Dissolved Oxygen	Dissolved Oxygen	2.7	7.80	7.7	11.2		Stable	2	70	10.0	Yes	
1003_02	East Fork San Jacinto River	4	18	Yes	3	HW TF	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.12	0.06	1.34		Deteriorating	2	70	10.0	Yes	
1003_02	East Fork San Jacinto River	4	18	Yes	3	HW TF	Total Nitrogen	Nutrients/Chlorophyll	0.27	1.57	2.14	2.47		Insufficient Data	2	5	0.7	Yes	
1003_02	East Fork San Jacinto River	4	18	Yes	3	HW TF	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.11	0.08	0.84		Stable	2	70	10.0	Yes	
1003_03	East Fork San Jacinto River	1	4	Yes	1	HG	E. Coli	Bacteria	10		340	10000	325	Stable	1	23	3.3	Yes	
1003_03	East Fork San Jacinto River	1	4	Yes	1	HG	Dissolved Oxygen	Dissolved Oxygen	3.5	6.71	6.6	9.9		Stable	1	21	3.0	Yes	
1003_03	East Fork San Jacinto River	1	4	Yes	1	HG	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.11	0.04	0.51		Stable	1	23	3.3	Yes	
1003_03	East Fork San Jacinto River	1	4	Yes	1	HG	Total Nitrogen	Nutrients/Chlorophyll	0.27	2.05	1.7	7.44		Improving	1	21	3.0	Yes	
1003_03	East Fork San Jacinto River	1	4	Yes	1	HG	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.43	0.25	1.84		Deteriorating	1	23	3.3	Yes	
1004J_01	White Oak Creek	1	4	Yes	1	HG	E. Coli	Bacteria	220		3900	24000	3184	Stable	1	26	3.7	Yes	
1004J_01	White Oak Creek	1	4	Yes	1	HG	Dissolved Oxygen	Dissolved Oxygen	6.6	8.25	8.05	10.2		Stable	1	26	3.7	Yes	
1004J_01	White Oak Creek	1	4	Yes	1	HG	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.04	1.40	1.585	2		Stable	1	26	3.7	Yes	
1004J_01	White Oak Creek	1	4	Yes	1	HG	Total Nitrogen	Nutrients/Chlorophyll	0.92	2.62	2.61	4.23		Stable	1	26	3.7	Yes	
1004J_01	White Oak Creek	1	4	Yes	1	HG	Total Phosphorus	Nutrients/Chlorophyll	0.03	0.26	0.195	1.19		Deteriorating	1	26	3.7	Yes	
1006D_01	Halls Bayou	4	24	Yes	4	HH	E. Coli	Bacteria	5		390	58000	504	Stable	1	252	36.0		Yes
1006D_01	Halls Bayou	4	24	Yes	4	HH	Dissolved Oxygen	Dissolved Oxygen	0.7	7.09	6.9	13.5		Stable	1	249	35.6		Yes
1006D_01	Halls Bayou	4	24	Yes	4	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	1.26	6.85	6.525	26.8		Improving	1	252	36.0		Yes
1006D_01	Halls Bayou	4	24	Yes	4	HH	Total Phosphorus	Nutrients/Chlorophyll	0.5	1.82	1.585	5.07		Improving	1	252	36.0		Yes
1006_03	Houston Ship Channel Tidal	4	17		1	FO HH	Enterococci	Bacteria	10		85	9800	78	Improving	2	85	12.1		Yes
1006_03	Houston Ship Channel Tidal	4	17		1	FO HH	Dissolved Oxygen	Dissolved Oxygen	0.4	6.58	6.5	11.9		Stable	2	171	24.4		Yes
1006_03	Houston Ship Channel Tidal	4	17		1	FO HH	Chlorophyll a	Nutrients/Chlorophyll	0.92	10.10	4.22	85		Stable	2	47	6.7		Yes
1006_03	Houston Ship Channel Tidal	4	17		1	FO HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.4	5.14	4.62	14.1		Stable	2	174	24.9		Yes
1006_03	Houston Ship Channel Tidal	4	17		1	FO HH	Total Nitrogen	Nutrients/Chlorophyll	1.66	5.36	5.09	13.13		Stable	2	41	5.9		Yes
1006_03	Houston Ship Channel Tidal	4	17		1	FO HH	Total Phosphorus	Nutrients/Chlorophyll	0.27	1.22	1.075	3.58		Improving	2	170	24.3		Yes
1007B_01	Brays Bayou Above Tidal	9	54	Yes	7	HH	E. Coli	Bacteria	10		1500	130000	1582	Stable	1	570	81.4		Yes
1007B_01	Brays Bayou Above Tidal	9	54	Yes	7	HH	Dissolved Oxygen	Dissolved Oxygen	2.5	10.04	10.1	16.8		Stable	1	567	81.0		Yes
1007B_01	Brays Bayou Above Tidal	9	54	Yes	7	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.04	6.14	6.15	16.6		Improving	1	569	81.3		Yes
1007B_01	Brays Bayou Above Tidal	9	54	Yes	7	HH	Total Phosphorus	Nutrients/Chlorophyll	0.08	1.24	1.195	2.94		Stable	1	570	81.4		Yes
1007B_02	Brays Bayou Above Tidal	1	6	Yes	1	HH	E. Coli	Bacteria	10		360	24000	481	Deteriorating	1	63	9.0		Yes
1007B_02	Brays Bayou Above Tidal	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	3.7	8.19	7.85	15.9		Stable	1	62	8.9		Yes
1007B_02	Brays Bayou Above Tidal	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.46	9.73	9.37	19.8		Stable	1	63	9.0		Yes
1007B_02	Brays Bayou Above Tidal	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.73	2.22	2.36	4.2		Improving	1	63	9.0		Yes
1007D_01	Sims Bayou Above Tidal	2	12	Yes	1	HH	E. Coli	Bacteria	8		435	120000	568	Stable	1	124	17.7		Yes
1007D_01	Sims Bayou Above Tidal	2	12	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	3.2	8.26	8	13.8		Stable	1	122	17.4		Yes
1007D_01	Sims Bayou Above Tidal	2	12	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	2.14	0.385	14.7		Stable	1	124	17.7		Yes
1007D_01	Sims Bayou Above Tidal	2	12	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.77	0.21	7.82		Stable	1	124	17.7		Yes
1007D_02	Sims Bayou Above Tidal	2	12	Yes	2	HH	E. Coli	Bacteria	37		660	140000	808	Stable	1	126	18.0		Yes
1007D_02	Sims Bayou Above Tidal	2	12	Yes	2	HH	Dissolved Oxygen	Dissolved Oxygen	4.2	10.50	10.6	18.1		Stable	1	123	17.6		Yes
1007D_02	Sims Bayou Above Tidal	2	12	Yes	2	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.26	3.55	2.91	12.1		Stable	1	126	18.0		Yes
1007D_02	Sims Bayou Above Tidal	2	12	Yes	2	HH	Total Phosphorus	Nutrients/Chlorophyll	0.16	1.50	1.24	6		Stable	1	126	18.0		Yes
1007D_03	Sims Bayou Above Tidal	3	18	Yes	2	HH	E. Coli	Bacteria	10		995	61000	958	Improving	1	186	26.6		Yes
1007D_03	Sims Bayou Above Tidal	3	18	Yes	2	HH	Dissolved Oxygen	Dissolved Oxygen	2.4	7.57	7.2	16.6		Improving	1	185	26.4		Yes
1007D_03	Sims Bayou Above Tidal	3	18	Yes	2	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.27	4.21	3.83	10.8		Improving	1	189	27.0		Yes
1007D_03	Sims Bayou Above Tidal	3	18	Yes	2	HH	Total Phosphorus	Nutrients/Chlorophyll	0.25	1.96	1.65	8		Improving	1	189	27.0		Yes
1007R_02	Hunting Bayou Above Tidal	1	6	Yes	1	HH	E. Coli	Bacteria	10		370	24000	481	Stable	1	63	9.0		Yes

AU ID	SEGMENT NAME	STATIONS IN AU	ANNUAL FREQUENCY IN AU	IN BIG	PAID SITES	COLLECTORS	PARAMETER	GROUP	MINIMUM	MEAN	MEDIAN	MAXIMUM	BACTERIA GEOMETRIC MEAN	TREND	COLLECTORS IN AU (#)	SAMPLES	FREQUENCY PAST 7 YEARS	HG PAID	HH PAID
1007R_02	Hunting Bayou Above Tidal	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	2.1	6.35	5.9	19.3		Stable	1	62	8.9		Yes
1007R_02	Hunting Bayou Above Tidal	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.11	0.04	0.67		Deteriorating	1	63	9.0		Yes
1007R_02	Hunting Bayou Above Tidal	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.09	0.08	0.26		Stable	1	63	9.0		Yes
1007R_03	Hunting Bayou Above Tidal	2	12	Yes	1	HH	E. Coli	Bacteria	2		510	200000	511	Stable	1	126	18.0		Yes
1007R_03	Hunting Bayou Above Tidal	2	12	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	0	6.74	6.65	13.4		Stable	1	124	17.7		Yes
1007R_03	Hunting Bayou Above Tidal	2	12	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	1.33	0.515	9.47		Stable	1	126	18.0		Yes
1007R_03	Hunting Bayou Above Tidal	2	12	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.03	0.23	0.155	0.92		Stable	1	126	18.0		Yes
1007R_04	Hunting Bayou Above Tidal	1	6	Yes	1	HH	E. Coli	Bacteria	75		2300	29000	1772	Improving	1	62	8.9		Yes
1007R_04	Hunting Bayou Above Tidal	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	3.9	7.42	7.45	12.8		Improving	1	62	8.9		Yes
1007R_04	Hunting Bayou Above Tidal	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.26	1.66	1.29	5.39		Stable	1	63	9.0		Yes
1007R_04	Hunting Bayou Above Tidal	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.09	0.26	0.22	0.6		Stable	1	63	9.0		Yes
1007W_01	Harris County Flood Control Ditch D 1	1	6	Yes	1	HH	E. Coli	Bacteria	10		490	240000	569	Stable	1	60	8.6		Yes
1007W_01	Harris County Flood Control Ditch D 1	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	1.3	4.91	4.4	13		Stable	1	59	8.4		Yes
1007W_01	Harris County Flood Control Ditch D 1	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.19	0.145	0.72		Stable	1	60	8.6		Yes
1007W_01	Harris County Flood Control Ditch D 1	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.03	0.21	0.14	1.5		Stable	1	60	8.6		Yes
1007_02	Houston Ship Channel/Buffalo Bayou	2	16		2	FO HH	Enterococci	Bacteria	10		62.5	24000	82	Improving	2	144	20.6		Yes
1007_02	Houston Ship Channel/Buffalo Bayou	2	16		2	FO HH	Dissolved Oxygen	Dissolved Oxygen	2.5	6.18	6	13.2		Stable	2	149	21.3		Yes
1007_02	Houston Ship Channel/Buffalo Bayou	2	16		2	FO HH	Chlorophyll a	Nutrients/Chlorophyll	1.01	36.20	6.44	555		Stable	2	27	3.9		Yes
1007_02	Houston Ship Channel/Buffalo Bayou	2	16		2	FO HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.4	4.01	3.89	13.4		Stable	2	152	21.7		Yes
1007_02	Houston Ship Channel/Buffalo Bayou	2	16		2	FO HH	Total Nitrogen	Nutrients/Chlorophyll	2.84	7.55	7.03	17.51		Stable	2	20	2.9		Yes
1007_02	Houston Ship Channel/Buffalo Bayou	2	16		2	FO HH	Total Phosphorus	Nutrients/Chlorophyll	0.19	1.24	1.14	3.51		Stable	2	147	21.0		Yes
1007_03	Houston Ship Channel/Buffalo Bayou	2	10		1	FO HH	Enterococci	Bacteria	10		10	7300	27	Improving	2	86	12.3		Yes
1007_03	Houston Ship Channel/Buffalo Bayou	2	10		1	FO HH	Dissolved Oxygen	Dissolved Oxygen	1.7	6.00	5.6	11.5		Stable	2	86	12.3		Yes
1007_03	Houston Ship Channel/Buffalo Bayou	2	10		1	FO HH	Chlorophyll a	Nutrients/Chlorophyll	0.56	2.48	2.08	5.49		Stable	2	24	3.4		Yes
1007_03	Houston Ship Channel/Buffalo Bayou	2	10		1	FO HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.23	1.17	1.03	4.6		Stable	2	86	12.3		Yes
1007_03	Houston Ship Channel/Buffalo Bayou	2	10		1	FO HH	Total Nitrogen	Nutrients/Chlorophyll	1.25	2.74	2.71	4.08		Insufficient Data	2	19	2.7		Yes
1007_03	Houston Ship Channel/Buffalo Bayou	2	10		1	FO HH	Total Phosphorus	Nutrients/Chlorophyll	0.06	0.27	0.24	0.65		Improving	2	83	11.9		Yes
1007_04	Houston Ship Channel/Buffalo Bayou	3	22		3	FO HH	Enterococci	Bacteria	10		75	65000	97	Stable	2	135	19.3		Yes
1007_04	Houston Ship Channel/Buffalo Bayou	3	22		3	FO HH	Dissolved Oxygen	Dissolved Oxygen	0.5	8.29	7.65	17.2		Stable	2	212	30.3		Yes
1007_04	Houston Ship Channel/Buffalo Bayou	3	22		3	FO HH	Chlorophyll a	Nutrients/Chlorophyll	1.96	11.37	7.39	71.6		Stable	2	27	3.9		Yes
1007_04	Houston Ship Channel/Buffalo Bayou	3	22		3	FO HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.9	5.18	5.05	11.6		Stable	2	215	30.7		Yes
1007_04	Houston Ship Channel/Buffalo Bayou	3	22		3	FO HH	Total Nitrogen	Nutrients/Chlorophyll	2.21	6.44	6.195	13.11		Stable	2	22	3.1		Yes
1007_04	Houston Ship Channel/Buffalo Bayou	3	22		3	FO HH	Total Phosphorus	Nutrients/Chlorophyll	0.08	1.02	0.995	2.22		Stable	2	210	30.0		Yes
1007_07	Houston Ship Channel/Buffalo Bayou	3	26		1	FO HC HH	Enterococci	Bacteria	10		63	24000	85	Stable	3	192	27.4		Yes
1007_07	Houston Ship Channel/Buffalo Bayou	3	26		1	FO HC HH	Dissolved Oxygen	Dissolved Oxygen	1.6	6.07	6.1	11.76		Stable	3	191	27.3		Yes
1007_07	Houston Ship Channel/Buffalo Bayou	3	26		1	FO HC HH	Chlorophyll a	Nutrients/Chlorophyll	1.38	7.58	3.45	55.1		Stable	3	68	9.7		Yes
1007_07	Houston Ship Channel/Buffalo Bayou	3	26		1	FO HC HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.2	4.17	3.875	15		Improving	3	194	27.7		Yes
1007_07	Houston Ship Channel/Buffalo Bayou	3	26		1	FO HC HH	Total Nitrogen	Nutrients/Chlorophyll	1.334	6.86	7.2	16.55		Stable	3	59	8.4		Yes
1007_07	Houston Ship Channel/Buffalo Bayou	3	26		1	FO HC HH	Total Phosphorus	Nutrients/Chlorophyll	0.2	0.88	0.84	2.02		Improving	3	189	27.0		Yes
1007_08	Houston Ship Channel/Buffalo Bayou	1	6		1	HH	Enterococci	Bacteria	10		96	1900	95	Stable	1	21	3.0		Yes
1007_08	Houston Ship Channel/Buffalo Bayou	1	6		1	HH	Dissolved Oxygen	Dissolved Oxygen	6.3	8.83	8.8	11		Improving	1	61	8.7		Yes
1007_08	Houston Ship Channel/Buffalo Bayou	1	6		1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.13	5.15	1.51	26.8		Stable	1	63	9.0		Yes
1007_08	Houston Ship Channel/Buffalo Bayou	1	6		1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.12	2.77	2.66	7.7		Stable	1	63	9.0		Yes
1009C_01	Faulkey Gully	1	6	Yes	1	HH	E. Coli	Bacteria	10		200	69000	256	Improving	1	63	9.0		Yes
1009C_01	Faulkey Gully	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	4.3	9.49	8.95	16.9		Improving	1	60	8.6		Yes
1009C_01	Faulkey Gully	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.65	9.75	10.3	23.1		Improving	1	63	9.0		Yes
1009C_01	Faulkey Gully	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.38	2.44	2.44	5.31		Improving	1	63	9.0		Yes
1009D_01	Spring Gully	1	6	Yes	1	HH	E. Coli	Bacteria	4		225	92000	255	Improving	1	62	8.9		Yes
1009D_01	Spring Gully	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	4.9	9.00	8.9	13.3		Improving	1	60	8.6		Yes
1009D_01	Spring Gully	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.54	7.84	7.305	19		Stable	1	62	8.9		Yes
1009D_01	Spring Gully	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.23	2.20	2.13	6.54		Stable	1	62	8.9		Yes
1009E_01	Little Cypress Creek	2	10	Yes	2	HG HH	E. Coli	Bacteria	10		215	31000	199	Stable	2	92	13.1	Yes	Yes
1009E_01	Little Cypress Creek	2	10	Yes	2	HG HH	Dissolved Oxygen	Dissolved Oxygen	1.7	7.26	7.4	11.9		Improving	2	87	12.4	Yes	Yes
1009E_01	Little Cypress Creek	2	10	Yes	2	HG HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.04	3.94	1.88	19.9		Stable	2	92	13.1	Yes	Yes
1009E_01	Little Cypress Creek	2	10	Yes	2	HG HH	Total Nitrogen	Nutrients/Chlorophyll	1.21	3.41	2.37	15.94		Stable	2	22	3.1	Yes	Yes
1009E_01	Little Cypress Creek	2	10	Yes	2	HG HH	Total Phosphorus	Nutrients/Chlorophyll	0.21	1.31	0.79	7.23		Improving	2	92	13.1	Yes	Yes
1009_01	Cypress Creek	2	10	Yes	2	HG HH	E. Coli	Bacteria	5		250	26000	238	Stable	2	89	12.7	Yes	Yes
1009_01	Cypress Creek	2	10	Yes	2	HG HH	Dissolved Oxygen	Dissolved Oxygen	1.8	6.67	6.15	12		Improving	2	84	12.0	Yes	Yes
1009_01	Cypress Creek	2	10	Yes	2	HG HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	3.45	0.97	17.1		Stable	2	89	12.7	Yes	Yes
1009_01	Cypress Creek	2	10	Yes	2	HG HH	Total Nitrogen	Nutrients/Chlorophyll	1.03	2.52	2.19	9.4		Insufficient Data	2	17	2.4	Yes	Yes
1009_01	Cypress Creek	2	10	Yes	2	HG HH	Total Phosphorus	Nutrients/Chlorophyll	0.12	1.36	0.55	7.05		Stable	2	89	12.7	Yes	Yes
1009_02	Cypress Creek	2	12	Yes	2	HH	E. Coli	Bacteria	37		310	49000	376	Stable	1	126	18.0		Yes
1009_02	Cypress Creek	2	12	Yes	2	HH	Dissolved Oxygen	Dissolved Oxygen	3.5	7.68	7.9	11.6		Improving	1	121	17.3		Yes
1009_02	Cypress Creek	2	12	Yes	2	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.1	5.01	4.82	13.5		Improving	1	126	18.0		Yes
1009_02	Cypress Creek	2	12	Yes	2	HH	Total Phosphorus	Nutrients/Chlorophyll	0.24	1.52	1.515	4.12		Improving	1	126	18.0		Yes
1009_03	Cypress Creek	2	12	Yes	1	HH HW	E. Coli	Bacteria	15		410	65000	459	Stable	2	103	14.7		Yes
1009_03	Cypress Creek	2	12	Yes	1	HH HW	Dissolved Oxygen	Dissolved Oxygen	4.7	8.11	8	11.2		Improving	2	101	14.4		Yes
1009_03	Cypress Creek	2	12	Yes	1	HH HW	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.04	5.83	5.31	15.4		Improving	2	103	14.7		Yes
1009_03	Cypress Creek	2	12	Yes	1	HH HW	Total Phosphorus	Nutrients/Chlorophyll	0.03	1.63	1.65	3.96		Improving	2	103	14.7		Yes
1010C_01	Spring Branch	1	4	Yes	1	HG	E. Coli	Bacteria	1		120	24000	114	Stable	1	29	4.1	Yes	
1010C_01	Spring Branch	1	4	Yes	1	HG	Dissolved Oxygen	Dissolved Oxygen	1.3	5.31	5.7	12		Stable	1	29	4.1	Yes	
1010C_01	Spring Branch	1	4	Yes	1	HG	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.15	0.1	1.2		Stable	1	29	4.1	Yes	
1010C_01	Spring Branch	1	4	Yes	1	HG	Total Nitrogen	Nutrients/Chlorophyll	0.29	1.93	1.82	3.72		Improving	1	25	3.6	Yes	
1010C_01	Spring Branch	1	4	Yes	1	HG	Total Phosphorus	Nutrients/Chlorophyll	0.06	0.36	0.25	1.68		Deteriorating	1	29	4.1	Yes	
1010_02	Caney Creek	2	10	Yes	1	HG HW	E. Coli	Bacteria	12		160	7700	186	Stable	2	69	9.9	Yes	
1010_02	Caney Creek	2	10	Yes	1	HG HW	Dissolved Oxygen	Dissolved Oxygen	3.7	7.54	7.3	10.6		Improving	2	69	9.9	Yes	
1010_02	Caney Creek	2	10	Yes	1	HG HW	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.32	0.28	0.73		Deteriorating	2	69	9.9	Yes	
1010_02	Caney Creek	2	10	Yes	1	HG HW	Total Nitrogen	Nutrients/Chlorophyll	0.41	1.61	1.27	4.19		Improving	2	22	3.1	Yes	
1010_02	Caney Creek	2	10	Yes	1	HG HW	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.15	0.1	0.69		Deteriorating	2	69	9.9	Yes	
1010_03	Caney Creek	1	4	Yes	1	HG	E. Coli	Bacteria	10		150	6500	200	Stable	1	29	4.1	Yes	
1010_03	Caney Creek	1	4	Yes	1	HG	Dissolved Oxygen	Dissolved Oxygen	6	8.21	7.5	12.8		Stable	1	29	4.1	Yes	
1010_03	Caney Creek	1	4	Yes	1	HG	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.13	0.39	0.37	0.9		Deteriorating	1	29	4.1	Yes	
1010_03	Caney Creek	1	4	Yes	1	HG	Total Nitrogen	Nutrients/Chlorophyll	0.52	1.84	1.63	4.09		Stable	1	29	4.1	Yes	

AU ID	SEGMENT NAME	STATIONS IN AU	ANNUAL FREQUENCY IN AU	IN BIG	PAID SITES	COLLECTORS	PARAMETER	GROUP	MINIMUM	MEAN	MEDIAN	MAXIMUM	BACTERIA GEOMETRIC MEAN	TREND	COLLECTORS IN AU (#)	SAMPLES	FREQUENCY PAST 7 YEARS	HG PAID	HH PAID
1010_03	Caney Creek	1	4	Yes	1	HG	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.36	0.12	2.43		Deteriorating	1	29	4.1	Yes	
1010_04	Caney Creek	2	14	Yes	1	FO HG HW	E. Coli	Bacteria	10		160	24000	178	Stable	3	93	13.3	Yes	
1010_04	Caney Creek	2	14	Yes	1	FO HG HW	Dissolved Oxygen	Dissolved Oxygen	5.7	8.59	8.4	13.7		Stable	3	95	13.6	Yes	
1010_04	Caney Creek	2	14	Yes	1	FO HG HW	Chlorophyll a	Nutrients/Chlorophyll	0.26	1.93	1.26	12.3		Stable	3	23	3.3	Yes	
1010_04	Caney Creek	2	14	Yes	1	FO HG HW	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.03	0.44	0.34	7.23		Deteriorating	3	95	13.6	Yes	
1010_04	Caney Creek	2	14	Yes	1	FO HG HW	Total Nitrogen	Nutrients/Chlorophyll	0.145	1.52	1.12	5.85		Stable	3	43	6.1	Yes	
1010_04	Caney Creek	2	14	Yes	1	FO HG HW	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.23	0.1	6.51		Deteriorating	3	93	13.3	Yes	
1011_01	Peach Creek	3	16	Yes	1	HG HW	E. Coli	Bacteria	1		140	17000	149	Stable	2	111	15.9	Yes	
1011_01	Peach Creek	3	16	Yes	1	HG HW	Dissolved Oxygen	Dissolved Oxygen	5.9	8.04	7.7	12		Stable	2	110	15.7	Yes	
1011_01	Peach Creek	3	16	Yes	1	HG HW	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.03	0.15	0.13	0.8		Deteriorating	2	110	15.7	Yes	
1011_01	Peach Creek	3	16	Yes	1	HG HW	Total Nitrogen	Nutrients/Chlorophyll	0.58	1.70	1.48	4.13		Improving	2	22	3.1	Yes	
1011_01	Peach Creek	3	16	Yes	1	HG HW	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.13	0.06	2.92		Deteriorating	2	110	15.7	Yes	
1013_01	Buffalo Bayou Tidal	4	28	Yes	2	FO HH	Enterococci	Bacteria	10		155	24000	192	Stable	2	250	35.7		Yes
1013_01	Buffalo Bayou Tidal	4	28	Yes	2	FO HH	Dissolved Oxygen	Dissolved Oxygen	2.7	6.85	7	10.6		Improving	2	246	35.1		Yes
1013_01	Buffalo Bayou Tidal	4	28	Yes	2	FO HH	Chlorophyll a	Nutrients/Chlorophyll	3.45	7.69	6.91	12.3		Insufficient Data	2	6	0.9		Yes
1013_01	Buffalo Bayou Tidal	4	28	Yes	2	FO HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.11	4.03	3.555	11		Stable	2	258	36.9		Yes
1013_01	Buffalo Bayou Tidal	4	28	Yes	2	FO HH	Total Nitrogen	Nutrients/Chlorophyll	1.912	5.51	5.56	8.54		Insufficient Data	2	5	0.7		Yes
1013_01	Buffalo Bayou Tidal	4	28	Yes	2	FO HH	Total Phosphorus	Nutrients/Chlorophyll	0.19	0.87	0.825	2.12		Stable	2	258	36.9		Yes
1014A_01	Bear Creek	1	6	Yes	1	HH	E. Coli	Bacteria	10		270	16000	256	Deteriorating	1	63	9.0		Yes
1014A_01	Bear Creek	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	4.4	8.22	8.1	13.3		Stable	1	62	8.9		Yes
1014A_01	Bear Creek	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.13	9.23	9.66	20.8		Improving	1	63	9.0		Yes
1014A_01	Bear Creek	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.11	2.18	2.36	4.62		Improving	1	63	9.0		Yes
1014B_01	Buffalo Bayou/Barker Reservoir	2	10	Yes	2	HG HH	E. Coli	Bacteria	1		260	41000	263	Stable	2	92	13.1	Yes	Yes
1014B_01	Buffalo Bayou/Barker Reservoir	2	10	Yes	2	HG HH	Dissolved Oxygen	Dissolved Oxygen	5.1	7.83	7.6	12.1		Stable	2	89	12.7	Yes	Yes
1014B_01	Buffalo Bayou/Barker Reservoir	2	10	Yes	2	HG HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.19	6.60	6.63	21.5		Stable	2	92	13.1	Yes	Yes
1014B_01	Buffalo Bayou/Barker Reservoir	2	10	Yes	2	HG HH	Total Nitrogen	Nutrients/Chlorophyll	3.17	10.23	9.62	23		Improving	2	29	4.1	Yes	Yes
1014B_01	Buffalo Bayou/Barker Reservoir	2	10	Yes	2	HG HH	Total Phosphorus	Nutrients/Chlorophyll	0.07	1.39	1.265	13.1		Stable	2	92	13.1	Yes	Yes
1014C_01	Horsepen Creek	1	4	Yes	1	HG	E. Coli	Bacteria	59		295	21000	437	Stable	1	28	4.0	Yes	
1014C_01	Horsepen Creek	1	4	Yes	1	HG	Dissolved Oxygen	Dissolved Oxygen	3.7	6.13	5.8	9.8		Stable	1	26	3.7	Yes	
1014C_01	Horsepen Creek	1	4	Yes	1	HG	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.04	7.74	6.63	19.64		Stable	1	28	4.0	Yes	
1014C_01	Horsepen Creek	1	4	Yes	1	HG	Total Nitrogen	Nutrients/Chlorophyll	1.8	11.13	11.27	22.21		Stable	1	21	3.0	Yes	
1014C_01	Horsepen Creek	1	4	Yes	1	HG	Total Phosphorus	Nutrients/Chlorophyll	0.03	1.30	1.23	3.44		Stable	1	28	4.0	Yes	
1014E_01	Langham Creek	1	6	Yes	1	HH	E. Coli	Bacteria	10		360	24000	313	Stable	1	63	9.0		Yes
1014E_01	Langham Creek	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	3.6	7.83	8	10.8		Improving	1	62	8.9		Yes
1014E_01	Langham Creek	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.94	9.66	9.62	22.2		Improving	1	63	9.0		Yes
1014E_01	Langham Creek	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.26	2.26	2.46	5.16		Improving	1	63	9.0		Yes
1014H_02	South Mayde Creek	1	6	Yes	1	HH	E. Coli	Bacteria	10		630	200000	678	Stable	1	63	9.0		Yes
1014H_02	South Mayde Creek	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	2.1	6.35	6.4	11.1		Improving	1	62	8.9		Yes
1014H_02	South Mayde Creek	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.5	8.38	9.24	18.2		Stable	1	63	9.0		Yes
1014H_02	South Mayde Creek	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.24	2.21	2.38	5.41		Improving	1	63	9.0		Yes
1014K_01	Turkey Creek	1	6	Yes	1	HH	E. Coli	Bacteria	26		480	41000	554	Stable	1	63	9.0		Yes
1014K_01	Turkey Creek	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	3.1	7.32	7.1	13.6		Stable	1	63	9.0		Yes
1014K_01	Turkey Creek	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	1.58	0.89	7.38		Stable	1	63	9.0		Yes
1014K_01	Turkey Creek	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.13	0.40	0.36	0.87		Stable	1	63	9.0		Yes
1014L_01	Mason Creek	1	6	Yes	1	HH	E. Coli	Bacteria	10		340	18000	427	Stable	1	63	9.0		Yes
1014L_01	Mason Creek	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	3.4	7.60	7.6	12.2		Stable	1	62	8.9		Yes
1014L_01	Mason Creek	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.44	9.87	9.54	23.2		Improving	1	63	9.0		Yes
1014L_01	Mason Creek	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.48	2.75	2.62	6.11		Improving	1	63	9.0		Yes
1014_01	Buffalo Bayou Above Tidal	10	62	Yes	8	FO HH	E. Coli	Bacteria	10		575	49000	679	Stable	2	616	88.0		Yes
1014_01	Buffalo Bayou Above Tidal	10	62	Yes	8	FO HH	Dissolved Oxygen	Dissolved Oxygen	0.3	7.38	7.2	12.4		Stable	2	616	88.0		Yes
1014_01	Buffalo Bayou Above Tidal	10	62	Yes	8	FO HH	Chlorophyll a	Nutrients/Chlorophyll	1.28	8.41	6.93	32.1		Deteriorating	2	51	7.3		Yes
1014_01	Buffalo Bayou Above Tidal	10	62	Yes	8	FO HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	5.54	5.72	18.4		Improving	2	617	88.1		Yes
1014_01	Buffalo Bayou Above Tidal	10	62	Yes	8	FO HH	Total Nitrogen	Nutrients/Chlorophyll	1.1	6.80	7.10625	15.16		Stable	2	40	5.7		Yes
1014_01	Buffalo Bayou Above Tidal	10	62	Yes	8	FO HH	Total Phosphorus	Nutrients/Chlorophyll	0.1	1.21	1.215	3.08		Improving	2	610	87.1		Yes
1015A_01	Mound Creek	1	4	Yes	1	HG	E. Coli	Bacteria	31		200	1100	196	Stable	1	26	3.7	Yes	
1015A_01	Mound Creek	1	4	Yes	1	HG	Dissolved Oxygen	Dissolved Oxygen	5.8	7.41	7	10.5		Stable	1	27	3.9	Yes	
1015A_01	Mound Creek	1	4	Yes	1	HG	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.05	0.35	0.305	1.51		Deteriorating	1	26	3.7	Yes	
1015A_01	Mound Creek	1	4	Yes	1	HG	Total Nitrogen	Nutrients/Chlorophyll	0.71	1.98	1.6	5.28		Improving	1	26	3.7	Yes	
1015A_01	Mound Creek	1	4	Yes	1	HG	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.28	0.11	1.68		Deteriorating	1	26	3.7	Yes	
1015_01	Lake Creek	1	4	Yes	1	HG	E. Coli	Bacteria	10		97	5500	113	Stable	1	55	7.9	Yes	
1015_01	Lake Creek	1	4	Yes	1	HG	Dissolved Oxygen	Dissolved Oxygen	2.2	6.66	6.5	10.5		Improving	1	55	7.9	Yes	
1015_01	Lake Creek	1	4	Yes	1	HG	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.13	0.07	1.36		Stable	1	55	7.9	Yes	
1015_01	Lake Creek	1	4	Yes	1	HG	Total Nitrogen	Nutrients/Chlorophyll	0.37	1.75	1.57	7.09		Improving	1	44	6.3	Yes	
1015_01	Lake Creek	1	4	Yes	1	HG	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.30	0.19	2.07		Deteriorating	1	55	7.9	Yes	
1015_02	Lake Creek	1	4		1	HG	E. Coli	Bacteria	150		500	860	401	Insufficient Data	1	3	0.4	Yes	
1015_02	Lake Creek	1	4		1	HG	Dissolved Oxygen	Dissolved Oxygen	4.5	6.63	5.5	9.9		Insufficient Data	1	3	0.4	Yes	
1015_02	Lake Creek	1	4		1	HG	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.14	0.21	0.22	0.26		Insufficient Data	1	3	0.4	Yes	
1015_02	Lake Creek	1	4		1	HG	Total Phosphorus	Nutrients/Chlorophyll	0.16	0.35	0.32	0.56		Insufficient Data	1	3	0.4	Yes	
1016_01	Greens Bayou Above Tidal	2	12	Yes	2	HH	E. Coli	Bacteria	5		250	120000	284	Stable	1	126	18.0		Yes
1016_01	Greens Bayou Above Tidal	2	12	Yes	2	HH	Dissolved Oxygen	Dissolved Oxygen	3.6	8.22	8.1	18		Stable	1	122	17.4		Yes
1016_01	Greens Bayou Above Tidal	2	12	Yes	2	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.3	7.16	7.59	16.4		Deteriorating	1	126	18.0		Yes
1016_01	Greens Bayou Above Tidal	2	12	Yes	2	HH	Total Phosphorus	Nutrients/Chlorophyll	0.02	1.48	1.445	3.78		Stable	1	126	18.0		Yes
1016_02	Greens Bayou Above Tidal	2	12	Yes	1	HH	E. Coli	Bacteria	10		695	24000	661	Stable	1	126	18.0		Yes
1016_02	Greens Bayou Above Tidal	2	12	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	3.5	8.19	8.1	13.3		Stable	1	122	17.4		Yes
1016_02	Greens Bayou Above Tidal	2	12	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.33	6.61	6.73	14.2		Stable	1	126	18.0		Yes
1016_02	Greens Bayou Above Tidal	2	12	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.07	1.57	1.55	3.24		Stable	1	126	18.0		Yes
1016_03	Greens Bayou Above Tidal	2	16	Yes	2	FO HH	E. Coli	Bacteria	10		200	29000	316	Deteriorating	2	149	21.3		Yes
1016_03	Greens Bayou Above Tidal	2	16	Yes	2	FO HH	Dissolved Oxygen	Dissolved Oxygen	5.2	8.04	8	13.1		Stable	2	150	21.4		Yes
1016_03	Greens Bayou Above Tidal	2	16	Yes	2	FO HH	Chlorophyll a	Nutrients/Chlorophyll	0.61	2.97	2.215	7.54		Stable	2	26	3.7		Yes
1016_03	Greens Bayou Above Tidal	2	16	Yes	2	FO HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.37	6.59	6.795	15.4		Stable	2	152	21.7		Yes
1016_03	Greens Bayou Above Tidal	2	16	Yes	2	FO HH	Total Nitrogen	Nutrients/Chlorophyll	3.26	8.20	7.74	14.3945		Stable	2	22	3.1		Yes
1016_03	Greens Bayou Above Tidal	2	16	Yes	2	FO HH	Total Phosphorus	Nutrients/Chlorophyll	0.02	1.53	1.5	4.15		Improving	2	150	21.4		Yes
1017C_01	Vogel Creek	1	6	Yes	1	HH	E. Coli	Bacteria	10		195	24000	165	Stable	1	60	8.6		Yes

AU ID	SEGMENT NAME	STATIONS IN AU	ANNUAL FREQUENCY IN AU	IN BIG	PAID SITES	COLLECTORS	PARAMETER	GROUP	MINIMUM	MEAN	MEDIAN	MAXIMUM	BACTERIA GEOMETRIC MEAN	TREND	COLLECTORS IN AU (#)	SAMPLES	FREQUENCY PAST 7 YEARS	HG PAID	HH PAID
1017C_01	Vogel Creek	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	2.5	7.83	7.3	12.5		Improving	1	59	8.4		Yes
1017C_01	Vogel Creek	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.76	5.38	5.025	11.7		Stable	1	60	8.6		Yes
1017C_01	Vogel Creek	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.45	1.56	1.555	3.13		Stable	1	60	8.6		Yes
1017_01	Whiteoak Bayou Above Tidal	2	12	Yes	1	HH	E. Coli	Bacteria	8		215	14000	221	Stable	1	126	18.0		Yes
1017_01	Whiteoak Bayou Above Tidal	2	12	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	3.7	8.29	8.4	13.1		Stable	1	123	17.6		Yes
1017_01	Whiteoak Bayou Above Tidal	2	12	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.09	10.77	10.7	22.7		Improving	1	126	18.0		Yes
1017_01	Whiteoak Bayou Above Tidal	2	12	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.06	2.54	2.6	4.38		Improving	1	126	18.0		Yes
1017_02	Whiteoak Bayou Above Tidal	1	6	Yes	1	HH	E. Coli	Bacteria	15		370	24000	564	Stable	1	63	9.0		Yes
1017_02	Whiteoak Bayou Above Tidal	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	4	7.20	7.1	11.7		Stable	1	62	8.9		Yes
1017_02	Whiteoak Bayou Above Tidal	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	1.22	8.19	8.36	15.7		Improving	1	63	9.0		Yes
1017_02	Whiteoak Bayou Above Tidal	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.48	2.04	2.08	3.68		Improving	1	63	9.0		Yes
1017_03	Whiteoak Bayou Above Tidal	1	6	Yes	1	HH	E. Coli	Bacteria	71		860	73000	1247	Stable	1	63	9.0		Yes
1017_03	Whiteoak Bayou Above Tidal	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	6.7	9.04	9	11.4		Stable	1	63	9.0		Yes
1017_03	Whiteoak Bayou Above Tidal	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	1.06	6.32	6.22	12.9		Stable	1	63	9.0		Yes
1017_03	Whiteoak Bayou Above Tidal	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.3	1.14	1.08	2.72		Stable	1	63	9.0		Yes
1103A_01	Bensons Bayou	1	4		1	UI	Enterococci	Bacteria	10		95	12000	167	Improving	1	33	4.7	Yes	
1103A_01	Bensons Bayou	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	1	5.12	4.8	11.1		Stable	1	31	4.4	Yes	
1103A_01	Bensons Bayou	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.11	0.06	0.77		Stable	1	33	4.7	Yes	
1103A_01	Bensons Bayou	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.22	1.86	1.77	4.27		Improving	1	21	3.0	Yes	
1103A_01	Bensons Bayou	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.04	0.18	0.15	0.42		Stable	1	33	4.7	Yes	
1103B_01	Bordens Gully	1	4		1	UI	Enterococci	Bacteria	10		120	24000	165	Improving	1	42	6.0	Yes	
1103B_01	Bordens Gully	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	2	5.05	4.5	9.5		Stable	1	47	6.7	Yes	
1103B_01	Bordens Gully	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.13	0.07	1.28		Stable	1	49	7.0	Yes	
1103B_01	Bordens Gully	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.51	1.75	1.62	3.97		Improving	1	43	6.1	Yes	
1103B_01	Bordens Gully	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.17	0.13	0.75		Stable	1	49	7.0	Yes	
1103C_01	Geisler Bayou	1	4		1	UI	Enterococci	Bacteria	10		140	13000	190	Stable	1	33	4.7	Yes	
1103C_01	Geisler Bayou	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	1.8	5.23	5.2	10.9		Stable	1	31	4.4	Yes	
1103C_01	Geisler Bayou	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.10	0.05	0.82		Deteriorating	1	33	4.7	Yes	
1103C_01	Geisler Bayou	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.61	2.01	1.695	3.82		Insufficient Data	1	18	2.6	Yes	
1103C_01	Geisler Bayou	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.04	0.20	0.16	0.76		Deteriorating	1	33	4.7	Yes	
1103D_01	Gum Bayou	1	4		1	UI	Enterococci	Bacteria	10		53	24000	91	Stable	1	28	4.0	Yes	
1103D_01	Gum Bayou	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	3.9	7.02	7	10.6		Stable	1	26	3.7	Yes	
1103D_01	Gum Bayou	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.11	0.04	0.48		Stable	1	28	4.0	Yes	
1103D_01	Gum Bayou	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.64	1.79	1.62	3.78		Improving	1	26	3.7	Yes	
1103D_01	Gum Bayou	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.06	0.35	0.2	3.25		Stable	1	28	4.0	Yes	
1103E_01	Cedar Creek	1	4		1	UI	E. Coli	Bacteria	32		190	14000	289	Deteriorating	1	27	3.9	Yes	
1103E_01	Cedar Creek	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	2	5.57	5.2	10.3		Stable	1	27	3.9	Yes	
1103E_01	Cedar Creek	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.12	0.04	2		Stable	1	28	4.0	Yes	
1103E_01	Cedar Creek	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.83	1.95	1.765	4.4		Insufficient Data	1	18	2.6	Yes	
1103E_01	Cedar Creek	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.04	0.23	0.145	0.93		Deteriorating	1	28	4.0	Yes	
1103G_01	Unnamed Tributary of Gum Bayou	1	4		1	UI	Enterococci	Bacteria	10		340	49000	502	Stable	1	28	4.0	Yes	
1103G_01	Unnamed Tributary of Gum Bayou	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	2.4	6.06	5.35	10		Stable	1	26	3.7	Yes	
1103G_01	Unnamed Tributary of Gum Bayou	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.12	0.075	0.69		Stable	1	28	4.0	Yes	
1103G_01	Unnamed Tributary of Gum Bayou	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.62	3.13	1.82	24.53		Insufficient Data	1	19	2.7	Yes	
1103G_01	Unnamed Tributary of Gum Bayou	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.04	0.23	0.165	1.4		Stable	1	28	4.0	Yes	
1103_01	Dickinson Bayou Tidal	1	4		1	UI	Enterococci	Bacteria	10		30.5	10000	45	Stable	1	28	4.0	Yes	
1103_01	Dickinson Bayou Tidal	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	4.1	7.73	7.3	11.2		Stable	1	25	3.6	Yes	
1103_01	Dickinson Bayou Tidal	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.08	0.05	0.36		Stable	1	28	4.0	Yes	
1103_01	Dickinson Bayou Tidal	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.54	1.44	1.24	3.03		Stable	1	23	3.3	Yes	
1103_01	Dickinson Bayou Tidal	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.07	0.36	0.24	2.65		Deteriorating	1	28	4.0	Yes	
1103_04	Dickinson Bayou Tidal	2	8		1	FO UI	Enterococci	Bacteria	10		90.5	9200	96	Stable	2	54	7.7	Yes	
1103_04	Dickinson Bayou Tidal	2	8		1	FO UI	Dissolved Oxygen	Dissolved Oxygen	1.8	4.98	4.4	12.3		Stable	2	53	7.6	Yes	
1103_04	Dickinson Bayou Tidal	2	8		1	FO UI	Chlorophyll a	Nutrients/Chlorophyll	1.37	22.65	6.375	402		Stable	2	26	3.7	Yes	
1103_04	Dickinson Bayou Tidal	2	8		1	FO UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.15	0.06	1.98		Deteriorating	2	54	7.7	Yes	
1103_04	Dickinson Bayou Tidal	2	8		1	FO UI	Total Nitrogen	Nutrients/Chlorophyll	0.3344	1.32	1.0525	3.63		Stable	2	38	5.4	Yes	
1103_04	Dickinson Bayou Tidal	2	8		1	FO UI	Total Phosphorus	Nutrients/Chlorophyll	0.03	0.19	0.13	0.79		Stable	2	51	7.3	Yes	
1105A_03	Flores Bayou	1	4		1	UI	E. Coli	Bacteria	1		98	7900	120	Stable	1	27	3.9	Yes	
1105A_03	Flores Bayou	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	3.6	6.48	6.4	9.5		Stable	1	28	4.0	Yes	
1105A_03	Flores Bayou	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.23	0.15	1.04		Stable	1	28	4.0	Yes	
1105A_03	Flores Bayou	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.42	2.24	2.08	4.54		Improving	1	20	2.9	Yes	
1105A_03	Flores Bayou	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.06	0.36	0.215	2.83		Stable	1	28	4.0	Yes	
1105B_01	Austin Bayou Tidal	2	8		2	UI	Enterococci	Bacteria	10		46.5	36000	62	Stable	1	56	8.0	Yes	
1105B_01	Austin Bayou Tidal	2	8		2	UI	Dissolved Oxygen	Dissolved Oxygen	3	6.94	7.15	10.9		Stable	1	54	7.7	Yes	
1105B_01	Austin Bayou Tidal	2	8		2	UI	Chlorophyll a	Nutrients/Chlorophyll	3	8.33	5	41		Stable	1	33	4.7	Yes	
1105B_01	Austin Bayou Tidal	2	8		2	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.18	0.065	1.34		Stable	1	56	8.0	Yes	
1105B_01	Austin Bayou Tidal	2	8		2	UI	Total Nitrogen	Nutrients/Chlorophyll	0.27	1.98	1.675	4.63		Improving	1	47	6.7	Yes	
1105B_01	Austin Bayou Tidal	2	8		2	UI	Total Phosphorus	Nutrients/Chlorophyll	0.04	0.32	0.185	2.58		Deteriorating	1	56	8.0	Yes	
1105C_01	Austin Bayou Above Tidal	1	4		1	UI	E. Coli	Bacteria	10		200	7300	247	Stable	1	27	3.9	Yes	
1105C_01	Austin Bayou Above Tidal	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	4.8	7.26	6.95	9.8		Stable	1	28	4.0	Yes	
1105C_01	Austin Bayou Above Tidal	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.23	0.125	1.93		Stable	1	28	4.0	Yes	
1105C_01	Austin Bayou Above Tidal	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.48	1.83	1.5275	4.63		Stable	1	26	3.7	Yes	
1105C_01	Austin Bayou Above Tidal	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.06	0.33	0.205	2.7		Stable	1	28	4.0	Yes	
1105D_01	Unnamed Tributary of Bastrop Creek	1	4		1	UI	E. Coli	Bacteria	1		52	6900	70	Stable	1	27	3.9	Yes	
1105D_01	Unnamed Tributary of Bastrop Creek	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	1.8	6.21	6.3	11.2		Improving	1	39	5.6	Yes	
1105D_01	Unnamed Tributary of Bastrop Creek	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.16	0.065	1.14		Stable	1	28	4.0	Yes	
1105D_01	Unnamed Tributary of Bastrop Creek	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.77	1.95	1.6875	3.66		Improving	1	24	3.4	Yes	
1105D_01	Unnamed Tributary of Bastrop Creek	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.03	0.19	0.16	0.8		Stable	1	28	4.0	Yes	
1105E_01	Brushy Bayou	1	4		1	UI	E. Coli	Bacteria	41		109	7700	198	Insufficient Data	1	14	2.0	Yes	
1105E_01	Brushy Bayou	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	3.7	7.36	7.1	11.2		Insufficient Data	1	14	2.0	Yes	
1105E_01	Brushy Bayou	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.04	0.18	0.08	1.16		Insufficient Data	1	14	2.0	Yes	
1105E_01	Brushy Bayou	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.59	2.23	2.235	3.79		Insufficient Data	1	8	1.1	Yes	
1105E_01	Brushy Bayou	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.06	0.27	0.15	1.43		Insufficient Data	1	14	2.0	Yes	
1105_01	Bastrop Bayou Tidal	5	20		4	FO UI	Enterococci	Bacteria	10		41	9800	47	Stable	2	133	19.0	Yes	
1105_01	Bastrop Bayou Tidal	5	20		4	FO UI	Dissolved Oxygen	Dissolved Oxygen	1	6.59	6.7	11.5		Stable	2	130	18.6	Yes	

AU ID	SEGMENT NAME	STATIONS IN AU	ANNUAL FREQUENCY IN AU	IN BIG	PAID SITES	COLLECTORS	PARAMETER	GROUP	MINIMUM	MEAN	MEDIAN	MAXIMUM	BACTERIA GEOMETRIC MEAN	TREND	COLLECTORS IN AU (#)	SAMPLES	FREQUENCY PAST 7 YEARS	HG PAID	HH PAID
1105_01	Bastrop Bayou Tidal	5	20		4	FO UI	Chlorophyll a	Nutrients/Chlorophyll	0.52	13.22	10	53.4		Stable	2	50	7.1	Yes	
1105_01	Bastrop Bayou Tidal	5	20		4	FO UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.23	0.04	8.09		Deteriorating	2	138	19.7	Yes	
1105_01	Bastrop Bayou Tidal	5	20		4	FO UI	Total Nitrogen	Nutrients/Chlorophyll	0.555	1.94	1.74	8.54		Stable	2	87	12.4	Yes	
1105_01	Bastrop Bayou Tidal	5	20		4	FO UI	Total Phosphorus	Nutrients/Chlorophyll	0.06	0.35	0.23	2.8		Deteriorating	2	135	19.3	Yes	
1107_01	Chocolate Bayou Tidal	2	8		2	UI	Enterococci	Bacteria	10		74	29000	92	Stable	1	73	10.4	Yes	
1107_01	Chocolate Bayou Tidal	2	8		2	UI	Dissolved Oxygen	Dissolved Oxygen	3.8	7.07	7.1	11.4		Stable	1	75	10.7	Yes	
1107_01	Chocolate Bayou Tidal	2	8		2	UI	Chlorophyll a	Nutrients/Chlorophyll	2.9	12.59	7	44.5		Stable	1	47	6.7	Yes	
1107_01	Chocolate Bayou Tidal	2	8		2	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.28	0.11	4.08		Stable	1	77	11.0	Yes	
1107_01	Chocolate Bayou Tidal	2	8		2	UI	Total Nitrogen	Nutrients/Chlorophyll	0.33	1.81	1.525	4.705		Stable	1	64	9.1	Yes	
1107_01	Chocolate Bayou Tidal	2	8		2	UI	Total Phosphorus	Nutrients/Chlorophyll	0.04	0.29	0.239	1.5		Stable	1	75	10.7	Yes	
1109_01	Oyster Creek Tidal	2	8		1	FO UI	Enterococci	Bacteria	10		63	2900	61	Stable	2	51	7.3	Yes	
1109_01	Oyster Creek Tidal	2	8		1	FO UI	Dissolved Oxygen	Dissolved Oxygen	1.4	6.04	6	11.33		Stable	2	55	7.9	Yes	
1109_01	Oyster Creek Tidal	2	8		1	FO UI	Chlorophyll a	Nutrients/Chlorophyll	3.72	13.06	11.1	42.4		Stable	2	23	3.3	Yes	
1109_01	Oyster Creek Tidal	2	8		1	FO UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.68	0.29	5.3		Deteriorating	2	55	7.9	Yes	
1109_01	Oyster Creek Tidal	2	8		1	FO UI	Total Nitrogen	Nutrients/Chlorophyll	0.525	2.05	1.605	6.3		Stable	2	43	6.1	Yes	
1109_01	Oyster Creek Tidal	2	8		1	FO UI	Total Phosphorus	Nutrients/Chlorophyll	0.06	0.41	0.32	1.3		Stable	2	53	7.6	Yes	
1110_02	Oyster Creek Above Tidal	1	12		1	UI	E. Coli	Bacteria	41		230	1800	206	Insufficient Data	1	11	1.6	Yes	
1110_02	Oyster Creek Above Tidal	1	12		1	UI	Dissolved Oxygen	Dissolved Oxygen	3.4	5.61	5.3	8.8		Insufficient Data	1	11	1.6	Yes	
1110_02	Oyster Creek Above Tidal	1	12		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.1	0.46	0.43	1.01		Insufficient Data	1	6	0.9	Yes	
1110_02	Oyster Creek Above Tidal	1	12		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.49	0.95	1.15	1.22		Insufficient Data	1	3	0.4	Yes	
1110_02	Oyster Creek Above Tidal	1	12		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.23	0.75	0.805	1.03		Insufficient Data	1	6	0.9	Yes	
1113A_01	Armand Bayou Above Tidal	2	12	Yes	2	HH	E. Coli	Bacteria	10		115	55000	154	Stable	1	124	17.7		Yes
1113A_01	Armand Bayou Above Tidal	2	12	Yes	2	HH	Dissolved Oxygen	Dissolved Oxygen	2.4	7.03	6.55	17.7		Stable	1	122	17.4		Yes
1113A_01	Armand Bayou Above Tidal	2	12	Yes	2	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.25	0.11	7.23		Stable	1	125	17.9		Yes
1113A_01	Armand Bayou Above Tidal	2	12	Yes	2	HH	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.13	0.09	1.22		Improving	1	125	17.9		Yes
1113C_01	Unnamed Tributary to Horsepen Bayo	1	6	Yes	1	HH	E. Coli	Bacteria	10		100	32000	153	Stable	1	63	9.0		Yes
1113C_01	Unnamed Tributary to Horsepen Bayo	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	3.2	9.55	9.3	18.7		Stable	1	62	8.9		Yes
1113C_01	Unnamed Tributary to Horsepen Bayo	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.16	0.14	0.48		Stable	1	63	9.0		Yes
1113C_01	Unnamed Tributary to Horsepen Bayo	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.04	0.02	0.24		Stable	1	63	9.0		Yes
1113D_01	Willow Springs Bayou	1	6	Yes	1	HH	E. Coli	Bacteria	19		520	58000	614	Stable	1	63	9.0		Yes
1113D_01	Willow Springs Bayou	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	7.1	17.25	16.9	26.1		Stable	1	61	8.7		Yes
1113D_01	Willow Springs Bayou	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.09	0.02	0.54		Stable	1	63	9.0		Yes
1113D_01	Willow Springs Bayou	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.05	0.03	0.22		Stable	1	63	9.0		Yes
1113E_01	Big Island Slough	1	6	Yes	1	HH	E. Coli	Bacteria	10		220	32000	229	Stable	1	63	9.0		Yes
1113E_01	Big Island Slough	1	6	Yes	1	HH	Dissolved Oxygen	Dissolved Oxygen	3.5	8.23	7.5	17.8		Stable	1	61	8.7		Yes
1113E_01	Big Island Slough	1	6	Yes	1	HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.08	0.07	0.29		Stable	1	63	9.0		Yes
1113E_01	Big Island Slough	1	6	Yes	1	HH	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.05	0.04	0.24		Stable	1	63	9.0		Yes
1113_01	Armand Bayou Tidal	2	10	Yes	1	HC UI	Enterococci	Bacteria	10		10	14000	13	Stable	2	42	6.0	Yes	
1113_01	Armand Bayou Tidal	2	10	Yes	1	HC UI	Dissolved Oxygen	Dissolved Oxygen	5.6	8.70	8.2	14.6		Stable	2	42	6.0	Yes	
1113_01	Armand Bayou Tidal	2	10	Yes	1	HC UI	Chlorophyll a	Nutrients/Chlorophyll	3	15.89	14	49		Deteriorating	2	27	3.9	Yes	
1113_01	Armand Bayou Tidal	2	10	Yes	1	HC UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.04	0.45	0.34	1.93		Stable	2	40	5.7	Yes	
1113_01	Armand Bayou Tidal	2	10	Yes	1	HC UI	Total Nitrogen	Nutrients/Chlorophyll	0.56	2.07	1.77	4.44		Improving	2	25	3.6	Yes	
1113_01	Armand Bayou Tidal	2	10	Yes	1	HC UI	Total Phosphorus	Nutrients/Chlorophyll	0.17	0.39	0.38	0.66		Improving	2	42	6.0	Yes	
1113_02	Armand Bayou Tidal	1	10	Yes	1	FO HH	Enterococci	Bacteria	10		20	7700	27	Stable	2	84	12.0		Yes
1113_02	Armand Bayou Tidal	1	10	Yes	1	FO HH	Dissolved Oxygen	Dissolved Oxygen	3.3	8.70	8.15	23.7		Stable	2	84	12.0		Yes
1113_02	Armand Bayou Tidal	1	10	Yes	1	FO HH	Chlorophyll a	Nutrients/Chlorophyll	2.47	47.52	41.55	130		Stable	2	26	3.7		Yes
1113_02	Armand Bayou Tidal	1	10	Yes	1	FO HH	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.41	0.22	2.83		Improving	2	89	12.7		Yes
1113_02	Armand Bayou Tidal	1	10	Yes	1	FO HH	Total Nitrogen	Nutrients/Chlorophyll	0.76	1.63	1.4775	3.056		Stable	2	20	2.9		Yes
1113_02	Armand Bayou Tidal	1	10	Yes	1	FO HH	Total Phosphorus	Nutrients/Chlorophyll	0.05	0.28	0.225	0.86		Improving	2	86	12.3		Yes
1301_01	San Bernard River Tidal	2	8		1	FO UI	Enterococci	Bacteria	10		41	2400	55	Stable	2	54	7.7	Yes	
1301_01	San Bernard River Tidal	2	8		1	FO UI	Dissolved Oxygen	Dissolved Oxygen	2.7	6.78	6.6	12.4		Stable	2	57	8.1	Yes	
1301_01	San Bernard River Tidal	2	8		1	FO UI	Chlorophyll a	Nutrients/Chlorophyll	0.92	11.97	5.225	43.3		Stable	2	34	4.9	Yes	
1301_01	San Bernard River Tidal	2	8		1	FO UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.35	0.22	2.14		Deteriorating	2	57	8.1	Yes	
1301_01	San Bernard River Tidal	2	8		1	FO UI	Total Nitrogen	Nutrients/Chlorophyll	0.49	1.84	1.6425	4.8		Stable	2	42	6.0	Yes	
1301_01	San Bernard River Tidal	2	8		1	FO UI	Total Phosphorus	Nutrients/Chlorophyll	0.11	0.42	0.29	2.4		Stable	2	55	7.9	Yes	
1302B_01	West Bernard Creek	1	4		1	UI	E. Coli	Bacteria	31		150	24000	231	Stable	1	26	3.7	Yes	
1302B_01	West Bernard Creek	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	3.8	6.35	5.9	11.5		Improving	1	34	4.9	Yes	
1302B_01	West Bernard Creek	1	4		1	UI	Chlorophyll a	Nutrients/Chlorophyll	1.44	4.41	3.5	9		Insufficient Data	1	6	0.9	Yes	
1302B_01	West Bernard Creek	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.38	0.19	2.63		Stable	1	27	3.9	Yes	
1302B_01	West Bernard Creek	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.6	1.94	1.555	5.53		Stable	1	25	3.6	Yes	
1302B_01	West Bernard Creek	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.1	0.48	0.27	2.43		Stable	1	27	3.9	Yes	
1302D_01	Peach Creek	1	4		1	UI	E. Coli	Bacteria	1		140	10000	118	Stable	1	27	3.9	Yes	
1302D_01	Peach Creek	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	2.9	4.96	4.75	9.7		Stable	1	26	3.7	Yes	
1302D_01	Peach Creek	1	4		1	UI	Chlorophyll a	Nutrients/Chlorophyll	3	3.50	3	5		Insufficient Data	1	6	0.9	Yes	
1302D_01	Peach Creek	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.26	0.13	1.61		Deteriorating	1	27	3.9	Yes	
1302D_01	Peach Creek	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.47	1.65	1.335	4.46		Stable	1	22	3.1	Yes	
1302D_01	Peach Creek	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.13	0.61	0.35	2.65		Stable	1	27	3.9	Yes	
1302E_01	Mound Creek	1	4		1	UI	E. Coli	Bacteria	10		275	26000	241	Stable	1	28	4.0	Yes	
1302E_01	Mound Creek	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	0.6	4.18	3.2	9.6		Stable	1	27	3.9	Yes	
1302E_01	Mound Creek	1	4		1	UI	Chlorophyll a	Nutrients/Chlorophyll	3	4.50	3	11		Insufficient Data	1	6	0.9	Yes	
1302E_01	Mound Creek	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.27	0.1	2.38		Stable	1	28	4.0	Yes	
1302E_01	Mound Creek	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.47	1.89	1.735	4.08		Stable	1	26	3.7	Yes	
1302E_01	Mound Creek	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.05	0.43	0.27	1.79		Stable	1	28	4.0	Yes	
1302_03	San Bernard River Above Tidal	2	8		1	FO UI	E. Coli	Bacteria	8		150	16000	153	Stable	2	51	7.3	Yes	
1302_03	San Bernard River Above Tidal	2	8		1	FO UI	Dissolved Oxygen	Dissolved Oxygen	1.9	5.99	5.55	12		Improving	2	52	7.4	Yes	
1302_03	San Bernard River Above Tidal	2	8		1	FO UI	Chlorophyll a	Nutrients/Chlorophyll	1.05	7.30	3.44	34.3		Stable	2	32	4.6	Yes	
1302_03	San Bernard River Above Tidal	2	8		1	FO UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.30	0.08	6.2		Stable	2	53	7.6	Yes	
1302_03	San Bernard River Above Tidal	2	8		1	FO UI	Total Nitrogen	Nutrients/Chlorophyll	0.625	1.90	1.2775	10.67		Stable	2	36	5.1	Yes	
1302_03	San Bernard River Above Tidal	2	8		1	FO UI	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.23	0.15	0.93		Deteriorating	2	49	7.0	Yes	
1304_01	Caney Creek Tidal	2	8		1	FO UI	Enterococci	Bacteria	10		31	1900	50	Stable	2	24	3.4	Yes	
1304_01	Caney Creek Tidal	2	8		1	FO UI	Dissolved Oxygen	Dissolved Oxygen	2.9	6.96	6.8	11		Stable	2	27	3.9	Yes	
1304_01	Caney Creek Tidal	2	8		1	FO UI	Chlorophyll a	Nutrients/Chlorophyll	1	13.58	8.71	94.8		Stable	2	28	4.0	Yes	
1304_01	Caney Creek Tidal	2	8		1	FO UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.42	0.04745	2.53		Stable	2	28	4.0	Yes	
1304_01	Caney Creek Tidal	2	8		1	FO UI	Total Nitrogen	Nutrients/Chlorophyll	0.76	1.57	1.075	3.76		Stable	2	20	2.9	Yes	

AU ID	SEGMENT NAME	STATIONS IN AU	ANNUAL FREQUENCY IN AU	IN BIG	PAID SITES	COLLECTORS	PARAMETER	GROUP	MINIMUM	MEAN	MEDIAN	MAXIMUM	BACTERIA GEOMETRIC MEAN	TREND	COLLECTORS IN AU (#)	SAMPLES	FREQUENCY PAST 7 YEARS	HG PAID	HH PAID
1304_01	Caney Creek Tidal	2	8		1	FO UI	Total Phosphorus	Nutrients/Chlorophyll	0.15	0.38	0.39	0.76		Stable	2	27	3.9	Yes	
1304_02	Caney Creek Tidal	1	4		1	UI	Enterococci	Bacteria	10		52	930	47	Stable	1	22	3.1	Yes	
1304_02	Caney Creek Tidal	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	3.2	6.13	5.85	8.8		Improving	1	22	3.1	Yes	
1304_02	Caney Creek Tidal	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.40	0.115	2.15		Stable	1	22	3.1	Yes	
1304_02	Caney Creek Tidal	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.21	1.77	1.765	3.4		Insufficient Data	1	14	2.0	Yes	
1304_02	Caney Creek Tidal	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.09	0.49	0.385	1.74		Stable	1	22	3.1	Yes	
1305A_01	Hardeman Slough	1	4		1	UI	E. Coli	Bacteria	1		110	530	60	Stable	1	23	3.3	Yes	
1305A_01	Hardeman Slough	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	0.7	4.72	4.3	8.7		Stable	1	23	3.3	Yes	
1305A_01	Hardeman Slough	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.25	0.15	1.91		Stable	1	23	3.3	Yes	
1305A_01	Hardeman Slough	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.58	1.75	1.255	5.16		Insufficient Data	1	14	2.0	Yes	
1305A_01	Hardeman Slough	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.07	0.50	0.31	2.34		Stable	1	23	3.3	Yes	
1305_01	Caney Creek Above Tidal	1	4		1	UI	E. Coli	Bacteria	1		78	830	51	Insufficient Data	1	12	1.7	Yes	
1305_01	Caney Creek Above Tidal	1	4		1	UI	Dissolved Oxygen	Dissolved Oxygen	4.1	5.93	5.95	8		Insufficient Data	1	12	1.7	Yes	
1305_01	Caney Creek Above Tidal	1	4		1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.04	0.31	0.1	1.2		Insufficient Data	1	7	1.0	Yes	
1305_01	Caney Creek Above Tidal	1	4		1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.42	1.26	0.97	2.4		Insufficient Data	1	3	0.4	Yes	
1305_01	Caney Creek Above Tidal	1	4		1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.07	0.57	0.43	1.55		Insufficient Data	1	7	1.0	Yes	
2431A_01	Moses Bayou	2			2	UI	E. Coli	Bacteria	22		275	24000	452	Stable	1	28	4.0	Yes	
2431A_01	Moses Bayou	2			2	UI	Enterococci	Bacteria	10		43.5	10000	57	Stable	1	28	4.0	Yes	
2431A_01	Moses Bayou	2			2	UI	Dissolved Oxygen	Dissolved Oxygen	2.4	6.78	6.75	13.9		Improving	1	56	8.0	Yes	
2431A_01	Moses Bayou	2			2	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.09	0.04	0.71		Stable	1	56	8.0	Yes	
2431A_01	Moses Bayou	2			2	UI	Total Nitrogen	Nutrients/Chlorophyll	0.49	1.75	1.57	3.82		Improving	1	31	4.4	Yes	
2431A_01	Moses Bayou	2			2	UI	Total Phosphorus	Nutrients/Chlorophyll	0.02	0.25	0.16	1.35		Stable	1	56	8.0	Yes	
2431C_01	Unnamed Tributary to the Southern A	1			1	UI	Enterococci	Bacteria	10		41	14000	67	Stable	1	28	4.0	Yes	
2431C_01	Unnamed Tributary to the Southern A	1			1	UI	Dissolved Oxygen	Dissolved Oxygen	3.1	6.83	6.45	12.8		Stable	1	28	4.0	Yes	
2431C_01	Unnamed Tributary to the Southern A	1			1	UI	Nitrate/Nitrite+Nitrite-N	Nutrients/Chlorophyll	0.02	0.07	0.04	0.2		Stable	1	28	4.0	Yes	
2431C_01	Unnamed Tributary to the Southern A	1			1	UI	Total Nitrogen	Nutrients/Chlorophyll	0.36	1.61	1.57	2.84		Insufficient Data	1	17	2.4	Yes	
2431C_01	Unnamed Tributary to the Southern A	1			1	UI	Total Phosphorus	Nutrients/Chlorophyll	0.07	0.24	0.18	1.04		Stable	1	28	4.0	Yes	

AU	PARAMETER	CORRELATION COEFFICIENT	P-VALUE	N
?	?	?	?	?
0901_01	Chlorophyll a	0.218	0.160	43
0901_01	Dissolved Oxygen	0.265	0.011	91
0901_01	Enterococci	-0.180	0.109	80
0901_01	Nitrate/Nitrite+Nitrite-N	-0.134	0.227	83
0901_01	Total Nitrogen	-0.241	0.041	72
0901_01	Total Phosphorus	-0.051	0.659	78
0902_01	Chlorophyll a	-0.083	0.592	44
0902_01	Dissolved Oxygen	0.287	0.006	90
0902_01	E. Coli	0.217	0.053	80
0902_01	Nitrate/Nitrite+Nitrite-N	0.066	0.558	81
0902_01	Total Nitrogen	-0.092	0.460	67
0902_01	Total Phosphorus	-0.088	0.445	77
1002A_01	Dissolved Oxygen	-0.139	0.480	28
1002A_01	E. Coli	0.157	0.426	28
1002A_01	Nitrate/Nitrite+Nitrite-N	-0.109	0.580	28
1002A_01	Total Nitrogen	-0.192	0.327	28
1002A_01	Total Phosphorus	-0.147	0.455	28
1003A_01	Dissolved Oxygen	-0.164	0.223	57
1003A_01	E. Coli	-0.123	0.409	47
1003A_01	Nitrate/Nitrite+Nitrite-N	0.135	0.312	58
1003A_01	Total Nitrogen	-0.144	0.447	30
1003A_01	Total Phosphorus	-0.031	0.820	58
1003B_01	Dissolved Oxygen	-0.245	0.526	9
1003B_01	E. Coli	-0.143	0.787	6
1003B_01	Nitrate/Nitrite+Nitrite-N	0.250	0.516	9
1003B_01	Total Phosphorus	0.545	0.130	9
1003C_01	Dissolved Oxygen	-0.541	0.210	7
1003C_01	E. Coli	0.800	0.200	4
1003C_01	Nitrate/Nitrite+Nitrite-N	0.802	0.030	7
1003C_01	Total Phosphorus	0.593	0.161	7
1003_01	Dissolved Oxygen	0.091	0.530	50
1003_01	E. Coli	0.020	0.891	47
1003_01	Nitrate/Nitrite+Nitrite-N	0.403	0.004	50
1003_01	Total Phosphorus	0.046	0.750	50
1003_02	Dissolved Oxygen	0.064	0.597	70
1003_02	E. Coli	0.168	0.195	61
1003_02	Nitrate/Nitrite+Nitrite-N	0.349	0.003	70
1003_02	Total Nitrogen	0.975	0.005	5
1003_02	Total Phosphorus	0.048	0.696	70
1003_03	Dissolved Oxygen	-0.122	0.597	21
1003_03	E. Coli	-0.053	0.809	23
1003_03	Nitrate/Nitrite+Nitrite-N	0.231	0.289	23
1003_03	Total Nitrogen	-0.652	0.001	21
1003_03	Total Phosphorus	0.530	0.009	23

AU	PARAMETER	CORRELATION COEFFICIENT	P-VALUE	N
1004J_01	Dissolved Oxygen	0.223	0.273	26
1004J_01	E. Coli	-0.139	0.497	26
1004J_01	Nitrate/Nitrite+Nitrite-N	0.024	0.909	26
1004J_01	Total Nitrogen	-0.102	0.622	26
1004J_01	Total Phosphorus	0.398	0.044	26
1006D_01	Dissolved Oxygen	-0.006	0.926	249
1006D_01	E. Coli	0.092	0.148	252
1006D_01	Nitrate/Nitrite+Nitrite-N	-0.149	0.018	252
1006D_01	Total Phosphorus	-0.187	0.003	252
1006_03	Chlorophyll a	-0.117	0.435	47
1006_03	Dissolved Oxygen	-0.012	0.878	171
1006_03	Enterococci	-0.231	0.033	85
1006_03	Nitrate/Nitrite+Nitrite-N	-0.121	0.112	174
1006_03	Total Nitrogen	0.068	0.673	41
1006_03	Total Phosphorus	-0.226	0.003	170
1007B_01	Dissolved Oxygen	-0.031	0.465	567
1007B_01	E. Coli	0.094	0.025	570
1007B_01	Nitrate/Nitrite+Nitrite-N	-0.182	0.000	569
1007B_01	Total Phosphorus	-0.076	0.069	570
1007B_02	Dissolved Oxygen	0.097	0.452	62
1007B_02	E. Coli	0.309	0.014	63
1007B_02	Nitrate/Nitrite+Nitrite-N	0.129	0.313	63
1007B_02	Total Phosphorus	-0.264	0.036	63
1007D_01	Dissolved Oxygen	-0.105	0.248	122
1007D_01	E. Coli	0.169	0.060	124
1007D_01	Nitrate/Nitrite+Nitrite-N	0.017	0.847	124
1007D_01	Total Phosphorus	-0.052	0.565	124
1007D_02	Dissolved Oxygen	0.076	0.405	123
1007D_02	E. Coli	-0.137	0.127	126
1007D_02	Nitrate/Nitrite+Nitrite-N	-0.024	0.793	126
1007D_02	Total Phosphorus	-0.077	0.394	126
1007D_03	Dissolved Oxygen	0.211	0.004	185
1007D_03	E. Coli	-0.353	0.000	186
1007D_03	Nitrate/Nitrite+Nitrite-N	-0.145	0.047	189
1007D_03	Total Phosphorus	-0.143	0.049	189
1007R_02	Dissolved Oxygen	0.061	0.635	62
1007R_02	E. Coli	0.220	0.084	63
1007R_02	Nitrate/Nitrite+Nitrite-N	0.392	0.001	63
1007R_02	Total Phosphorus	-0.105	0.413	63
1007R_03	Dissolved Oxygen	0.028	0.761	124
1007R_03	E. Coli	0.074	0.413	126
1007R_03	Nitrate/Nitrite+Nitrite-N	-0.004	0.968	126
1007R_03	Total Phosphorus	-0.029	0.745	126
1007R_04	Dissolved Oxygen	0.250	0.050	62
1007R_04	E. Coli	-0.565	0.000	62

AU	PARAMETER	CORRELATION COEFFICIENT	P-VALUE	N
1007R_04	Nitrate/Nitrite+Nitrite-N	0.122	0.340	63
1007R_04	Total Phosphorus	-0.199	0.118	63
1007W_01	Dissolved Oxygen	-0.098	0.461	59
1007W_01	E. Coli	0.064	0.629	60
1007W_01	Nitrate/Nitrite+Nitrite-N	-0.025	0.850	60
1007W_01	Total Phosphorus	0.001	0.995	60
1007_02	Chlorophyll a	-0.241	0.227	27
1007_02	Dissolved Oxygen	0.039	0.638	149
1007_02	Enterococci	-0.181	0.030	144
1007_02	Nitrate/Nitrite+Nitrite-N	-0.047	0.567	152
1007_02	Total Nitrogen	-0.050	0.835	20
1007_02	Total Phosphorus	-0.081	0.329	147
1007_03	Chlorophyll a	-0.285	0.177	24
1007_03	Dissolved Oxygen	0.179	0.100	86
1007_03	Enterococci	-0.343	0.001	86
1007_03	Nitrate/Nitrite+Nitrite-N	-0.095	0.383	86
1007_03	Total Nitrogen	0.204	0.403	19
1007_03	Total Phosphorus	-0.572	0.000	83
1007_04	Chlorophyll a	-0.078	0.698	27
1007_04	Dissolved Oxygen	0.017	0.810	212
1007_04	Enterococci	-0.125	0.150	135
1007_04	Nitrate/Nitrite+Nitrite-N	-0.051	0.454	215
1007_04	Total Nitrogen	-0.181	0.419	22
1007_04	Total Phosphorus	0.042	0.547	210
1007_07	Chlorophyll a	0.231	0.059	68
1007_07	Dissolved Oxygen	0.137	0.058	191
1007_07	Enterococci	-0.116	0.108	192
1007_07	Nitrate/Nitrite+Nitrite-N	-0.153	0.033	194
1007_07	Total Nitrogen	-0.057	0.668	59
1007_07	Total Phosphorus	-0.246	0.001	189
1007_08	Dissolved Oxygen	0.258	0.044	61
1007_08	Enterococci	-0.236	0.304	21
1007_08	Nitrate/Nitrite+Nitrite-N	0.132	0.302	63
1007_08	Total Phosphorus	-0.145	0.258	63
1009C_01	Dissolved Oxygen	0.345	0.007	60
1009C_01	E. Coli	-0.393	0.001	63
1009C_01	Nitrate/Nitrite+Nitrite-N	-0.506	0.000	63
1009C_01	Total Phosphorus	-0.506	0.000	63
1009D_01	Dissolved Oxygen	0.419	0.001	60
1009D_01	E. Coli	-0.288	0.023	62
1009D_01	Nitrate/Nitrite+Nitrite-N	-0.172	0.182	62
1009D_01	Total Phosphorus	-0.024	0.851	62
1009E_01	Dissolved Oxygen	0.399	0.000	87
1009E_01	E. Coli	-0.101	0.339	92
1009E_01	Nitrate/Nitrite+Nitrite-N	-0.146	0.164	92

AU	PARAMETER	CORRELATION COEFFICIENT	P-VALUE	N
1009E_01	Total Nitrogen	-0.127	0.575	22
1009E_01	Total Phosphorus	-0.243	0.020	92
1009_01	Dissolved Oxygen	0.224	0.041	84
1009_01	E. Coli	0.152	0.155	89
1009_01	Nitrate/Nitrite+Nitrite-N	0.041	0.702	89
1009_01	Total Nitrogen	-0.196	0.451	17
1009_01	Total Phosphorus	-0.090	0.399	89
1009_02	Dissolved Oxygen	0.391	0.000	121
1009_02	E. Coli	0.128	0.153	126
1009_02	Nitrate/Nitrite+Nitrite-N	-0.346	0.000	126
1009_02	Total Phosphorus	-0.371	0.000	126
1009_03	Dissolved Oxygen	0.289	0.003	101
1009_03	E. Coli	0.064	0.520	103
1009_03	Nitrate/Nitrite+Nitrite-N	-0.261	0.008	103
1009_03	Total Phosphorus	-0.245	0.013	103
1010C_01	Dissolved Oxygen	0.345	0.066	29
1010C_01	E. Coli	0.005	0.978	29
1010C_01	Nitrate/Nitrite+Nitrite-N	0.020	0.918	29
1010C_01	Total Nitrogen	-0.409	0.042	25
1010C_01	Total Phosphorus	0.433	0.019	29
1010_02	Dissolved Oxygen	0.262	0.029	69
1010_02	E. Coli	0.163	0.180	69
1010_02	Nitrate/Nitrite+Nitrite-N	0.293	0.015	69
1010_02	Total Nitrogen	-0.776	0.000	22
1010_02	Total Phosphorus	0.296	0.013	69
1010_03	Dissolved Oxygen	0.050	0.797	29
1010_03	E. Coli	0.167	0.388	29
1010_03	Nitrate/Nitrite+Nitrite-N	0.432	0.019	29
1010_03	Total Nitrogen	-0.319	0.092	29
1010_03	Total Phosphorus	0.527	0.003	29
1010_04	Chlorophyll a	-0.024	0.914	23
1010_04	Dissolved Oxygen	-0.046	0.660	95
1010_04	E. Coli	0.130	0.214	93
1010_04	Nitrate/Nitrite+Nitrite-N	0.231	0.024	95
1010_04	Total Nitrogen	-0.224	0.149	43
1010_04	Total Phosphorus	0.235	0.023	93
1011_01	Dissolved Oxygen	0.128	0.184	110
1011_01	E. Coli	-0.108	0.257	111
1011_01	Nitrate/Nitrite+Nitrite-N	0.335	0.000	110
1011_01	Total Nitrogen	-0.587	0.004	22
1011_01	Total Phosphorus	0.237	0.013	110
1013_01	Chlorophyll a	0.486	0.329	6
1013_01	Dissolved Oxygen	0.165	0.009	246
1013_01	Enterococci	-0.001	0.991	250
1013_01	Nitrate/Nitrite+Nitrite-N	-0.045	0.476	258

AU	PARAMETER	CORRELATION COEFFICIENT	P-VALUE	N
1013_01	Total Nitrogen	-0.700	0.188	5
1013_01	Total Phosphorus	-0.114	0.067	258
1014A_01	Dissolved Oxygen	0.005	0.970	62
1014A_01	E. Coli	0.375	0.002	63
1014A_01	Nitrate/Nitrite+Nitrite-N	-0.331	0.008	63
1014A_01	Total Phosphorus	-0.346	0.006	63
1014B_01	Dissolved Oxygen	-0.074	0.493	89
1014B_01	E. Coli	0.052	0.624	92
1014B_01	Nitrate/Nitrite+Nitrite-N	-0.187	0.075	92
1014B_01	Total Nitrogen	-0.404	0.030	29
1014B_01	Total Phosphorus	-0.084	0.427	92
1014C_01	Dissolved Oxygen	0.146	0.477	26
1014C_01	E. Coli	-0.224	0.252	28
1014C_01	Nitrate/Nitrite+Nitrite-N	-0.363	0.057	28
1014C_01	Total Nitrogen	-0.352	0.118	21
1014C_01	Total Phosphorus	0.020	0.919	28
1014E_01	Dissolved Oxygen	0.288	0.023	62
1014E_01	E. Coli	0.020	0.877	63
1014E_01	Nitrate/Nitrite+Nitrite-N	-0.401	0.001	63
1014E_01	Total Phosphorus	-0.342	0.006	63
1014H_02	Dissolved Oxygen	0.662	0.000	62
1014H_02	E. Coli	0.067	0.605	63
1014H_02	Nitrate/Nitrite+Nitrite-N	-0.091	0.480	63
1014H_02	Total Phosphorus	-0.401	0.001	63
1014K_01	Dissolved Oxygen	0.196	0.123	63
1014K_01	E. Coli	0.098	0.446	63
1014K_01	Nitrate/Nitrite+Nitrite-N	0.164	0.200	63
1014K_01	Total Phosphorus	-0.228	0.073	63
1014L_01	Dissolved Oxygen	-0.015	0.905	62
1014L_01	E. Coli	-0.087	0.499	63
1014L_01	Nitrate/Nitrite+Nitrite-N	-0.424	0.001	63
1014L_01	Total Phosphorus	-0.265	0.036	63
1014_01	Chlorophyll a	0.278	0.048	51
1014_01	Dissolved Oxygen	0.083	0.040	616
1014_01	E. Coli	-0.009	0.823	616
1014_01	Nitrate/Nitrite+Nitrite-N	-0.102	0.011	617
1014_01	Total Nitrogen	0.044	0.789	40
1014_01	Total Phosphorus	-0.139	0.001	610
1015A_01	Dissolved Oxygen	0.335	0.088	27
1015A_01	E. Coli	0.016	0.939	26
1015A_01	Nitrate/Nitrite+Nitrite-N	0.419	0.033	26
1015A_01	Total Nitrogen	-0.636	0.000	26
1015A_01	Total Phosphorus	0.553	0.003	26
1015_01	Dissolved Oxygen	0.509	0.000	55
1015_01	E. Coli	0.076	0.580	55

AU	PARAMETER	CORRELATION COEFFICIENT	P-VALUE	N
1015_01	Nitrate/Nitrite+Nitrite-N	0.201	0.140	55
1015_01	Total Nitrogen	-0.324	0.032	44
1015_01	Total Phosphorus	0.338	0.012	55
1015_02	Dissolved Oxygen	0.500	0.667	3
1015_02	E. Coli	0.500	0.667	3
1015_02	Nitrate/Nitrite+Nitrite-N	0.500	0.667	3
1015_02	Total Phosphorus	-0.500	0.667	3
1016_01	Dissolved Oxygen	0.114	0.211	122
1016_01	E. Coli	0.093	0.299	126
1016_01	Nitrate/Nitrite+Nitrite-N	0.172	0.054	126
1016_01	Total Phosphorus	0.049	0.585	126
1016_02	Dissolved Oxygen	0.017	0.854	122
1016_02	E. Coli	-0.144	0.108	126
1016_02	Nitrate/Nitrite+Nitrite-N	-0.012	0.894	126
1016_02	Total Phosphorus	-0.117	0.191	126
1016_03	Chlorophyll a	-0.006	0.978	26
1016_03	Dissolved Oxygen	0.127	0.122	150
1016_03	E. Coli	0.262	0.001	149
1016_03	Nitrate/Nitrite+Nitrite-N	-0.147	0.070	152
1016_03	Total Nitrogen	-0.033	0.883	22
1016_03	Total Phosphorus	-0.307	0.000	150
1017C_01	Dissolved Oxygen	0.252	0.054	59
1017C_01	E. Coli	0.023	0.863	60
1017C_01	Nitrate/Nitrite+Nitrite-N	-0.074	0.574	60
1017C_01	Total Phosphorus	-0.165	0.207	60
1017_01	Dissolved Oxygen	0.091	0.319	123
1017_01	E. Coli	-0.075	0.403	126
1017_01	Nitrate/Nitrite+Nitrite-N	-0.329	0.000	126
1017_01	Total Phosphorus	-0.363	0.000	126
1017_02	Dissolved Oxygen	0.010	0.940	62
1017_02	E. Coli	0.029	0.823	63
1017_02	Nitrate/Nitrite+Nitrite-N	-0.413	0.001	63
1017_02	Total Phosphorus	-0.462	0.000	63
1017_03	Dissolved Oxygen	-0.107	0.404	63
1017_03	E. Coli	0.226	0.074	63
1017_03	Nitrate/Nitrite+Nitrite-N	-0.177	0.164	63
1017_03	Total Phosphorus	-0.219	0.085	63
1103A_01	Dissolved Oxygen	0.128	0.493	31
1103A_01	Enterococci	-0.441	0.010	33
1103A_01	Nitrate/Nitrite+Nitrite-N	-0.011	0.950	33
1103A_01	Total Nitrogen	-0.580	0.006	21
1103A_01	Total Phosphorus	0.287	0.105	33
1103B_01	Dissolved Oxygen	-0.132	0.378	47
1103B_01	Enterococci	-0.554	0.000	42
1103B_01	Nitrate/Nitrite+Nitrite-N	0.129	0.378	49

AU	PARAMETER	CORRELATION COEFFICIENT	P-VALUE	N
1103B_01	Total Nitrogen	-0.297	0.054	43
1103B_01	Total Phosphorus	0.234	0.105	49
1103C_01	Dissolved Oxygen	-0.053	0.778	31
1103C_01	Enterococci	-0.204	0.256	33
1103C_01	Nitrate/Nitrite+Nitrite-N	0.345	0.049	33
1103C_01	Total Nitrogen	-0.294	0.236	18
1103C_01	Total Phosphorus	0.443	0.010	33
1103D_01	Dissolved Oxygen	0.143	0.487	26
1103D_01	Enterococci	-0.133	0.500	28
1103D_01	Nitrate/Nitrite+Nitrite-N	-0.130	0.511	28
1103D_01	Total Nitrogen	-0.525	0.006	26
1103D_01	Total Phosphorus	0.059	0.766	28
1103E_01	Dissolved Oxygen	0.207	0.301	27
1103E_01	E. Coli	0.434	0.024	27
1103E_01	Nitrate/Nitrite+Nitrite-N	0.196	0.317	28
1103E_01	Total Nitrogen	-0.357	0.146	18
1103E_01	Total Phosphorus	0.512	0.005	28
1103G_01	Dissolved Oxygen	-0.013	0.948	26
1103G_01	Enterococci	-0.009	0.962	28
1103G_01	Nitrate/Nitrite+Nitrite-N	-0.032	0.872	28
1103G_01	Total Nitrogen	-0.502	0.029	19
1103G_01	Total Phosphorus	0.173	0.377	28
1103_01	Dissolved Oxygen	0.216	0.300	25
1103_01	Enterococci	-0.256	0.188	28
1103_01	Nitrate/Nitrite+Nitrite-N	0.005	0.981	28
1103_01	Total Nitrogen	-0.358	0.093	23
1103_01	Total Phosphorus	0.527	0.004	28
1103_04	Chlorophyll a	-0.376	0.058	26
1103_04	Dissolved Oxygen	0.086	0.542	53
1103_04	Enterococci	0.166	0.231	54
1103_04	Nitrate/Nitrite+Nitrite-N	0.321	0.018	54
1103_04	Total Nitrogen	-0.155	0.353	38
1103_04	Total Phosphorus	0.072	0.615	51
1105A_03	Dissolved Oxygen	0.184	0.349	28
1105A_03	E. Coli	-0.073	0.717	27
1105A_03	Nitrate/Nitrite+Nitrite-N	-0.127	0.518	28
1105A_03	Total Nitrogen	-0.462	0.040	20
1105A_03	Total Phosphorus	0.201	0.306	28
1105B_01	Chlorophyll a	0.330	0.060	33
1105B_01	Dissolved Oxygen	-0.027	0.846	54
1105B_01	Enterococci	-0.156	0.250	56
1105B_01	Nitrate/Nitrite+Nitrite-N	0.222	0.100	56
1105B_01	Total Nitrogen	-0.381	0.008	47
1105B_01	Total Phosphorus	0.376	0.004	56
1105C_01	Dissolved Oxygen	0.128	0.515	28
1105C_01	E. Coli	-0.202	0.312	27
1105C_01	Nitrate/Nitrite+Nitrite-N	0.079	0.690	28
1105C_01	Total Nitrogen	-0.303	0.132	26
1105C_01	Total Phosphorus	0.035	0.861	28
1105D_01	Dissolved Oxygen	0.445	0.005	39
1105D_01	E. Coli	-0.270	0.173	27
1105D_01	Nitrate/Nitrite+Nitrite-N	0.192	0.328	28
1105D_01	Total Nitrogen	-0.527	0.008	24
1105D_01	Total Phosphorus	-0.047	0.814	28
1105E_01	Dissolved Oxygen	0.469	0.091	14
1105E_01	E. Coli	-0.350	0.220	14
1105E_01	Nitrate/Nitrite+Nitrite-N	-0.093	0.752	14
1105E_01	Total Nitrogen	0.643	0.086	8
1105E_01	Total Phosphorus	0.110	0.707	14
1105_01	Chlorophyll a	0.074	0.608	50
1105_01	Dissolved Oxygen	-0.004	0.968	130
1105_01	Enterococci	-0.102	0.242	133
1105_01	Nitrate/Nitrite+Nitrite-N	0.267	0.002	138
1105_01	Total Nitrogen	-0.152	0.160	87
1105_01	Total Phosphorus	0.246	0.004	135
1107_01	Chlorophyll a	0.208	0.160	47
1107_01	Dissolved Oxygen	0.005	0.965	75
1107_01	Enterococci	-0.049	0.678	73
1107_01	Nitrate/Nitrite+Nitrite-N	0.156	0.176	77
1107_01	Total Nitrogen	-0.199	0.115	64
1107_01	Total Phosphorus	0.064	0.588	75
1109_01	Chlorophyll a	0.150	0.494	23
1109_01	Dissolved Oxygen	0.061	0.658	55
1109_01	Enterococci	-0.136	0.343	51
1109_01	Nitrate/Nitrite+Nitrite-N	0.273	0.044	55
1109_01	Total Nitrogen	0.012	0.941	43
1109_01	Total Phosphorus	0.162	0.245	53
1110_02	Dissolved Oxygen	-0.301	0.368	11
1110_02	E. Coli	-0.427	0.190	11
1110_02	Nitrate/Nitrite+Nitrite-N	-0.429	0.397	6
1110_02	Total Nitrogen	-0.500	0.667	3
1110_02	Total Phosphorus	-0.886	0.019	6
1113A_01	Dissolved Oxygen	0.090	0.325	122
1113A_01	E. Coli	0.044	0.628	124
1113A_01	Nitrate/Nitrite+Nitrite-N	-0.046	0.611	125
1113A_01	Total Phosphorus	-0.446	0.000	125
1113C_01	Dissolved Oxygen	-0.071	0.584	62
1113C_01	E. Coli	0.157	0.218	63
1113C_01	Nitrate/Nitrite+Nitrite-N	0.183	0.150	63
1113C_01	Total Phosphorus	0.234	0.064	63
1113D_01	Dissolved Oxygen	0.174	0.181	61
1113D_01	E. Coli	0.107	0.402	63
1113D_01	Nitrate/Nitrite+Nitrite-N	0.146	0.252	63
1113D_01	Total Phosphorus	-0.055	0.671	63
1113E_01	Dissolved Oxygen	0.035	0.791	61
1113E_01	E. Coli	-0.020	0.875	63
1113E_01	Nitrate/Nitrite+Nitrite-N	0.082	0.522	63
1113E_01	Total Phosphorus	0.173	0.176	63
1113_01	Chlorophyll a	0.510	0.007	27
1113_01	Dissolved Oxygen	-0.131	0.409	42
1113_01	Enterococci	-0.116	0.466	42
1113_01	Nitrate/Nitrite+Nitrite-N	-0.145	0.372	40
1113_01	Total Nitrogen	-0.541	0.005	25
1113_01	Total Phosphorus	-0.548	0.000	42
1113_02	Chlorophyll a	0.039	0.850	26
1113_02	Dissolved Oxygen	0.040	0.720	84
1113_02	Enterococci	-0.070	0.528	84
1113_02	Nitrate/Nitrite+Nitrite-N	-0.420	0.000	89
1113_02	Total Nitrogen	0.032	0.895	20
1113_02	Total Phosphorus	-0.351	0.001	86
1301_01	Chlorophyll a	-0.086	0.629	34
1301_01	Dissolved Oxygen	-0.043	0.749	57
1301_01	Enterococci	0.067	0.630	54
1301_01	Nitrate/Nitrite+Nitrite-N	0.264	0.048	57
1301_01	Total Nitrogen	-0.248	0.113	42
1301_01	Total Phosphorus	-0.136	0.321	55
1302B_01	Chlorophyll a	0.086	0.872	6
1302B_01	Dissolved Oxygen	0.407	0.017	34
1302B_01	E. Coli	0.091	0.658	26
1302B_01	Nitrate/Nitrite+Nitrite-N	0.372	0.056	27
1302B_01	Total Nitrogen	-0.056	0.791	25
1302B_01	Total Phosphorus	0.091	0.652	27
1302D_01	Chlorophyll a	0.152	0.774	6
1302D_01	Dissolved Oxygen	0.324	0.106	26
1302D_01	E. Coli	-0.265	0.182	27
1302D_01	Nitrate/Nitrite+Nitrite-N	0.536	0.004	27
1302D_01	Total Nitrogen	-0.224	0.316	22
1302D_01	Total Phosphorus	0.285	0.150	27
1302E_01	Chlorophyll a	0.845	0.034	6
1302E_01	Dissolved Oxygen	0.143	0.476	27
1302E_01	E. Coli	0.066	0.738	28
1302E_01	Nitrate/Nitrite+Nitrite-N	0.344	0.073	28
1302E_01	Total Nitrogen	-0.163	0.426	26
1302E_01	Total Phosphorus	0.181	0.357	28
1302_03	Chlorophyll a	-0.141	0.440	32
1302_03	Dissolved Oxygen	0.315	0.023	52
1302_03	E. Coli	0.262	0.063	51
1302_03	Nitrate/Nitrite+Nitrite-N	0.131	0.350	53
1302_03	Total Nitrogen	-0.148	0.389	36
1302_03	Total Phosphorus	0.485	0.000	49
1304_01	Chlorophyll a	-0.052	0.793	28
1304_01	Dissolved Oxygen	0.093	0.646	27
1304_01	Enterococci	-0.123	0.568	24
1304_01	Nitrate/Nitrite+Nitrite-N	0.242	0.215	28
1304_01	Total Nitrogen	0.080	0.738	20
1304_01	Total Phosphorus	-0.013	0.949	27
1304_02	Dissolved Oxygen	0.477	0.025	22
1304_02	Enterococci	-0.396	0.068	22
1304_02	Nitrate/Nitrite+Nitrite-N	0.206	0.357	22
1304_02	Total Nitrogen	-0.279	0.334	14
1304_02	Total Phosphorus	-0.190	0.397	22
1305A_01	Dissolved Oxygen	0.291	0.178	23
1305A_01	E. Coli	-0.353	0.099	23
1305A_01	Nitrate/Nitrite+Nitrite-N	0.089	0.686	23
1305A_01	Total Nitrogen	-0.077	0.794	14
1305A_01	Total Phosphorus	-0.239	0.271	23
1305_01	Dissolved Oxygen	0.490	0.106	12
1305_01	E. Coli	0.168	0.601	12
1305_01	Nitrate/Nitrite+Nitrite-N	-0.286	0.535	7
1305_01	Total Nitrogen	-1.000	0.000	3
1305_01	Total Phosphorus	-0.321	0.482	7
2431A_01	Dissolved Oxygen	0.277	0.039	56
2431A_01	E. Coli	-0.206	0.293	28
2431A_01	Enterococci	0.164	0.403	28
2431A_01	Nitrate/Nitrite+Nitrite-N	0.234	0.083	56
2431A_01	Total Nitrogen	-0.460	0.009	31
2431A_01	Total Phosphorus	0.255	0.058	56
2431C_01	Dissolved Oxygen	0.356	0.063	28
2431C_01	Enterococci	-0.189	0.336	28
2431C_01	Nitrate/Nitrite+Nitrite-N	-0.186	0.343	28
2431C_01	Total Nitrogen	0.170	0.513	17
2431C_01	Total Phosphorus	0.270	0.164	28

APPENDIX B - Field Data Spreadsheet

1 Instructions detail how to complete the form.

Instructions

1. This is version 1 of HGAC CRP Data Entry Template, released in January 2021.
2. Updated per QAPP FY2021 Amendment #X.
3. This template will be revised accordingly if amendments are made.
4. Email the data files to Jessica Casillas at Jessica.Casillas@h-gac.com AND Jean Wright at Jean.Wright@h-gac.com
5. Email suggestions and comments to Jessica Casillas at Jessica.Casillas@h-gac.com
6. Do not make changes to the pre-loaded information in the shaded areas of the data entry page(s). Only fill out the appropriate information i
7. If there is no reported result for a particular site/parameter, indicate the reasons in the NOTES column. For example, "parameter not scheduled", "forgot to record value", "value not reported due to lab error", "value not reported due to sonde failure", etc...
8. 24-hr data, equipment blanks, and vertical profile data should be entered in a separate sheet. For equipment blanks, copy the entire row block for the site and paste to new page where the results will be entered.
9. The laboratory measurements are required to be checked against the corresponding quality control requirements and acceptability criteria, stated in the QAPP. There are shown in the Units, Parameter Code, Method, LOQ, Minimum Value, and Maximum Value columns.
10. Conduct data quality assurance following the items indicated in the Data Review Checklist, and complete the Data Review Checklist.
11. If there is no assigned Tag or Sample ID, leave it blank.

2

The Data Submittal Schedule details the frequency and due dates for data submission to H-GAC and TCEQ.

Data Submittal Schedule

Quarter Covering Months	Timeline for Partner Data Submittal to HGAC	HGAC Reporting to TCEQ
Sep 1-Nov 30 (Quarter 1)	**Feb 28 (Quarter 2)**	**March**
Dec 1-Feb 28 (Quarter 2)	**May 31 (Quarter 3)**	**Aug**
Mar 1-May 31 (Quarter 3)	**Aug 31 (Quarter 4)**	
Jun 1-Aug 31 (Quarter 4)	**Nov 30 (Quarter 1)**	**Dec**

3

The Data Review Checklist documents review of the data to verify that it meets project-specific data quality objectives.

Data Review Checklist

#	Item	Action (Yes, No, or NA)
1	Are the entered data consistent with the pre-loaded ***station/ID/parameter/code*** ?	
2	Are the units of the entered data consistent with the pre-loaded ***units*** ? If not, convert to the specified unit.	
3	Are the sampling methods consistent with the preloaded ***methods*** ? If not, explain why in the Notes field.	
4	Are all "less than" values reported at or below the ***LOQ*** ? If not, explain why the less than value is reported above the LOQ in the Notes field.	
5	Are there ***outliers*** ? Need to verify if it is an outlier or an error. If the value is accurate and outside of the range in the Minmum/Maximum Value columns, explain why the value is a verified outlier.	
6	Are the ***dates/time*** in the correct format?	
7	Are all values associated with a ***depth*** ?	
8	Are the GT/LT ***signs*** and ***results*** separated? If not, separate into the GT/LT and Result columns.	
9	Are there any ***blanks*** in results? Make notes explaining why data is missing.	
10	Are there ***equipment blanks*** for all metals?	
11	Are sample storage, preservation, and hold times consistent with QAPP Table B2.1?	
12	Are analytical methods consistent with those listed in the QAPP Table A7 for your entity?	
13	Are LOQs consistent with those listed in the QAPP Table A7 for your entity? If LOQ is greater than the LOQ listed in the QAPP, provide an explanation of this deviation in the Notes field.	
14	Are LOQ check sample % recoveries provided in the lab report and consistent with the ranges defined in the QAPP Table A7 for your entity?	
15	Were LCS and LCS Duplicates conducted?	
16	Are precision values (RPD of LCS/LCS Duplicate results) consistent with the ranges defined in the QAPP Table A7 for your entity?	
17	Is the bias (% recovery of LCS and LCS Duplicate) consistent with the ranges defined in the QAPP Table A7 for your entity?	
18	Are method blanks run at levels at or below the LOQ?	
19	Is the precision (difference between the logarithm of the result and logarithm of the lab duplicate result) less than or equal to 0.5 for bacteriological parameters?	

Dataset Information

Date Range:
QA Officer:
Additional Notes:

4

TheMonitoringScheduledetailssamplingsiteinformation,suchaslocation,parameterscollected,andfrequencyofcollection.

Site Description	Name	Station ID	Latitude	Longitude	Waterbody ID	Region	SE	CE	MT	Conventional	Indicator Bacteria	Inst Flow	Field	Comment
LOWER PANTHER BRANCH AT FOOTBRIDGE 265 M UPSTREAM OF SAWDUST RD	LPB #2	16627	30.135262	-95.479377	1008C	12	HG	SJ	RT	4	4		4	
PANTHER BRANCH 295 METERS DOWNSTREAM OF SAWDUST ROAD	LPB #3	16422	30.131782	-95.477117	1008C	12	HG	SJ	RT	4	4		4	
LAKE WOODLANDS AT NORTH END	LW #1	16484	30.1756317	-95.471585	1008F	12	HG	SJ	RT	4	4		4	
LAKE WOODLANDS AT MID POINT	LW #2	16483	30.1621919	95.4777358	1008F	12	HG	SJ	RT	4	4		4	
LAKE WOODLANDS AT WESTERN REACH	LW #3	16481	30.1601162	-95.485545	1008F	12	HG	SJ	RT	4	4		4	
LAKE WOODLANDS AT SOUTH END	LW #4	16482	30.1549508	-95.482816	1008F	12	HG	SJ	RT	4	4		4	
UPPER PANTHER BRANCH UPSTREAM OF WWTP 2 OUTFALL	UPB #1	16629	30.195972	-95.488495	1008B	12	HG	SJ	RT	4	4		4	
UPPER PANTHER BRANCH DOWNSTREAM OF WWTP 2	UPB #2	16630	30.193916	-95.488187	1008B	12	HG	SJ	RT	4	4		4	
BEAR BRANCH AT RESEARCH FOREST	UPB #3	16631	30.1903674	-95.490794	1008E	12	HG	SJ	RT	4	4	4	4	Flow reported from USGS Gage # 8068400

5

The Data Entry Form provides a space for recording field parameters for each sampling site in the Monitoring Schedule.

Site	Site ID	Type	Parameter	Units	Parameter Code	Method	Minimum Value	Maximum Value	Date (mm/dd/yyyy)	Time (hh:mm)	Depth (m)	GT/LT	Result	Notes
LOWER PANTHER BRANCH AT FOOTBRIDGE 265 M UPSTREAM OF SAWDUST RD (LPB #2)	16627	Field Parameters	TEMPERATURE, WATER	DEG C	00010	SM 2550 B and TCEQ SOP V1	1	38						
	16627		TRANSPARENCY, SECCHI DISC	meters	00078	TCEQ SOP V1	0.01	7						
	16627		SPECIFIC CONDUCTANCE,FIELD (@ 25C)	us/cm	00094	EPA 120.1 and TCEQ SOP, V1	30	60000						
	16627		OXYGEN, DISSOLVED	mg/L	00300	SM 4500-O G and TCEQ SOP V1	0.5	15						
	16627		PH	s.u	00400	EPA 150.1 and TCEQ SOP V1	5	10						
	16627		DAYS SINCE PRECIPITATION EVENT	days	72053	TCEQ SOP V1	0	75						
	16627		DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	meters	82903	TCEQ SOP V2	0.1	80						
	16627		PRESENT WEATHER (1=CLEAR,2=PTCLDY,3=CLDY,4=RAIN,5=OTHER)	NU	89966	NA	NA	NA						
	16627		WIND INTENSITY (1=CALM,2=SLIGHT,3=MOD.,4=STRONG)	NU	89965	NA	NA	NA						
	16627		WATER SURFACE(1=CALM,2=RIPPLE,3=WAVE,4=WHITECAP)	NU	89968	NA	NA	NA						
	16627		WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGGS, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER (WRITE IN COMMENTS))	NU	89971	NA	NA	NA						
	16627		WATER COLOR 1=BRWN 2=RED 3=GRN 4=BLCK 5=CLR 6=OTHER (WRITE IN COMMENTS)	NU	89969	NA	NA	NA						
PANTHER BRANCH 295 METERS DOWNSTREAM OF SAWDUST ROAD (LPB #3)	16422	Field Parameters	TEMPERATURE, WATER	DEG C	00010	SM 2550 B and TCEQ SOP V1	1	38						
	16422		TRANSPARENCY, SECCHI DISC	meters	00078	TCEQ SOP V1	0.01	7						
	16422		SPECIFIC CONDUCTANCE,FIELD (@ 25C)	us/cm	00094	EPA 120.1 and TCEQ SOP, V1	30	60000						
	16422		OXYGEN, DISSOLVED	mg/L	00300	SM 4500-O G and TCEQ SOP V1	0.5	15						
	16422		PH	s.u	00400	EPA 150.1 and TCEQ SOP V1	5	10						
	16422		DAYS SINCE PRECIPITATION EVENT	days	72053	TCEQ SOP V1	0	75						
	16422		DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	meters	82903	TCEQ SOP V2	0.1	80						
	16422		PRESENT WEATHER (1=CLEAR,2=PTCLDY,3=CLDY,4=RAIN,5=OTHER)	NU	89966	NA	NA	NA						
	16422		WIND INTENSITY (1=CALM,2=SLIGHT,3=MOD.,4=STRONG)	NU	89965	NA	NA	NA						
	16422		WATER SURFACE(1=CALM,2=RIPPLE,3=WAVE,4=WHITECAP)	NU	89968	NA	NA	NA						
	16422		WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGGS, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER (WRITE IN COMMENTS))	NU	89971	NA	NA	NA						
	16422		WATER COLOR 1=BRWN 2=RED 3=GRN 4=BLCK 5=CLR 6=OTHER (WRITE IN COMMENTS)	NU	89969	NA	NA	NA						
LAKE WOODLANDS AT NORTH END (LW #1)	16484	Field Parameters	TEMPERATURE, WATER	DEG C	00010	SM 2550 B and TCEQ SOP V1	1	38						
	16484		TRANSPARENCY, SECCHI DISC	meters	00078	TCEQ SOP V1	0.01	7						
	16484		SPECIFIC CONDUCTANCE,FIELD (@ 25C)	us/cm	00094	EPA 120.1 and TCEQ SOP, V1	30	60000						
	16484		OXYGEN, DISSOLVED	mg/L	00300	SM 4500-O G and TCEQ SOP V1	0.5	15						
	16484		PH	s.u	00400	EPA 150.1 and TCEQ SOP V1	5	10						
	16484		DAYS SINCE PRECIPITATION EVENT	days	72053	TCEQ SOP V1	0	75						
	16484		DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	meters	82903	TCEQ SOP V2	0.1	80						
	16484		RESERVOIR STAGE (FEET ABOVE MEAN SEA LEVEL)	FT ABOVE MSL	00052	TWDB	NA	NA						
	16484		RESERVOIR PERCENT FULL	% RESERVOIR CAPACITY	00053	TWDB	NA	NA						
	16484		RESERVOIR ACCESS NOT POSSIBLE LEVEL TOO LOW ENTER 1 IF REPORTING	NS	00051	TCEQ Drought Guidance	NA	NA						
	16484		PRESENT WEATHER (1=CLEAR,2=PTCLDY,3=CLDY,4=RAIN,5=OTHER)	NU	89966	NA	NA	NA						
	16484		WIND INTENSITY (1=CALM,2=SLIGHT,3=MOD.,4=STRONG)	NU	89965	NA	NA	NA						
	16484		WATER SURFACE(1=CALM,2=RIPPLE,3=WAVE,4=WHITECAP)	NU	89968	NA	NA	NA						
	16484		WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGGS, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER (WRITE IN COMMENTS))	NU	89971	NA	NA	NA						
	16484		WATER COLOR 1=BRWN 2=RED 3=GRN 4=BLCK 5=CLR 6=OTHER (WRITE IN COMMENTS)	NU	89969	NA	NA	NA						

6

The Measurement Performance Specifications provides acceptance criteria and is used for QA/QC of the data.

TABLE A7.3 Measurement Performance Specifications for the City of Arlington

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD	Bias %Rec. of LCS	Lab	Outlier Values: CI_LOCATION	Outlier Values: CI_VALUE
Field Parameters												
TEMPERATURE, WATER (DEGREES CENTIGRADE)*	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	NA*	NA	NA	NA	NA	Field	Statewide	1 to 38
TEMPERATURE, AIR (DEGREES CENTIGRADE)	DEG C	air	SM 2550 B and TCEQ SOP V1	00020	NA*	NA	NA	NA	NA	Field	Statewide	-15 to 45
TRANSPARENCY, SECCHI DISC (METERS)*	meters	water	TCEQ SOP V1	00078	NA*	NA	NA	NA	NA	Field	Statewide	.00999999977648258 to 7
SPECIFIC CONDUCTANCE,FIELD (US/CM @ 25C)*	µs/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	NA*	NA	NA	NA	NA	Field	Statewide	30 to 60000
OXYGEN, DISSOLVED (MG/L)*	mg/L	water	SM 4500-O G and TCEQ SOP V1	00300	NA*	NA	NA	NA	NA	Field	Statewide	.5 to 15
PH (STANDARD UNITS)*	s.u	water	EPA 150.1 and TCEQ SOP V1	00400	NA*	NA	NA	NA	NA	Field	Statewide	5 to 10
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	NA*	NA	NA	NA	NA	Field	Statewide	0 to 75
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE	meters	water	TCEQ SOP V2	82903	NA*	NA	NA	NA	NA	Field	Statewide	.1 to 80
MAXIMUM POOL WIDTH AT TIME OF STUDY (METERS)**	meters	other	TCEQ SOP V2	89864	NA*	NA	NA	NA	NA	Field	Statewide	.001 to 50
MAXIMUM POOL DEPTH AT TIME OF STUDY(METERS)**	meters	other	TCEQ SOP V2	89865	NA*	NA	NA	NA	NA	Field	Statewide	.1 to 5
POOL LENGTH, METERS**	meters	other	TCEQ SOP V2	89869	NA*	NA	NA	NA	NA	Field	Statewide	1 to 1000
% POOL COVERAGE IN 500 METER REACH**	%	other	TCEQ SOP V2	89870	NA*	NA	NA	NA	NA	Field	Statewide	10 to 100
Flow Parameters												
FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)	cfs	water	TCEQ SOP V1	00061	NA	NA	NA	NA	NA	Field	Statewide	.01 to 15000
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	Statewide	1 to 6
STREAM FLOW ESTIMATE (CFS)	cfs	Water	TCEQ SOP V1	74069	NA	NA	NA	NA	NA	Field	Statewide	.00999999977648258 to 10000
FLOW MTH 1=GAGE 2=ELEC 3=MECH 4=WEIR/FLU 5=DOPPLER	NU	other	TCEQ SOP V1	89835	NA	NA	NA	NA	NA	Field	Statewide	1 to 5
Bacteriological Parameters in Water												
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/ 100 mL	water	IDEXX Laboratories Colilert®/ Colilert®-18	31699	1	1	NA	0.50***	NA	CRWS	Statewide	.9 to 100000
Conventional Parameters in Water												
NITRITE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00615	0.05	0.05	70-130	20	80-120	CRWS	Statewide	.005 to .54
NITRATE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00620	0.05	0.05	70-130	20	80-120	CRWS	Statewide	.005 to 11.61
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	EPA 351.2	00625	0.2	0.2	70-130	20	80-120	CRWS	Statewide	.05 to 4.2
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	EPA 365.1 (Primary Method) SM 4500-P E (Backup Method)	00665	0.06	0.02	70-130	20	80-120	CRWS	Statewide	.005 to 3.09
HARDNESS, TOTAL (MG/L AS CACO3)****	mg/L	water	SM 2340 C	00900	5	5	NA	20	80-120	CRWS	Statewide	12 to 2625
CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	µg/L	water	SM 10200 H	32211	3	3	NA	20	80-120	CRWS	Statewide	0 to 50
ORTHOPHOSPHATE PHOSPHORUS,DISS,MG/L,FILTER >15MIN	mg/L	water	SM 4500-P F	70507	0.04	0.02	70-130	20	80-120	CRWS	Statewide	.005 to 1.9
Metals in Water												
CADMIUM, DISSOLVED (UG/L AS CD)	µg/L	water	EPA 200.8 Rev 5.4 (1998)	01025	0.1 for waters <50mg/L hardness ------- 0.3 for waters >50mg/L hardness	0.3	70-130	20	80-120	AR	Statewide	.007 to .81
CHROMIUM, DISSOLVED (UG/L AS CR)	µg/L	water	EPA 200.8 Rev 5.4 (1998)	01030	10	1	70-130	20	80-120	AR	Statewide	.05 to 140
COPPER, DISSOLVED (UG/L AS CU)	µg/L	water	EPA 200.8 Rev 5.4 (1998)	01040	1 for waters < 50mg/L hardness ------- 3 for waters >= 50mg/L hardness	1	70-130	20	80-120	AR	Statewide	.05 to 9
IRON, DISSOLVED (UG/L)	µg/L	water	EPA 200.8 Rev 5.4 (1998)	01046	NA	100	70-130	20	80-120	AR	Statewide	.01 to 5000
LEAD, DISSOLVED (UG/L AS PB)	µg/L	water	EPA 200.8 Rev 5.4 (1998)	01049	0.1 for waters < 85 mg/L hardness ------- 1 for waters >= 85 mg/L hardness	1	70-130	20	80-120	AR	Statewide	.008 to 2
MANGANESE, DISSOLVED (UG/L AS MN)	µg/L	water	EPA 200.8 Rev 5.4 (1998)	01056	NA	1	70-130	20	80-120	AR	Statewide	.01 to 4000
NICKEL, DISSOLVED (UG/L AS NI)	µg/L	water	EPA 200.8 Rev 5.4 (1998)	01065	10	1	70-130	20	80-120	AR	Statewide	.16 to 122
ZINC, DISSOLVED (UG/L AS ZN)	µg/L	water	EPA 200.8 Rev 5.4 (1998)	01090	5	5	70-130	20	80-120	AR	Statewide	.07 to 81

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

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

*** 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.

**** 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
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

APPENDIX C - Clean Rivers Program Partners/Contractors Questionnaire Results (Consolidated)

Monitoring Efficiencies Questionnaire
4/7/2020

Question	Environmental Institute of Houston | UH (EIH) Answers provided verbally at 2020 CMM	Harris County Pollution Control (HCPC)	Houston Drinking Water Operations HDW	Houston-Gal Cou (H-G
Please describe your monitoring program (number of sites, frequency, parameters, etc.)	Approximately 70 sites on a quarterly basis in Harris, Galveston, Matagorda, and Brazoria Counties. Occasional 24-hour DO monitoring.	HCPC monitors 33 Sites, Two runs every month, other runs are bi-monthly. 18 Field parameters including (Salinity, Conductivity, Temp., pH, Depth, D.O., Turbidity and field observations for Water and Weather and Other), 5 laboratory parameters (TSS, Enterococcus, NH3, Nitrate + Nitrite, TPO4) and 2 parameters collected during profiling (TKN, CHL).	8 sites from the lake sampled monthly. 13 sites in the watershed sampled every two months. TKN and Chl-a are collected quarterly at 3 of the lake sites.	20 sites quarterly Most in Montgor 3 sites monitored flow 1 24-hour DO site
Why do you monitor the stations and/or parameters that you currently monitor?	Monitors under contract to H-GAC. Their monitoring schedule is dependent upon H-GAC's needs.	HCPC partnered with CRP prior to the current administration. It is important to HCPC that we maintain our partnership with H-GAC to provide sound data to assist with making sure our waterways are safe.	Working to support surface water plants. Baseline long-term data for surveillance Immediate data for surface water plants.	H-GAC focuses m tributaries

lveston Area ncil GAC)	City of Houston Health and Human Services (HHD)	San Jacinto River Authority (SJRA)	Texas Commission on Environmental Quality Region 12 (TCEQ R12)	TRIES
y mery County d monthly for e	133 sites monitored 6 times per year; Parameters include pH, D.O., conductivity, temperature, ammonia, bacteria, chloride, TSS, sulfate, nitrate, & TKN (quarterly)	**Lake Conroe** - 10 sites-monthly - **Parameters:** Alkalinity Chloride E. Coli Ammonia Nitrate Nitrite Sulfate Total Phosphorus Total Suspended Solids TKN Chlorophyll **Woodlands** - 9 sites - quarterly **Parameters:** E coli TSS BOD 5 Chloride Sulfate Nitrate Nitrite Total Phosphorus Ammonia TKN Chlorophyll Hardness Selenium	Roughly 125 sites per quarter. Includes field measurements, bacteria, chlorophyll-a, TSS, nutrients. For 10-15 of these sites we also collect samples for metals in water, volatiles, semi-volatiles and metals in sediment	We have 10 sites that are sampled quarterly. We measure *E. coli* , TSS, Total PO4, Cl, NO3-N, NO2 – N, SO4 and NH3 - N. Currently, we do not measure TKN and Chlorophyll.
nostly on the	We review with H-GAC and other partners how to best assess surface water for our area, taking into consideration other monitoring sites, point sources, etc.	Lake Conroe sites are sampled as volunteer program with the HGAC, since SJRA owns and operates Lake Conroe. I am not sure who selected the parameters or site locations historically, but the same sites and parameters have been samples since the 80's. There has been small changes in what parameters are selected over the years, but the sites have relatively stayed the same. Best guess is that is what TCEQ wants sampled for on a reservoir that has the "uses" that Lake Conroe has. SJRA has CRP sites in the Woodlands due to SJRA providing drinking water and waste water services to The Woodlands Township. From what i could gather, the parameters were selected based off of permit restrictions for the waste water plants and also what TCEQ wanted to see with the CRP program.	Historical data combined with current data to monitor trends in water quality over time	Our HQ is only 2 hours away from our furthest site, allowing for quick access to all of our sites. With the Analytical Lab at HQ we are also able to quickly and efficiently process all water samples without exceeding holding times.

Question	Environmental Institute of Houston | UH (EIH) Answers provided verbally at 2020 CMM	Harris County Pollution Control (HCPC)	Houston Drinking Water Operations HDW	Houston-Galv Cour (H-G
How does participation in the Clean Rivers Program benefit your agency?	Monitors under contract to H-GAC. Their monitoring schedule is dependent upon H-GAC's needs.	Participation allows us to monitor the impact on the overall water quality for the parameters that we currently provide data to CRP for monitoring purposes. It is our goal to obtain clean water to allow recreation and enjoyment of our waterways.	Streamlining with other partners and filling the gaps with other partners. QAQC, and standardization of monitoring procedures. Training.	
How do you feel the Clean Rivers Program benefits from your monitoring efforts?	Monitors under contract to H-GAC. Their monitoring schedule is dependent upon H-GAC's needs.	HCPC is one of the partners with the capability to access the sites in the Houston Ship Channel, San Jacinto River, Clear Lake waterways, and side bays and provide data from the water bodies that benefit the group as a whole .	By having access to the data that is collected.	

veston Area ncil AC)	City of Houston Health and Human Services (HHD)	San Jacinto River Authority (SJRA)	Texas Commission on Environmental Quality Region 12 (TCEQ R12)	TRIES
	Collaboration and sharing of information regarding sites, parameters, frequency; avoids overlap of sampling locations; we appreciate the guidance and feedback from other professional monitoring agencies	For Lake Conroe, it gives the opportunity to monitor the water quality in the reservoir and share the cost with someone else. Being able to see the water quality benefits the SJRA on several different levels. First it gives the ability to look at what the quality of water is and how that will effect the running of our water plant on the Lake Conroe. It also gives us a chance to see where there might be a possible problem with pollution in the reservoir and point us in the right direction for mitigation. Lake Woodlands this program benefits us by seeing the impacts before and below two of our waste water plants. It helps to see our impact on the environment as well as PR for the area. Both programs give us a great PR boost for the water ways that we manage.	We can't handle all of these sites on our own. The CRP allows more data to be collected throughout the state	This opportunity has provided growth for TRIES through funding, training and education programs. Through the CRP, one of our Lab Technicians is now the Lab QAO and survey field assistant for our sites. Also, this program allows us to recruit Graduate Students to be trained in SWQM procedure and assist in CRP sites. That experience can help prepare them for a future in water quality monitoring.
	Professional monitoring and lab analysis with data collected in urban streams; over the past several years, provides extensive background data and changes observed over long periods of time along with seasonal effects	I believe they benefit by having an agency that manages waterways in the area and know these waterways very well. They also benefit by the SJRA providing the equipment and man power to provide professionally trained monitors to test these waterways.		Our combined aquatics and analytical lab facilities provide rapid assessment of water parameters. This allows us to provide all reports in a timely manner, and strengthen CRP data. Furthermore, our northern location reduces the previous travel load of other HGAC partners, and our capabilities allow for more sampling efforts in our area, if needed.

Question	Environmental Institute of Houston | UH (EIH) Answers provided verbally at 2020 CMM	Harris County Pollution Control (HCPC)	Houston Drinking Water Operations HDW	Houston-Galv Cour (H-G/
Are there any monitoring activities that you are currently performing that you would like to discontinue (locations, parameters, frequency, etc.)? If so, why?		No.	No.	
Are there any monitoring activities that you are not currently performing that you would like to add (locations, parameters, frequency, etc.)? If so, why?		We would be interested in possibly adding a parameter for PCB sample collection and analysis. This would give us a better indication of the water quality for the sites and locations in the waterways that we monitor.	Interested in adding sites from the Trinity River due to expansion of their drinking water facilities and interbasin transfer. Both Luce Bayou and Trinity River. Luce Bayou is part of Lake Houston. For monitoring on the Trinity, will need to contact Trinity River Authority about sampling in their basin. TCEQ would be interested in profile data (quarterly at minimum), particularly from the site downstream from Luce Bayou.	

veston Area ncil AC)	City of Houston Health and Human Services (HHD)	San Jacinto River Authority (SJRA)	Texas Commission on Environmental Quality Region 12 (TCEQ R12)	TRIES
	Not at this time.	All sites seem to be beneficial to the SJRA and to the CRP. Metals in the Woodlands	We don't want to, but due to diminishment of staff, we will need to drop some sites. We will assess what we were capable of at the end of FY20 to determine how many and which sites will be dropped for FY21	We are very satisfied with our current monitoring parameters and frequency. There have been two SLOCs of concern, 11236 and 14242, but we have been in constant communication with HGAC about this. For SLOC 14242-East San Jac @ I-69, the freeway is undergoing construction. SE1 (Oct 2019) was impeded due to block of access; however we found new access for SE2 in (Jan 2020). We collected water samples but not able to measure flow; TRIES wants to reassess in SE3 (now May 2020) and is willing to continue sampling at SLOC 14242 as long as it remains accessible. In previous years it has been difficult to get flow measurements at SLOC 11236; new survey crew is going to reassess feasibility with flow-boat when SE3 occurs.
	Not at this time.	I would like to add flow monitoring to the Woodlands sampling at the creek sites.	VOCs, SVOCs, PFAS, and organics. Would like to get background data that can be used for comparison after adverse events. Frequency of at least once per year, preferably twice, in areas that are heavily industrial and areas that are relatively undisturbed	Not at this time.

Question	Environmental Institute of Houston | UH (EIH) Answers provided verbally at 2020 CMM	Harris County Pollution Control (HCPC)	Houston Drinking Water Operations HDW	Houston-Galv Coun (H-G
What parameters (bacteria, nitrogen, phosphorus, total suspended solids, etc.) are your agency most interested in, and why?	Monitors under contract to H-GAC. Their monitoring schedule is dependent upon H-GAC's needs.	We would continue to look at results from all of the parameters that we currently provide data to CRP for. This gives us an indication of the water quality for the sites and locations in the waterways that we monitor.	Bacteria, nutrients, turbidity	After getting a fev of recent data, ma discontinue monit portion of Lake Cr to collect Chlorop prohibitive.
What changes do you anticipate in your agency's monitoring program in the next year? 5 years? 10 years?	Monitors under contract to H-GAC. Their monitoring schedule is dependent upon H-GAC's needs.	HCPC anticipates increasing our capacity to be able to increase our sampling sites and parameters. We are purchasing a new boat and lab instrumentation to be able to increase our workload over the next 5 to 10 years.	Sourcewater protection is also looking at groundwater.	Continue monitor where there are r monitoring entitie getting other ager entities as partne Walker County, Po
Are there any changes you'd like to see in the way H-GAC operates its Clean Rivers Program activities?	No	Not at this time.	No.	
Are there any equipment or training needs that would help your agency better implement your monitoring program?		The purchase of an additional IDEXX Sealer for the microbiology samples.	Training for depth profiles.	Jessie and Kendal in the Flow Tracke would require tra maintenance cost the older sondes may need to upgr equipment in the two.
Please provide any additional comments or suggestions.		N/A	No.	

veston Area ncil AC)	City of Houston Health and Human Services (HHD)	San Jacinto River Authority (SJRA)	Texas Commission on Environmental Quality Region 12 (TCEQ R12)	TRIES
v years worth ay want to toring on upper reek. Would like hyll, but cost	Bacteria and dissolved oxygen as the most significant indicators of surface water quality	It would be nice to go back to sampling Chlorophyll and TKN at all sites.	All of them.	Our interests align with the CRP monitoring. Now that we have several years of data to compare, our short-term interests are in tracking any fluctuations in parameters that could suggest an environmental change.
ing in areas not other es. Looking at ncies and local rs (such as earland, etc.)	Staffing changes and cross-trainings	None	Anticipate scaling back number of sample sites based on lack of TCEQ staff assigned to SWQM	The TRIES Analytical Laboratory will be undergoing location change on the SHSU campus. We feel this will help strengthen our monitoring program over the next 5 years. This will allow the analytical lab to streamline their program, improve assay capabilities and expand its services to the community.
	The CRP training by EIH was extremely beneficial to our staff. We would like to see the training held occasionally as needed or maybe 1-2 years. We appreciated the opportunity to have new staff attend the event.	No		Not at this time.
l are interested er 2, which ining. Increased s on some of mean that we ade to newer next year or	We are planning to purchase at least one new monitoring instrument and would like to discuss with H-GAC their thoughts on preferred equipment as its been a while since our last purchase of monitoring equipment	We would need flow equipment if we are going to do flow. We would always take a new fancy YSI as well if all had extras.	Training on new equipment, such as Flowtracker 2	HGAC provided SWQM Water Monitoring training to the new Field and Lab QAOs in February 2020. In FY19, we acquired a flow boat and the new survey team wants to try it at SLOC 11236 where flow measurements have been limited. Our team is comfortable and successful with using a Marsh McBirney to measure flow. However, if access to a flowmeter becomes available, it would streamline our flow portion.
	Thank you	Keep up the good work and have a good day.		We are very appreciative of the advice and training offered by HGAC. It eased the transition process of the new Field QAO & Data Manager and Lab QAO.

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