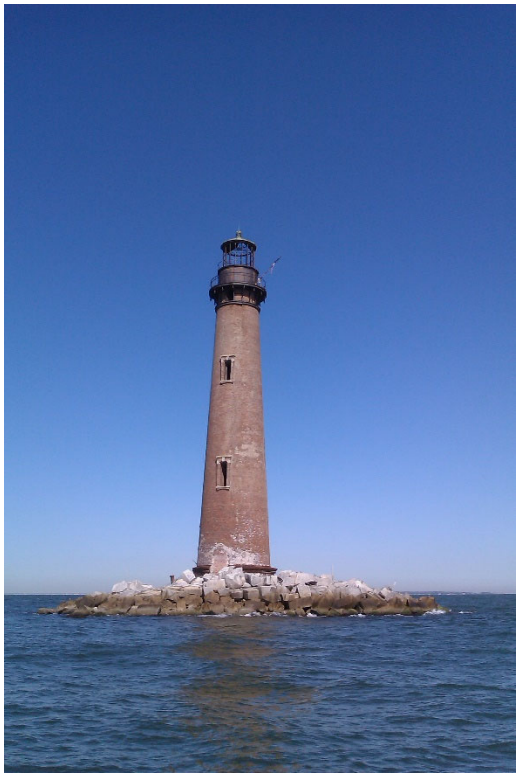
2019 Mississippi Sound Sub-Estuary Report



Alabama Department of Environmental Management

Field Operations Division
Mobile Office
Environmental Assessment Section
Water Unit
July 2022

Coastal Waters Monitoring Program

2019

Mississippi Sound Sub-Estuary Report

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Water Unit

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LIST OF ACRONYMS

A&I	Agricultural and Industrial Water Supply use classification
ADEM	Alabama Department of Environmental Management
CHL *a*	Chlorophyll *a*
CWA	Clean Water Act
CWMP	Coastal Waters Monitoring Program
DO	Dissolved Oxygen
F&W	Fish and Wildlife
LWF	Limited Warmwater Fishery
MAX	Maximum
MDL	Method Detection Limit
MIN	Minimum
NTU	Nephelometric Turbidity Units
OAW	Outstanding Alabama Water
PWS	Public Water Supply
QAPP	Quality Assurance Project Plan
S	Swimming and Other Whole Body Water-Contact Sports
SD	Standard Deviation
SH	Shellfish Harvesting
SOP	Standard Operating Procedures
TEMP	Temperature
TN	Total Nitrogen
TMDL	Total Maximum Daily Load
TP	Total Phosphorus
TSS	Total Suspended Solids
USACE	United States Army Corp of Engineers
USEPA	United States Environmental Protection Agency

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INTRODUCTION

The Mississippi Sound watershed forms the southwestern boundary of coastal Alabama and Mississippi and empties into the Gulf of Mexico. Major tributaries to the Mississippi Sound include West Fowl River, Bayou La Batre River, Grand Bay, Portersville Bay, and Heron Bay. This watershed provides valuable resources to the area including spawning habitats for commercial and recreational fish and shellfish, and recreational activities such as boating, fishing, and swimming.

The Alabama Department of Environmental Management (ADEM) monitored stations within the Mississippi Sound watershed as part of the 2019 assessment under the Coastal Waters Monitoring Program (CWMP). Implemented in 2011, the CWMP is designed to provide data to assess current water quality conditions, identify long-term trends in water quality conditions and to develop Total Maximum Daily Loads (TMDLs) and nutrient criteria, Table 1. The program is also being used to update protocols and methodologies to more accurately assess water quality conditions for estuaries and coastal rivers and streams. Although the CWMP is relatively new, most sites within it have been sampled in other programs throughout ADEM's history, with many having been sampled since the 1970's. Descriptions of all CWMP monitoring activities are available in ADEM's State of Alabama Water Quality Monitoring Strategy (ADEM 2017).

Surface waters within Alabama are categorized according to their designated use classification and the degree to which the water quality supports its use classification. As required by Section 303(d) of the 1972 Clean Water Act (CWA), surface waters that do not meet their use classification are placed on Alabama's 303(d) List of Impaired Waters. Once a waterbody is listed as impaired, a TMDL is implemented to take measures needed for the waterbody to meet or exceed

its water quality standards. Table 1 shows a tabular listing of waterbodies that remain on the 303(d) list as impaired. Figure 1 shows a map of 2019 monitoring locations as well as waterbodies within the Mississippi Sound watershed that are on the 2019 CWA 303(d) list.

The purpose of this report is to summarize data collected at sixteen stations within the Mississippi Sound watershed during the 2019 growing season and to evaluate trends in nutrient concentrations using ADEM's historic dataset. Monthly and/or mean concentrations of nutrients [total nitrogen (TN); total phosphorus (TP)], algal biomass/productivity [chl *a*], and sediment [total suspended solids (TSS)], were compared to ADEM's historical data.

Table 1. 303(d) listed water bodies in the Mississippi Sound Sub-Estuary.

Assessment Unit ID	Waterbody Name	County	Uses	Causes	Sources	Size	Unit Type	Year Listed
AL03170008-0402-110	Escatawpa River	Mobile	Swimming Fish & Wildlife	Metals (Mercury)	Atmospheric deposition	70.66	miles	2002
AL03170008-0502-110	Big Creek (Big Creek Lake)	Mobile	Public Water Supply Fish & Wildlife	Metals (Mercury)	Atmospheric deposition	2,724.87	acres	2008
AL03170008-0502-211	Hamilton Creek (Big Creek Lake)	Mobile	Public Water Supply Fish & Wildlife	Metals (Mercury)	Atmospheric deposition	583.14	acres	2008
AL03170008-0502-600	Boggy Branch	Mobile	Fish & Wildlife	Metals (Iron)	Natural Wet weather discharge	3.62	miles	1998
AL03170008-0502-600	Boggy Branch	Mobile	Fish & Wildlife	Metals (Lead)	Natural Wet weather discharge	3.62	miles	1998
AL03170008-0502-800	Collins Creek	Mobile	Fish & Wildlife	Metals (Arsenic)	Unknown source	5.15	miles	2006
AL03170009-0201-100	Mississippi Sound	Mobile	Shellfish Harvesting Swimming Fish & Wildlife	Metals (Thallium)	Industrial	94.62	square miles	2010
AL03170009-0201-100	Mississippi Sound	Mobile	Shellfish Harvesting Swimming Fish & Wildlife	Pathogens (Enterococcus)	Urban runoff/storm sewers	94.62	square miles	1998

Table 1. (continued)

Assessment Unit ID	Waterbody Name	County	Uses	Causes	Sources	Size	Unit Type	Year Listed
AL03170009-0201-200	Portersville Bay	Mobile	Shellfish Harvesting Swimming Fish & Wildlife	Pathogens (Enterococcus)	Municipal	18.81	square miles	1998
AL03170009-0201-300	Grand Bay	Mobile	Shellfish Harvesting Swimming Fish & Wildlife	Pathogens (Enterococcus)	On-site wastewater systems	30.73	square miles	2006
AL-Gulf-of-Mexico-1	Gulf of Mexico	Baldwin Mobile	Shellfish Harvesting Swimming Fish & Wildlife	Metals (Mercury)	Atmospheric deposition	205.77	square miles	1998
AL-Gulf-of-Mexico-2	Pelican Bay	Mobile	Shellfish Harvesting Swimming Fish & Wildlife	Metals (Mercury)	Atmospheric deposition	0.50	square miles	1998
AL-Gulf-of-Mexico-2	Pelican Bay	Mobile	Shellfish Harvesting Swimming Fish & Wildlife	Pathogens (Enterococcus)	Unknown source	0.50	square miles	2018

METHODS

Sampling stations were selected using historical data and previous assessments (Fig. 1). Specific location information can be found in Table 2. Bayou La Batre, West Fowl River, Fowl River Bay, Grand Bay, Portersville Bay, Heron Bay, Mississippi Sound, and the Gulf of Mexico were sampled within the Mississippi Sound watershed.

Water quality assessments were conducted monthly March-October. All samples were collected, preserved, stored, and transported according to procedures in the ADEM Field Operations Division Standard Operation Procedures (ADEM 2019), Surface Water Quality Assurance Project Plan (2015), and Quality Management Plan (ADEM 2018).

Mean growing season (March-October) TN, TP, chl *a*, and TSS were calculated for long-term trend stations to evaluate water quality conditions at each site using data from 2009 through 2019. Monthly concentrations of these parameters were graphed with ADEM's previously collected data for all stations within the focus watershed. Monthly growing season readings of dissolved oxygen (DO), salinity, and temperature were graphed at 1.5m (5ft), or mid-depth if less than 10ft deep, for comparison with ADEM's water quality criteria level of 5.0 mg/L DO. Growing season profiles of DO, salinity, and temperature were also graphed to show stratification of each parameter. Chemical analysis also includes select total and dissolved metals. While summary statistics of metals analysis are presented in Appendix Table 1, all metals analyses are available through the National Water Quality Monitoring Council Water Quality Data Portal, https://www.waterqualitydata.us/. As Alabama's state environmental regulatory agency, the ADEM submits all surface water quality monitoring data to the EPA.

Figure 1. 2019 Mississippi Sound stations & impaired waterbodies.

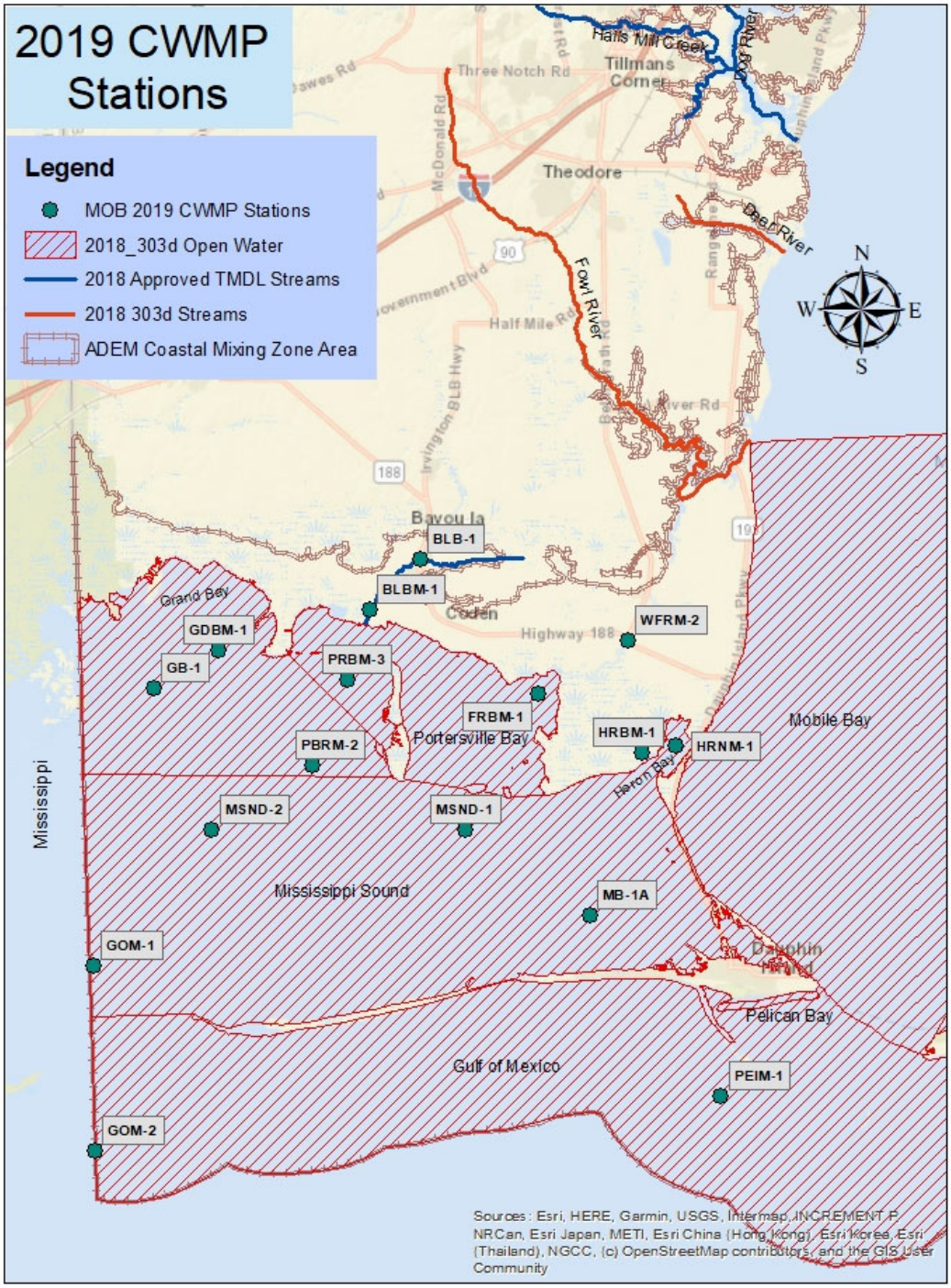


Table 2. Descriptions for the monitoring stations in 2019 for the Mississippi Sound Sub-Watershed.

HUC8	County	Station Number	Use Classification	Waterbody Name	Station Description	Latitude	Longitude
3170009	Mobile	BLB-1	F&W	Bayou la Batre	Bayou La Batre at AL Hwy 188 crossing.	30.4059	-88.2481
3170009	Mobile	BLBM-1	F&W	Bayou la Batre	Bayou La Batre in channel next to light approximately 0.4 mile upstream of the mouth.	30.3867	-88.27
3170009	Mobile	WFRM-2	F&W, S	West Fowl River	West Fowl River at CR188 (approximately 2.5 miles inland from Fowl River Bay).	30.376186	-88.158137
3170009	Mobile	FRBM-1	F&W, S, SH	Fowl River Bay	Middle of Fowl River Bay.	30.3559	-88.1965
3170009	Mobile	HRNM-1	F&W, S, SH	Heron Bay	Heron Bay.	30.337194	-88.136889
3170009	Mobile	HRBM-1	F&W, S, SH	Heron Bay	Middle of Heron Bayou.	30.33445	-88.15178
3170009	Mobile	GDBM-1	F&W, S, SH	Grand Bay	Middle of Grand Bay.	30.3709	-88.335

Table 2. (continued)

HUC8	County	Station Number	Use Classification	Waterbody Name	Station Description	Latitude	Longitude
3170009	Mobile	GB-1	F&W, S, SH	Grand Bay	Grand Bay	30.356667	-88.362833
3170009	Mobile	PRBM-3	F&W, S, SH	Portersville Bay	0.5 miles south of the most northern point on Isle of Herbes and 1.25 miles west of Isle of Herbes.	30.36046	-88.279224
3170009	Mobile	PBRM-2	F&W, S, SH	Portersville Bay	Portersville Bay just west of the southern tip of the Isle aux Herbes in the main navagation channel.	30.328467	-88.29403
3170009	Mobile	MSND-2	F&W, S, SH	Mississippi Sound	5.25 mi NNW of the western most tip of Dauphin Island.	30.303542	-88.33695
3170009	Mobile	MSND-1	F&W, S, SH	Mississippi Sound	One mile south of the most western tip of Marsh Island.	30.304615	-88.22746
3170009	Mobile	MB-1A	F&W, S, SH	Mississippi Sound	Intracoastal Waterway on east side of Portersville Bay at buoy 25.	30.27308	-88.17317
	Open Ocean	GOM-1	F&W, S, SH	Mississippi Sound	Gulf of Mexico-Mississippi Sound on state line.	30.25208	-88.38714
	Open Ocean	GOM-2	F&W, S, SH	Gulf of Mexico	Alabama/Mississippi State Line, 3 miles south of Petit Bois Pass in the Gulf of Mexico and approximately 0.5 miles NE of Eastern extent of Petit Bois Island.	30.18303	-88.38559
	Open Ocean	PEIM-1	F&W, S, SH	Gulf of Mexico	Alabama/Mississippi State Line, 3 miles south of Petit Bois Pass in the Gulf of Mexico and approximately 0.5 miles NE of Eastern extent of Petit Bois Island.	30.20616	-88.11608

RESULTS

Growing season mean graphs of TN, TP, chl *a*, and TSS are provided in this section (Figs. 2-5). Monthly graphs for TN, TP, chl *a*, TSS, DO, temperature, and salinity are also provided (Figs. 6-10). Depth profile graphs of DO, temperature, and salinity appear in Figure 11. Summary statistics of all data collected during 2019 are presented in Appendix Table 1. The table contains the minimum, maximum, median, mean, and standard deviation of each parameter analyzed.

Stations with the highest concentrations of nutrients, chlorophyll, and TSS are noted in the paragraphs to follow. Though stations with the lowest concentrations may not always be mentioned, review of the graphs that follow will indicate these stations that may be potential candidates for reference waterbodies and watersheds.

In 2019 the highest mean TN value in the Mississippi Sound watershed was in the Gulf of Mexico at PEIM-1 (Fig. 2). With the exception of Grand Bay (GB-1) and the Gulf of Mexico (GOM-2 and PEIM-1), monthly TN concentrations tended to be lower in the spring and increase through the fall Fig. 6.

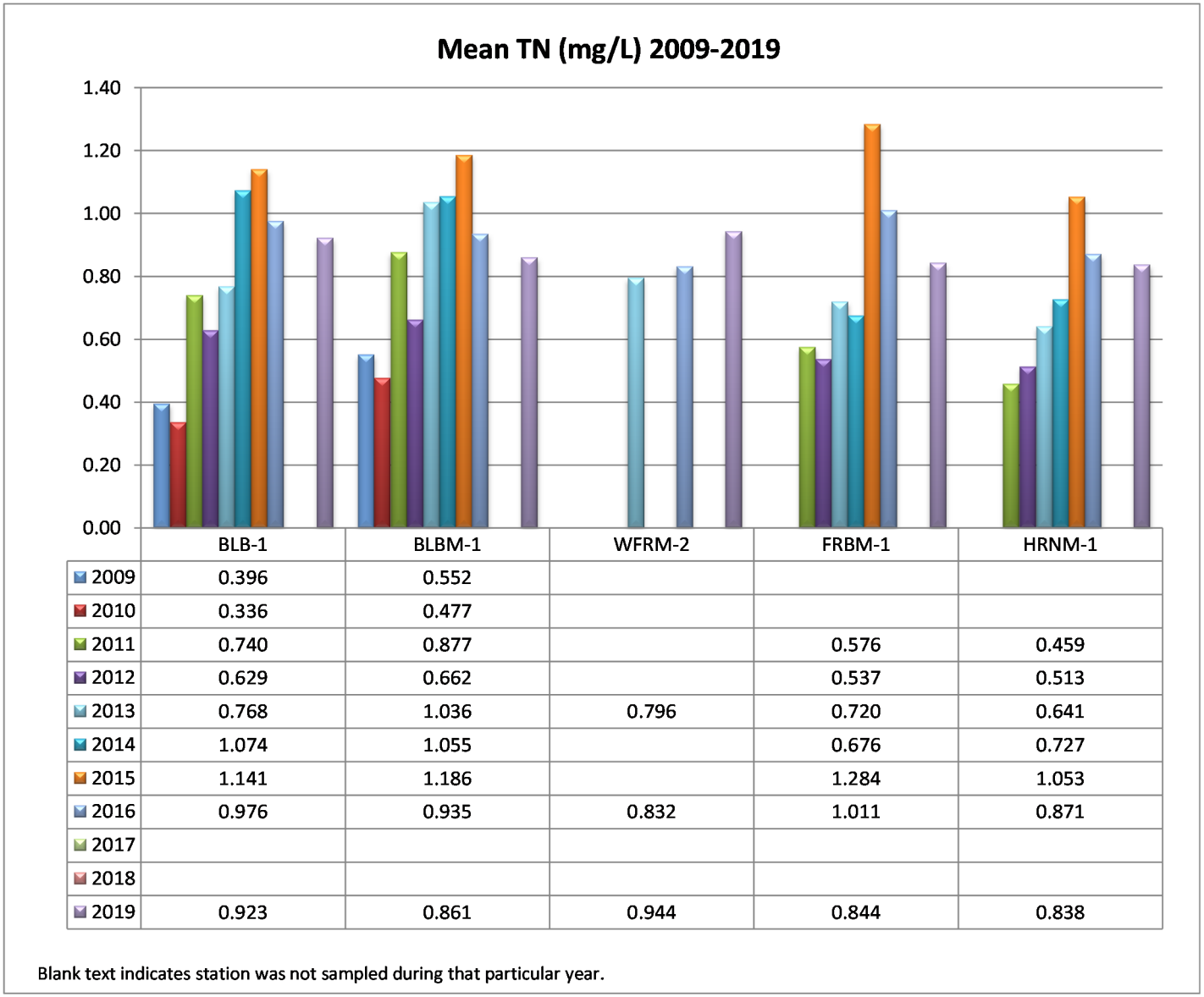
In 2019 the highest growing season mean TP value was in Bayou la Batre (BLB-1) and Heron Bay (HRBM-1) (Fig. 3). Monthly TP concentrations are displayed in Fig. 7. The highest monthly TP concentration was measured in the Gulf of Mexico at GOM-1 during March.

In 2019 the highest mean growing season chl *a* values were in and near Grand Bay at GB-1 and GDBM-1 (Fig. 4). Monthly chl *a* concentrations for most stations have decreased or remained near the historic means (Fig. 8). The highest monthly chl a concentration was measured in Bayou la Batre at BLB-1 during September. Chl *a* criteria have not been established in the coastal area.

In 2019 the highest mean growing season TSS value was in the Heron Bay at HRBM-1 (Fig. 5). Monthly concentrations were the highest in 2019 during May at Heron Bay (HRBM-1) (Fig. 9).

Dissolved oxygen concentrations in the Bayou La Batre at BLB-1 were below the ADEM criteria limit of 5.0 mg/L April through October (ADEM Admin. Code R. 335-6-10-09) (Fig. 10). DO concentrations in Bayou La Batre (BLBM-1), West Fowl River (WFRM-2), Mississippi Sound (MSND-1) and the Gulf of Mexico (GOM-2) were near or below the criteria limit at least one month during the growing season. All measurements of DO concentrations at other sites were above the ADEM criteria. Monthly depth profiles of dissolved oxygen, temperature, and salinity for Mississippi Sound Watershed stations are provided in Figure 11.

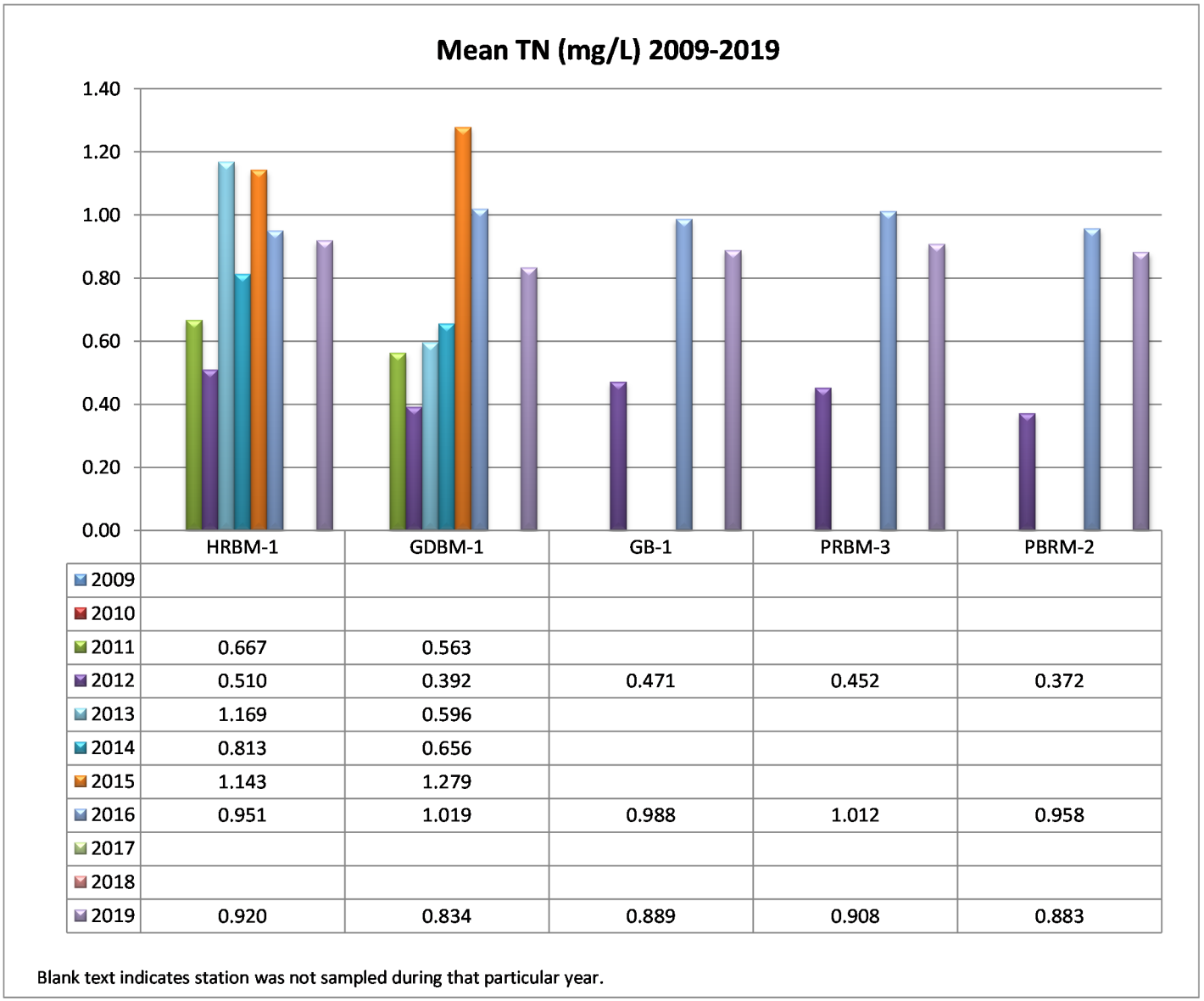
Figure 2. Mean growing season TN measured in Mississippi Sound Sub-Watershed stations, 2009-2019.



	BLB-1	BLBM-1	WFRM-2	FRBM-1	HRNM-1
2009	0.396	0.552			
2010	0.336	0.477			
2011	0.740	0.877		0.576	0.459
2012	0.629	0.662		0.537	0.513
2013	0.768	1.036	0.796	0.720	0.641
2014	1.074	1.055		0.676	0.727
2015	1.141	1.186		1.284	1.053
2016	0.976	0.935	0.832	1.011	0.871
2017					
2018					
2019	0.923	0.861	0.944	0.844	0.838

Blank text indicates station was not sampled during that particular year.

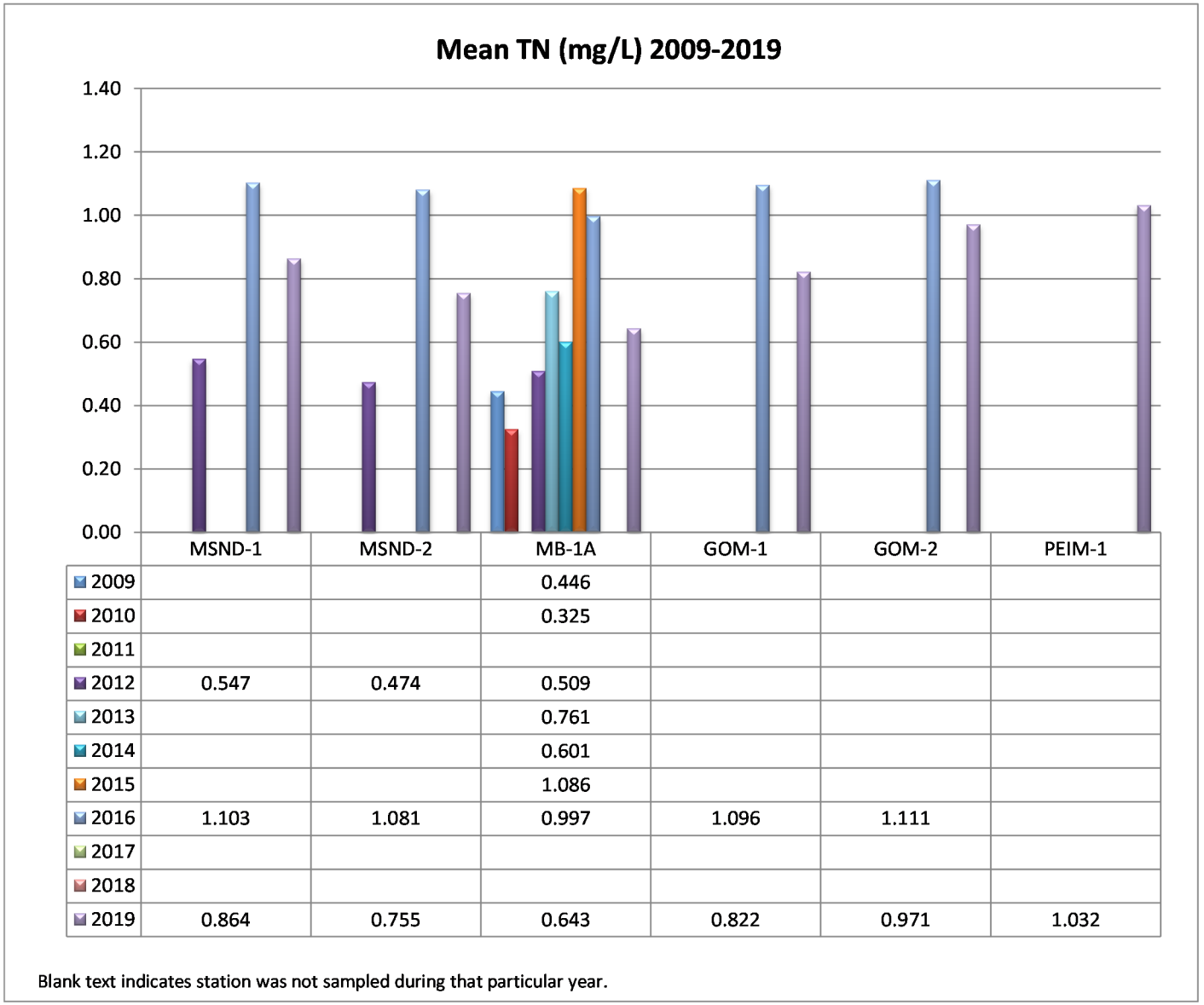
Figure 2. (continued)



	HRBM-1	GDBM-1	GB-1	PRBM-3	PBRM-2
2009					
2010					
2011	0.667	0.563			
2012	0.510	0.392	0.471	0.452	0.372
2013	1.169	0.596			
2014	0.813	0.656			
2015	1.143	1.279			
2016	0.951	1.019	0.988	1.012	0.958
2017					
2018					
2019	0.920	0.834	0.889	0.908	0.883

Blank text indicates station was not sampled during that particular year.

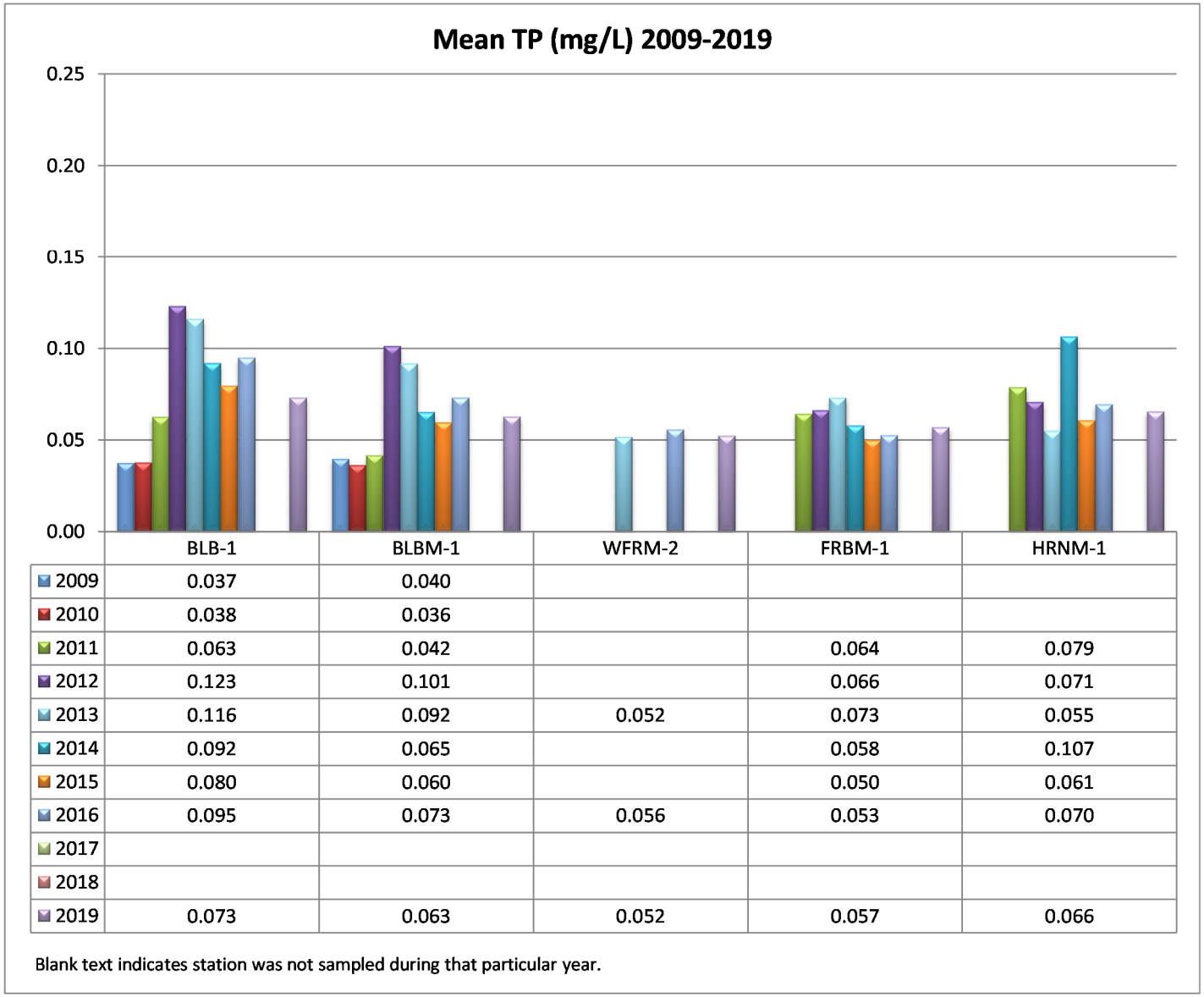
Figure 2. (continued)



	MSND-1	MSND-2	MB-1A	GOM-1	GOM-2	PEIM-1
2009			0.446			
2010			0.325			
2011						
2012	0.547	0.474	0.509			
2013			0.761			
2014			0.601			
2015			1.086			
2016	1.103	1.081	0.997	1.096	1.111	
2017						
2018						
2019	0.864	0.755	0.643	0.822	0.971	1.032

Blank text indicates station was not sampled during that particular year.

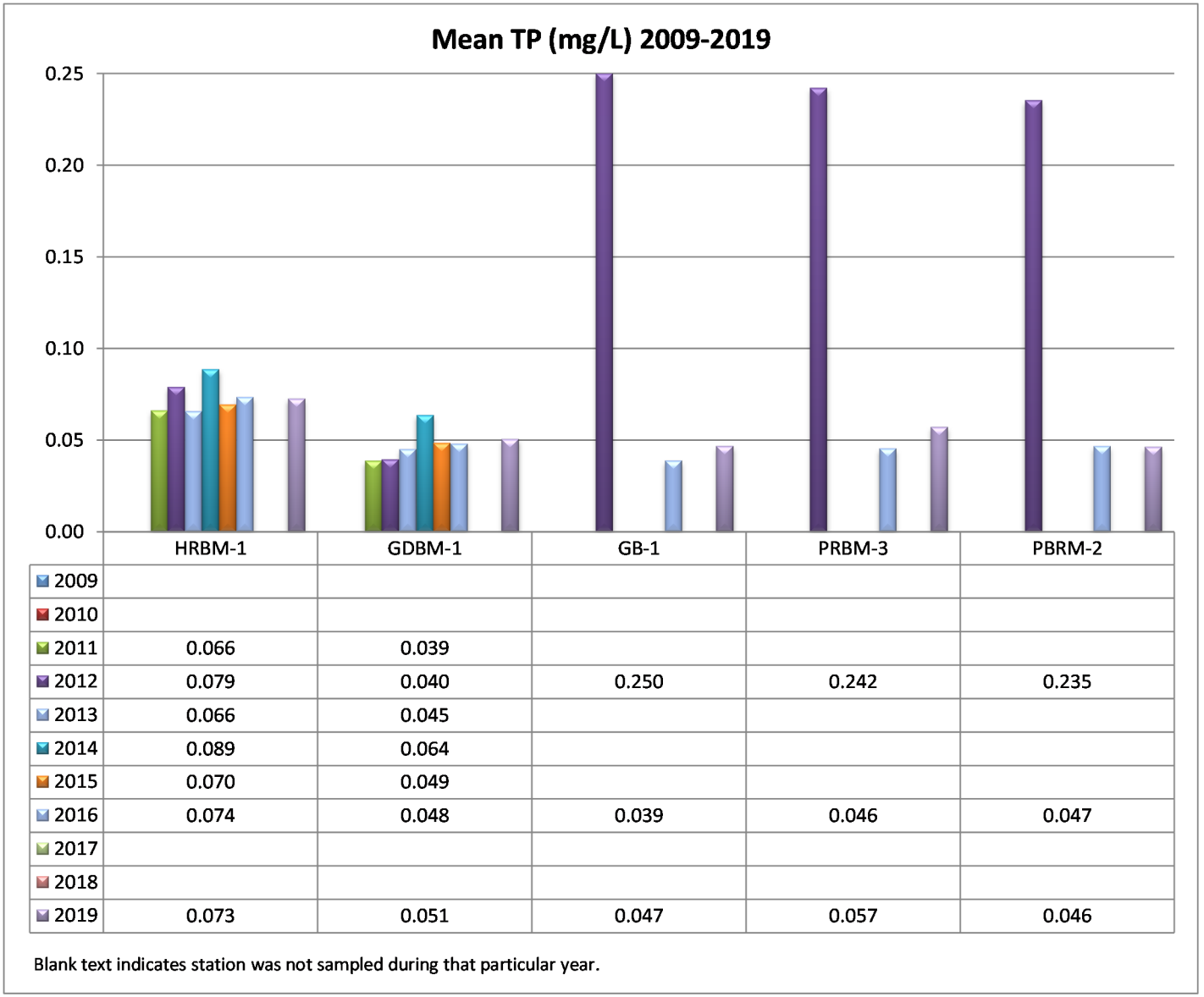
Figure 3. Mean growing season TP measured in Mississippi Sound Sub-Watershed stations, 2009-2019.



	BLB-1	BLBM-1	WFRM-2	FRBM-1	HRNM-1
2009	0.037	0.040			
2010	0.038	0.036			
2011	0.063	0.042		0.064	0.079
2012	0.123	0.101		0.066	0.071
2013	0.116	0.092	0.052	0.073	0.055
2014	0.092	0.065		0.058	0.107
2015	0.080	0.060		0.050	0.061
2016	0.095	0.073	0.056	0.053	0.070
2017					
2018					
2019	0.073	0.063	0.052	0.057	0.066

Blank text indicates station was not sampled during that particular year.

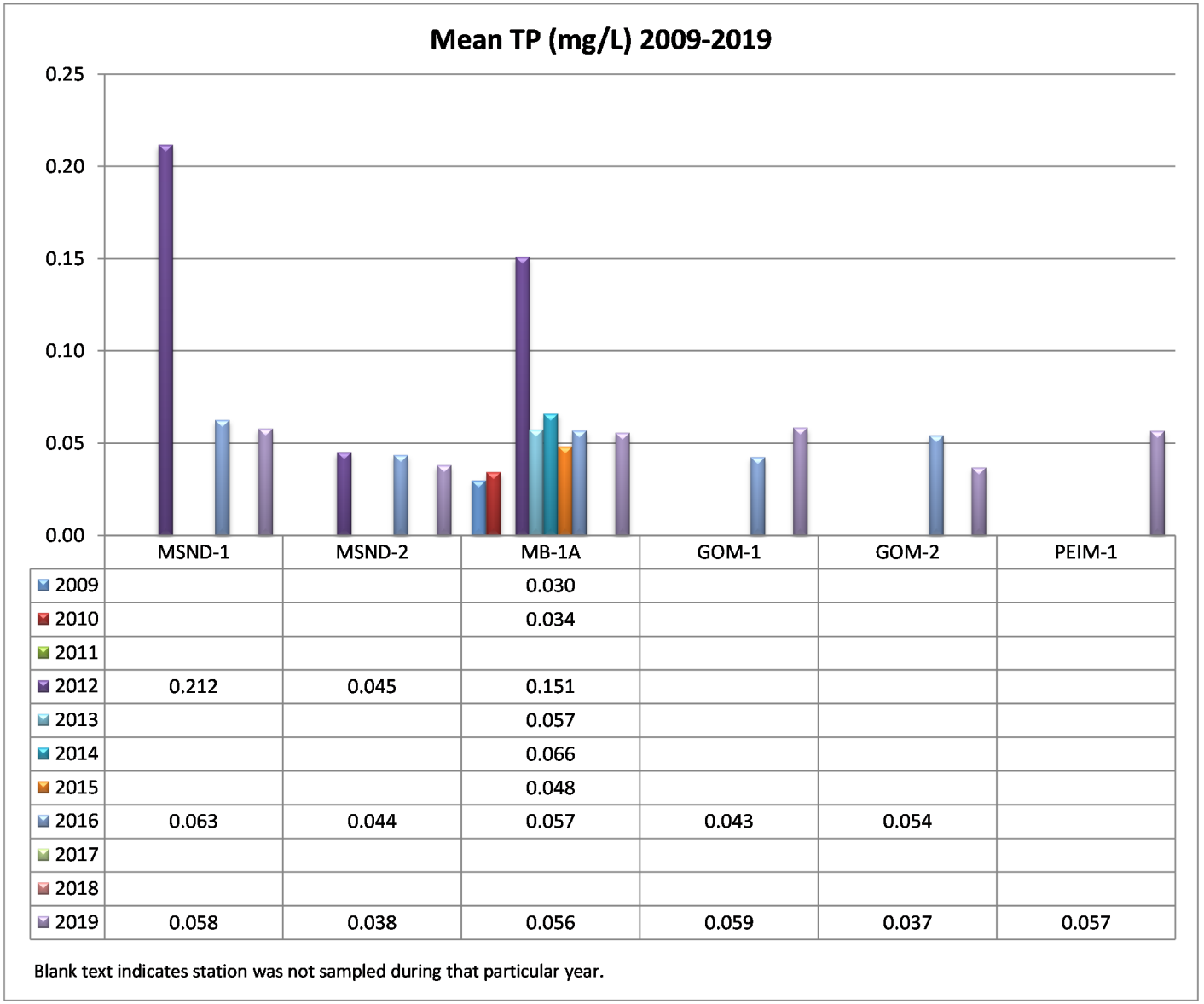
Figure 3. (continued)



	HRBM-1	GDBM-1	GB-1	PRBM-3	PBRM-2
2009					
2010					
2011	0.066	0.039			
2012	0.079	0.040	0.250	0.242	0.235
2013	0.066	0.045			
2014	0.089	0.064			
2015	0.070	0.049			
2016	0.074	0.048	0.039	0.046	0.047
2017					
2018					
2019	0.073	0.051	0.047	0.057	0.046

Blank text indicates station was not sampled during that particular year.

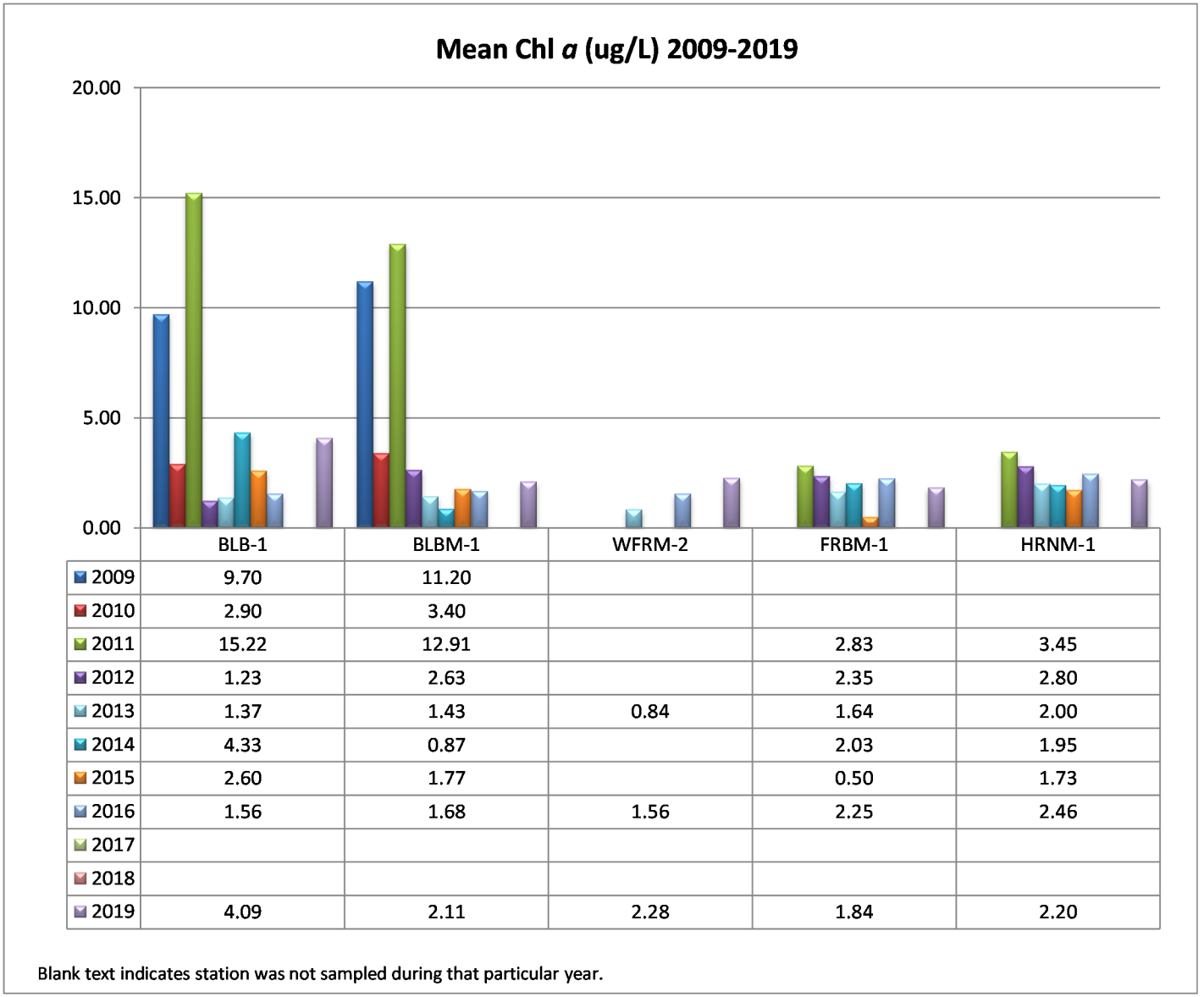
Figure 3. (continued)



	MSND-1	MSND-2	MB-1A	GOM-1	GOM-2	PEIM-1
2009			0.030			
2010			0.034			
2011						
2012	0.212	0.045	0.151			
2013			0.057			
2014			0.066			
2015			0.048			
2016	0.063	0.044	0.057	0.043	0.054	
2017						
2018						
2019	0.058	0.038	0.056	0.059	0.037	0.057

Blank text indicates station was not sampled during that particular year.

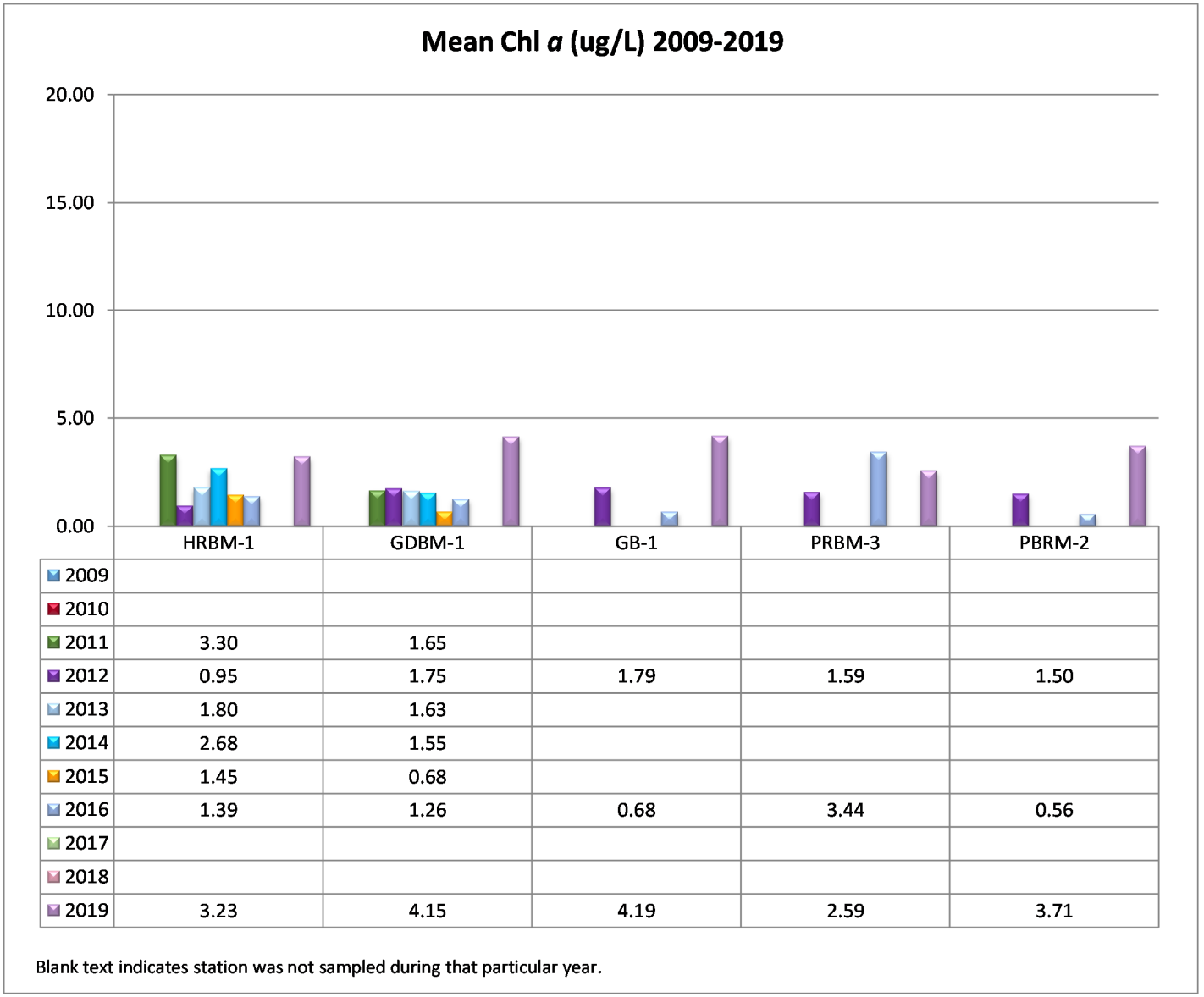
Figure 4. Mean growing season chl *a* measured in Mississippi Sound Sub-Watershed stations, 2009-2019.



	BLB-1	BLBM-1	WFRM-2	FRBM-1	HRNM-1
2009	9.70	11.20			
2010	2.90	3.40			
2011	15.22	12.91		2.83	3.45
2012	1.23	2.63		2.35	2.80
2013	1.37	1.43	0.84	1.64	2.00
2014	4.33	0.87		2.03	1.95
2015	2.60	1.77		0.50	1.73
2016	1.56	1.68	1.56	2.25	2.46
2017					
2018					
2019	4.09	2.11	2.28	1.84	2.20

Blank text indicates station was not sampled during that particular year.

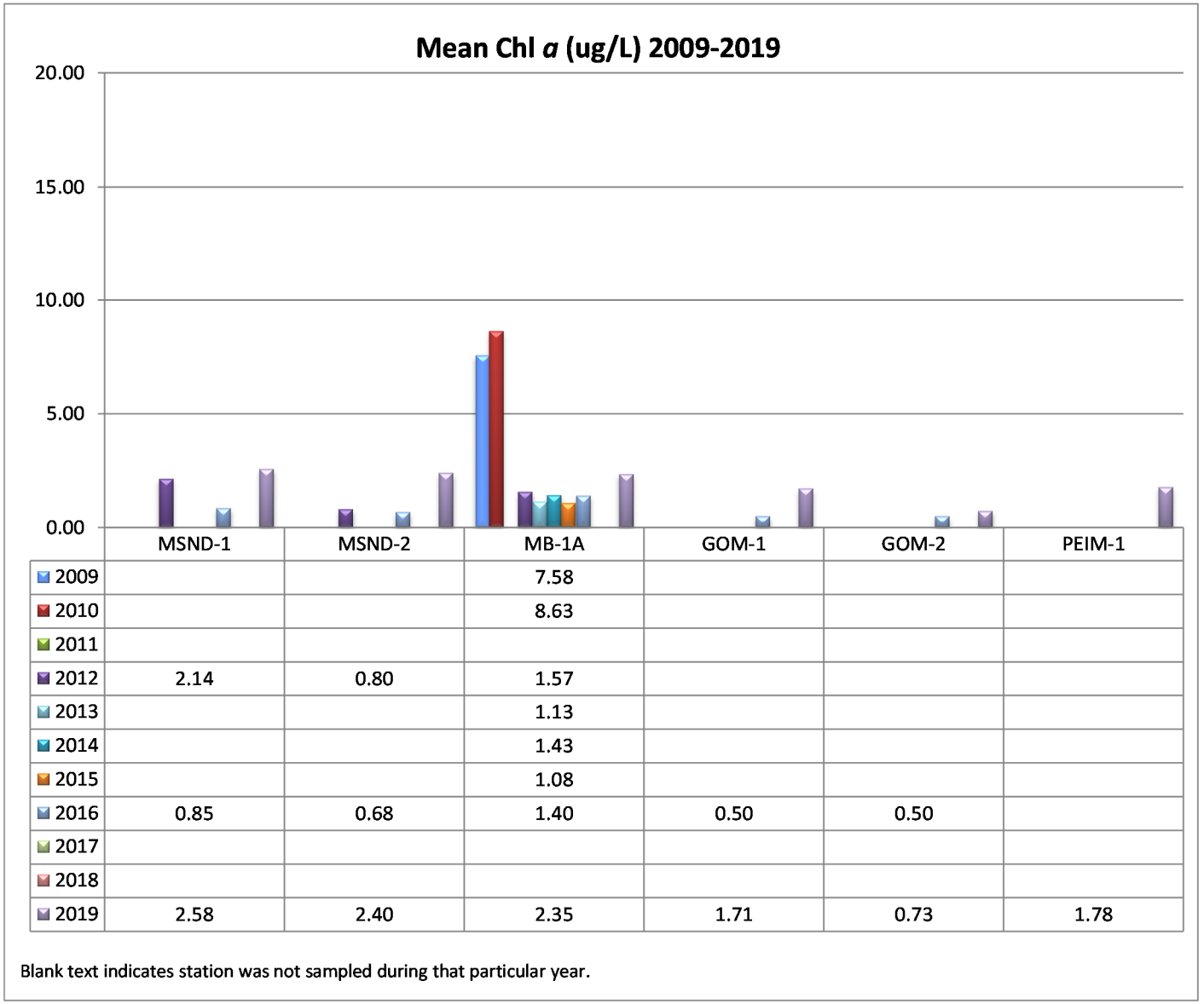
Figure 4. (continued)



	HRBM-1	GDBM-1	GB-1	PRBM-3	PBRM-2
2009					
2010					
2011	3.30	1.65			
2012	0.95	1.75	1.79	1.59	1.50
2013	1.80	1.63			
2014	2.68	1.55			
2015	1.45	0.68			
2016	1.39	1.26	0.68	3.44	0.56
2017					
2018					
2019	3.23	4.15	4.19	2.59	3.71

Blank text indicates station was not sampled during that particular year.

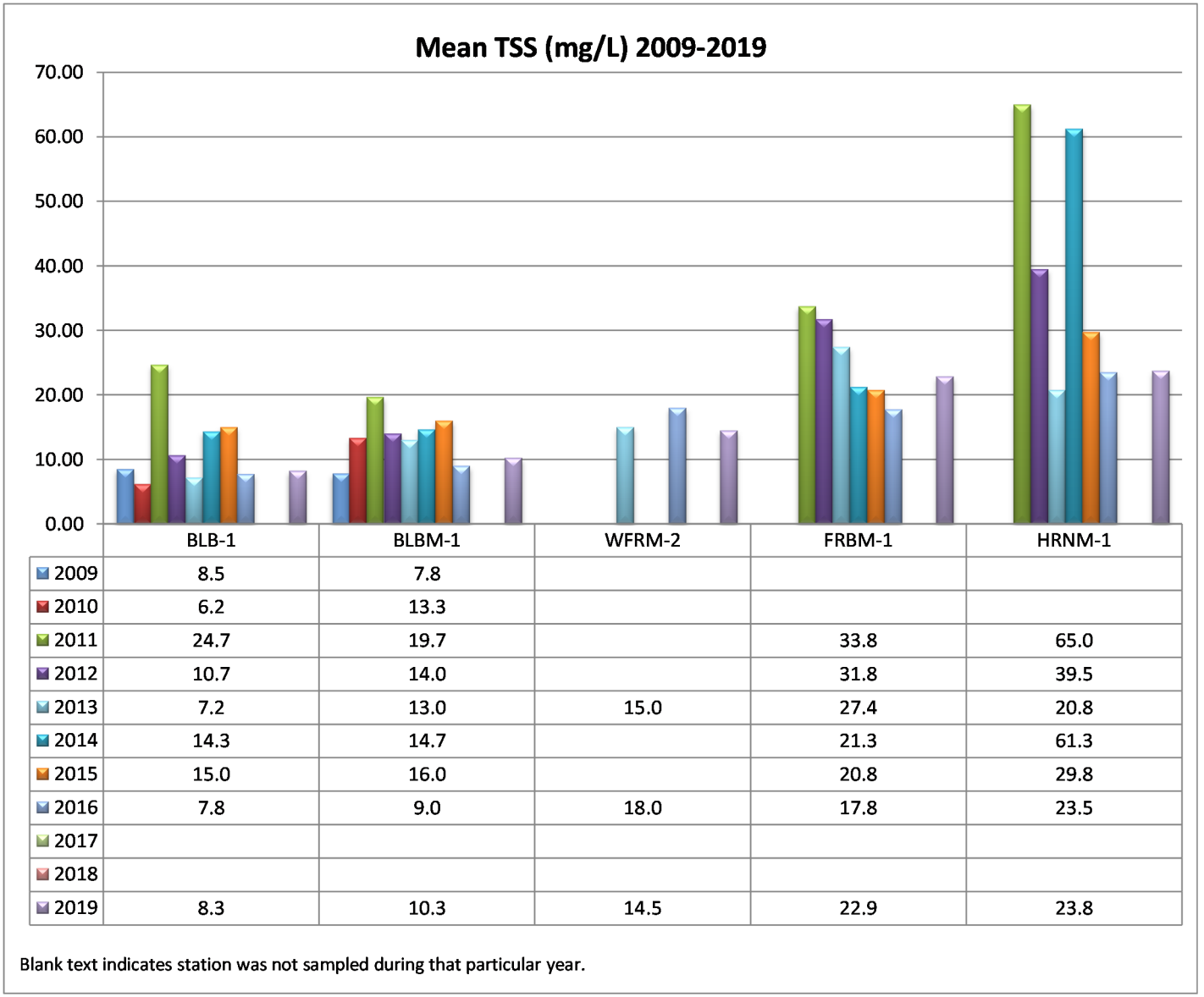
Figure 4. (continued)



	MSND-1	MSND-2	MB-1A	GOM-1	GOM-2	PEIM-1
2009			7.58			
2010			8.63			
2011						
2012	2.14	0.80	1.57			
2013			1.13			
2014			1.43			
2015			1.08			
2016	0.85	0.68	1.40	0.50	0.50	
2017						
2018						
2019	2.58	2.40	2.35	1.71	0.73	1.78

Blank text indicates station was not sampled during that particular year.

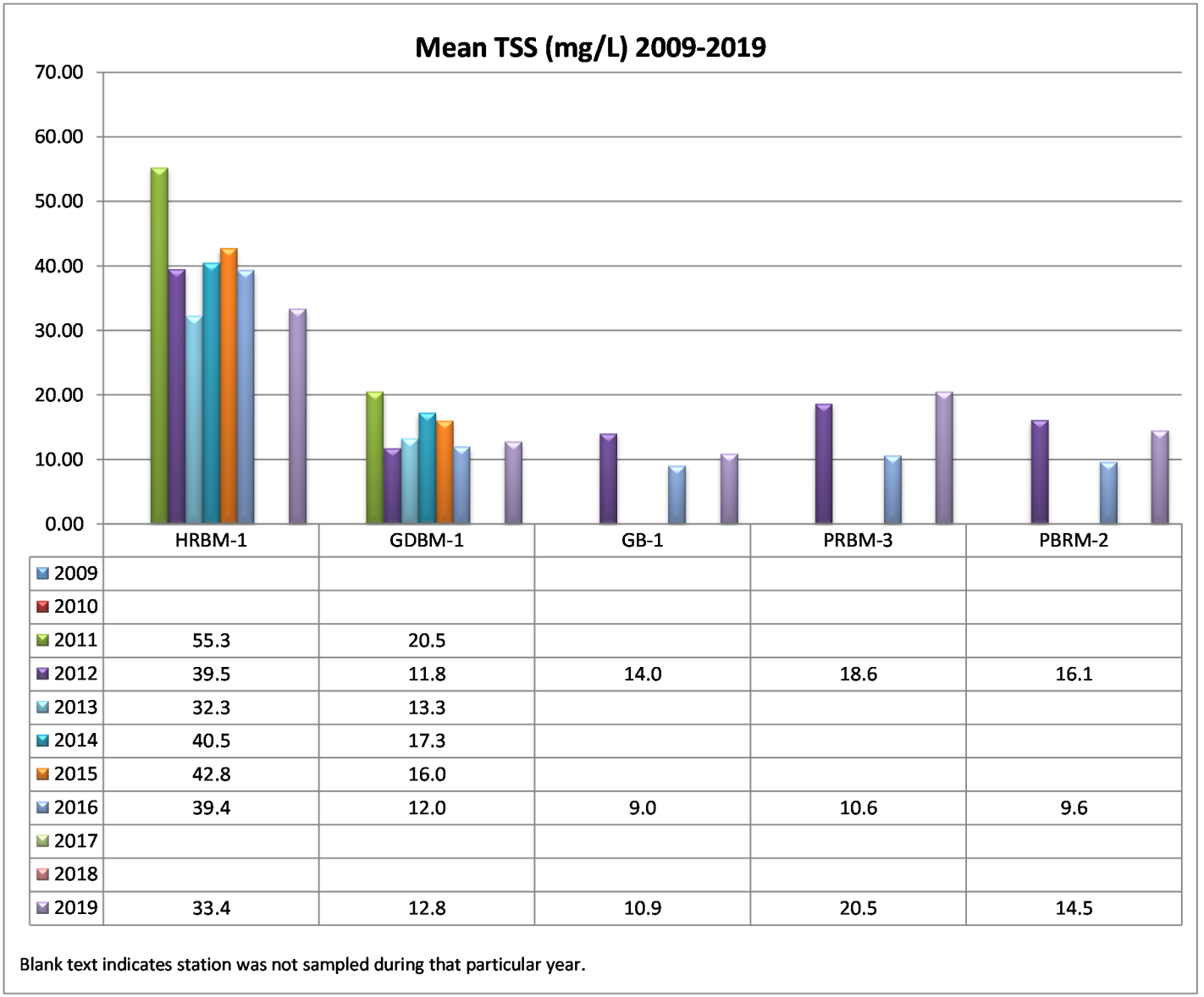
Figure 5. Mean growing season TSS measured in Mississippi Sound Sub-Watershed stations, 2009-2019.



	BLB-1	BLBM-1	WFRM-2	FRBM-1	HRNM-1
2009	8.5	7.8			
2010	6.2	13.3			
2011	24.7	19.7		33.8	65.0
2012	10.7	14.0		31.8	39.5
2013	7.2	13.0	15.0	27.4	20.8
2014	14.3	14.7		21.3	61.3
2015	15.0	16.0		20.8	29.8
2016	7.8	9.0	18.0	17.8	23.5
2017					
2018					
2019	8.3	10.3	14.5	22.9	23.8

Blank text indicates station was not sampled during that particular year.

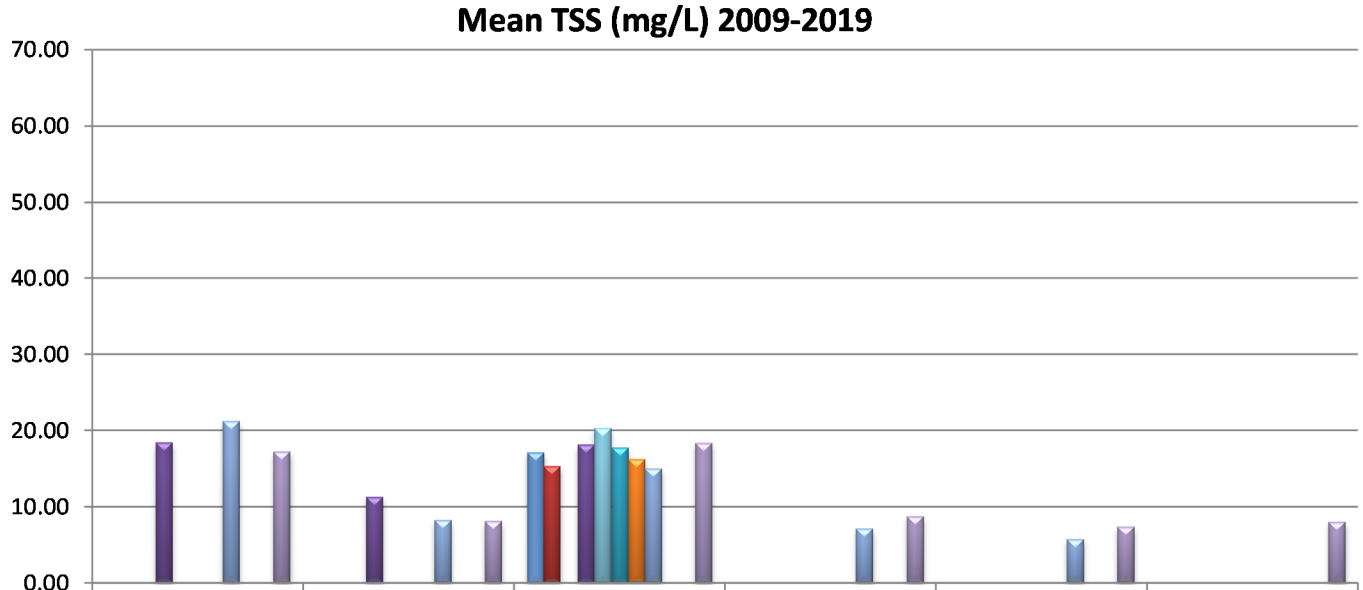
Figure 5. (continued)



	HRBM-1	GDBM-1	GB-1	PRBM-3	PBRM-2
2009					
2010					
2011	55.3	20.5			
2012	39.5	11.8	14.0	18.6	16.1
2013	32.3	13.3			
2014	40.5	17.3			
2015	42.8	16.0			
2016	39.4	12.0	9.0	10.6	9.6
2017					
2018					
2019	33.4	12.8	10.9	20.5	14.5

Blank text indicates station was not sampled during that particular year.

Figure 5. (continued)



	MSND-1	MSND-2	MB-1A	GOM-1	GOM-2	PEIM-1
2009			17.1			
2010			15.3			
2011						
2012	18.4	11.3	18.1			
2013			20.3			
2014			17.8			
2015			16.3			
2016	21.3	8.3	15.0	7.1	5.8	
2017						
2018						
2019	17.3	8.1	18.4	8.8	7.4	8.0

Blank text indicates station was not sampled during that particular year.

Figure 6. Monthly TN concentrations measured in the Mississippi Sound Sub-Watershed, March-October 2019. Each bar graph depicts changes in each station. The historic mean (1990-2019) and min/max ranges are also displayed for comparison. The "n" value equals the number of data points included in the monthly historic calculations. Flow is included for comparison, if conducted.

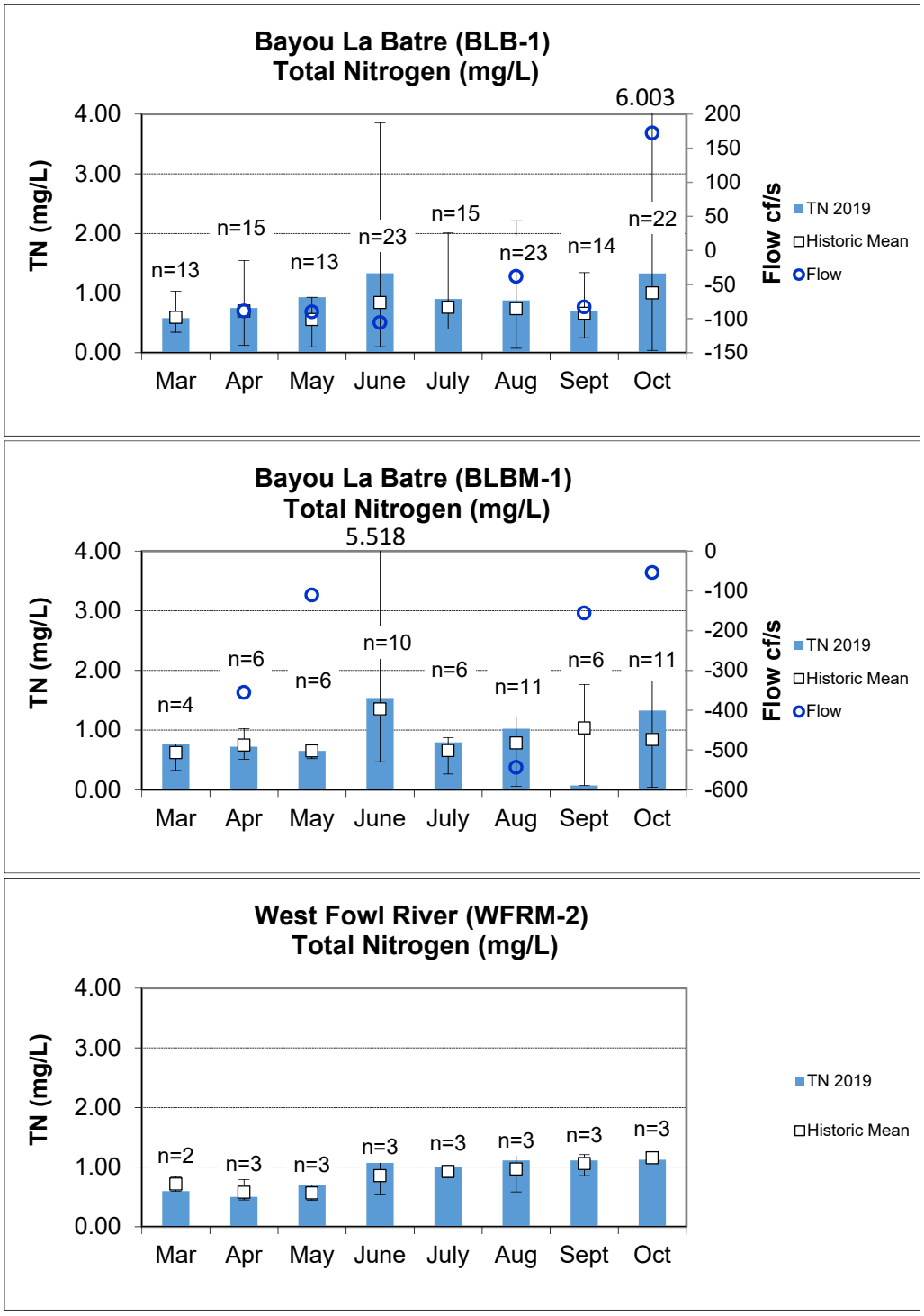


Figure 6. (continued)

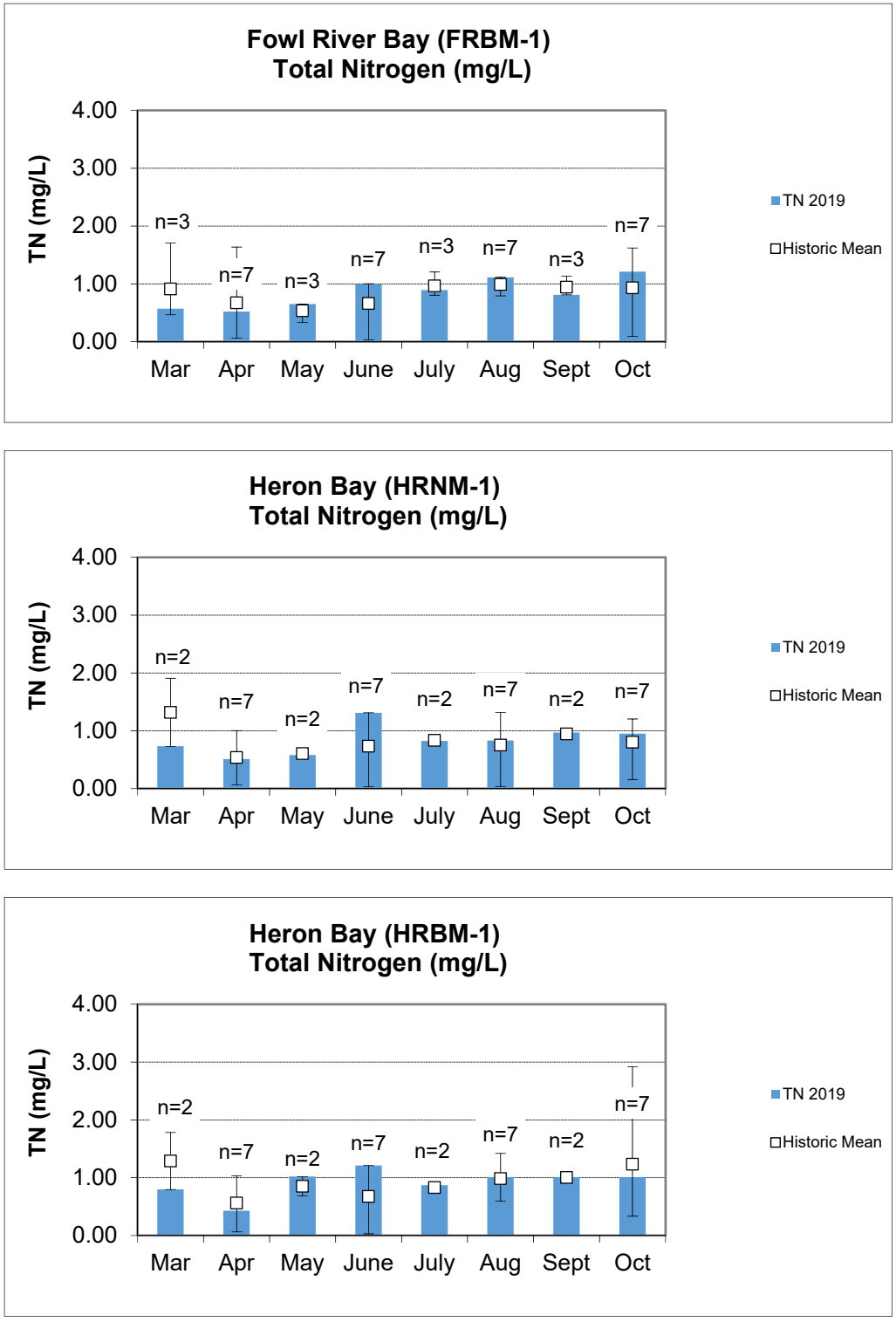
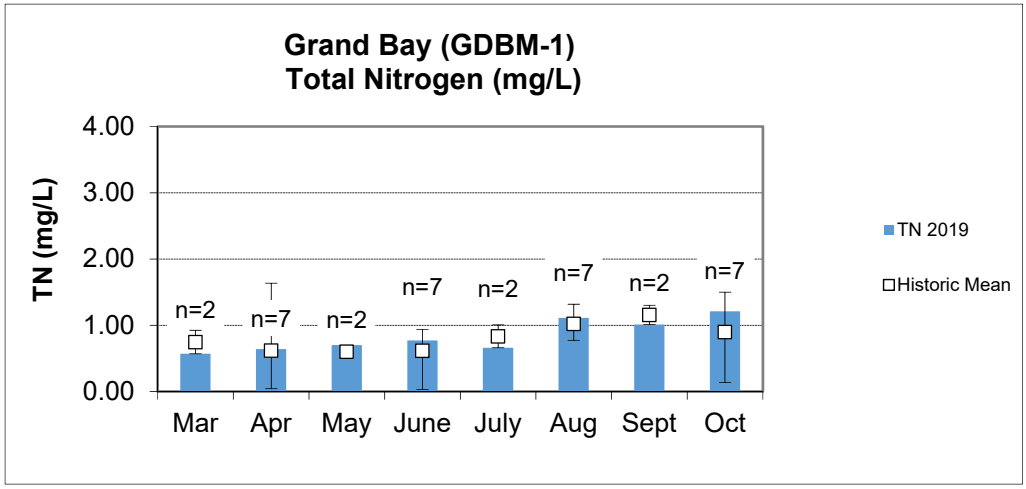
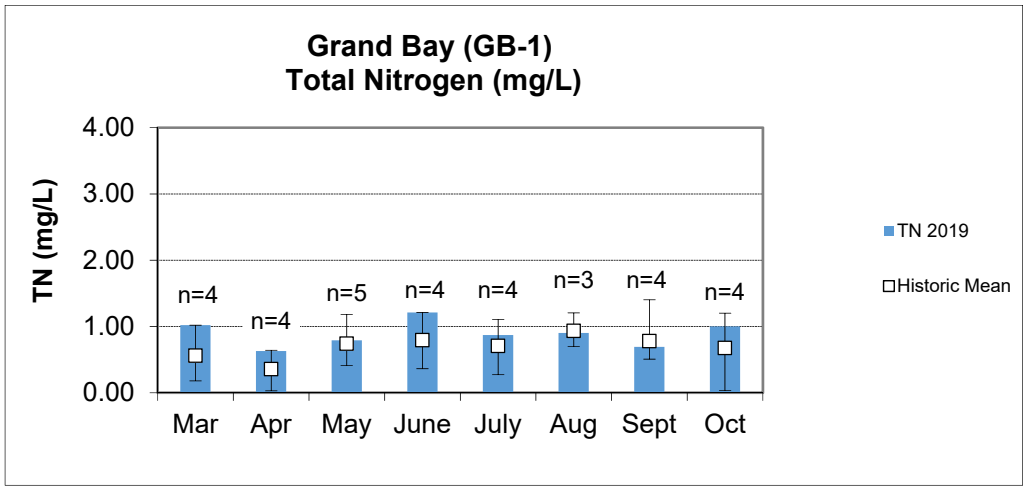
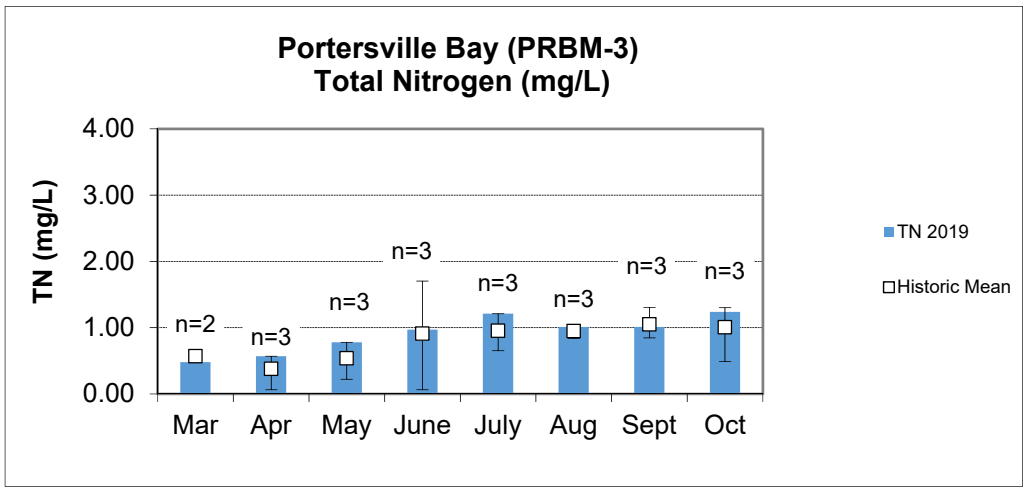


Figure 6. (continued)







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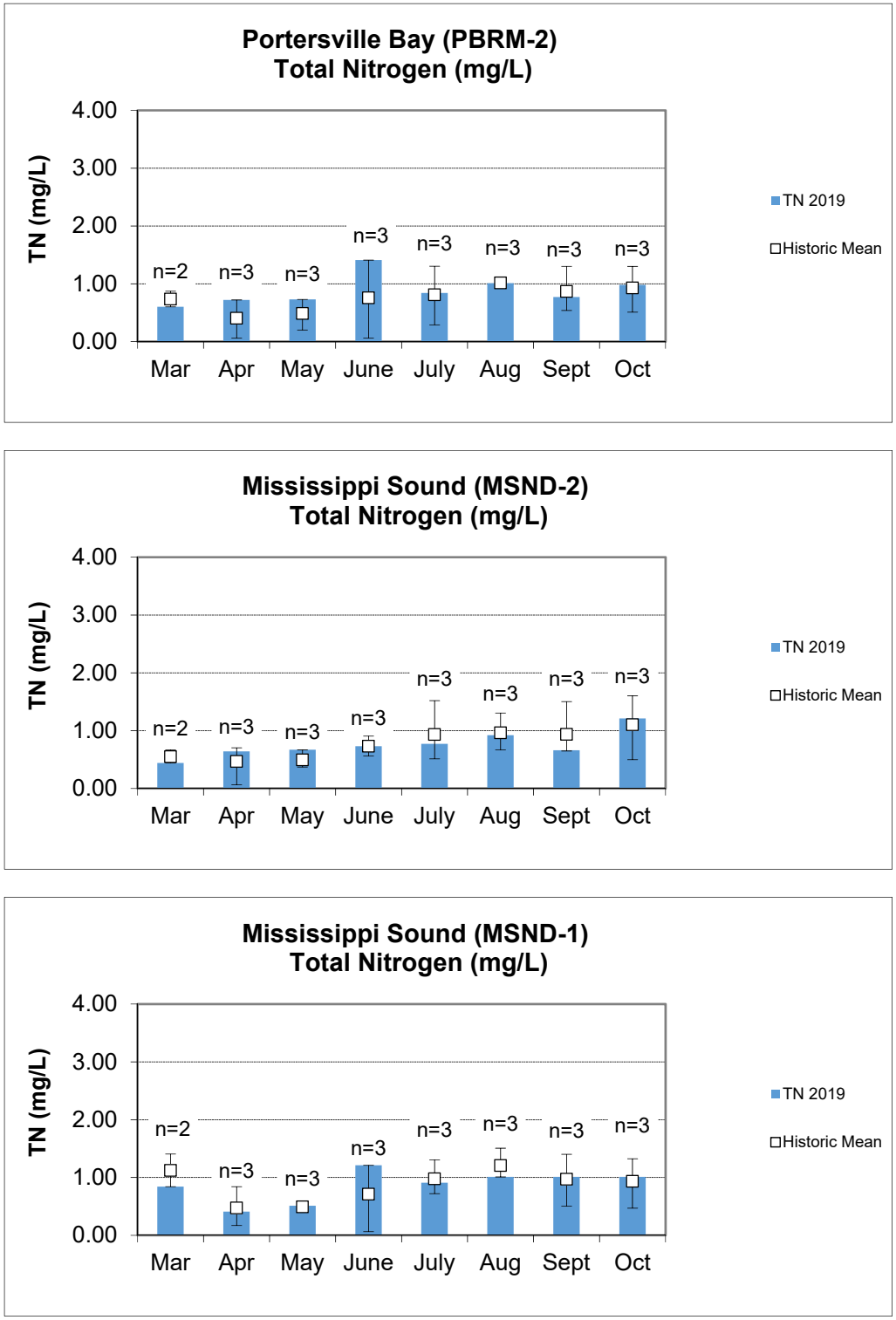

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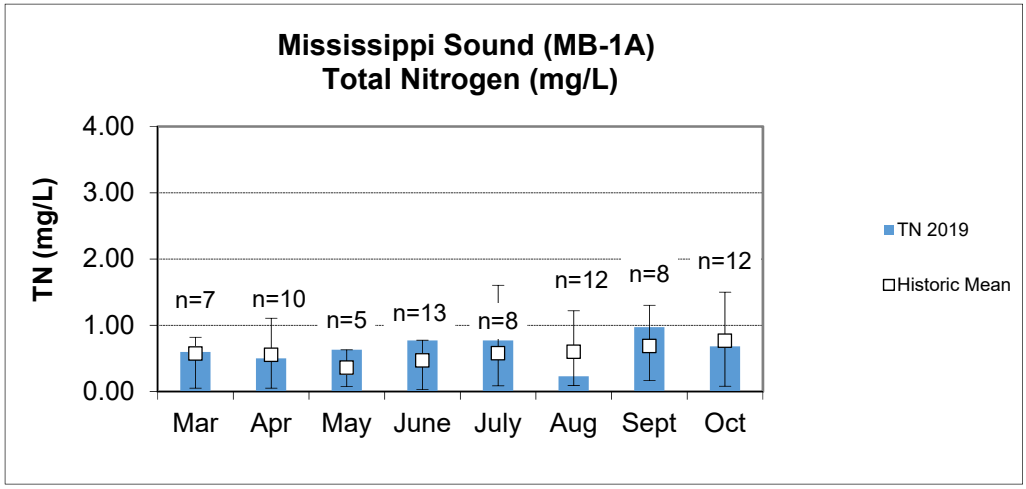

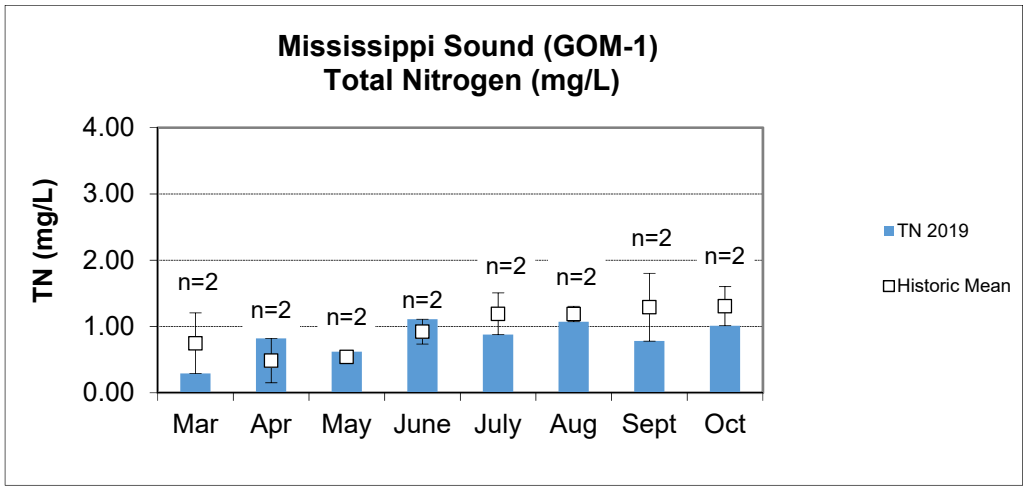

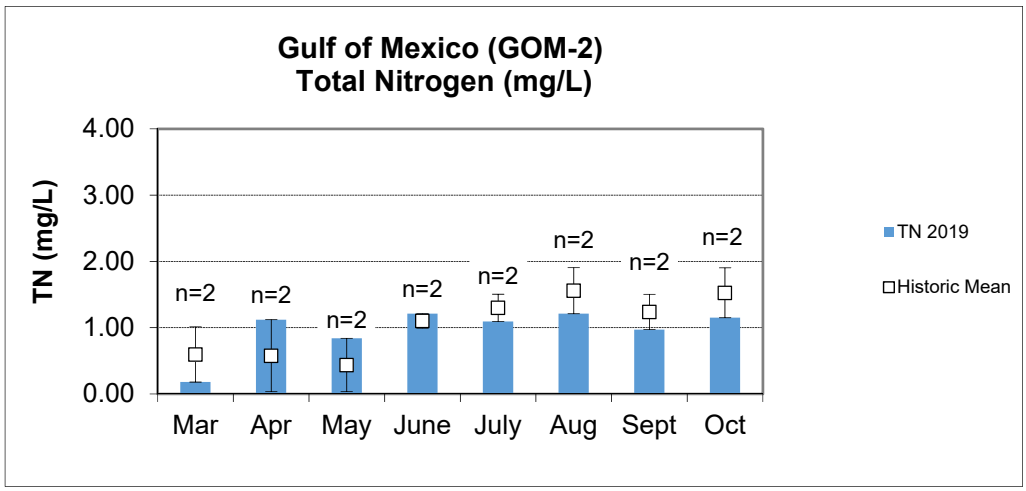

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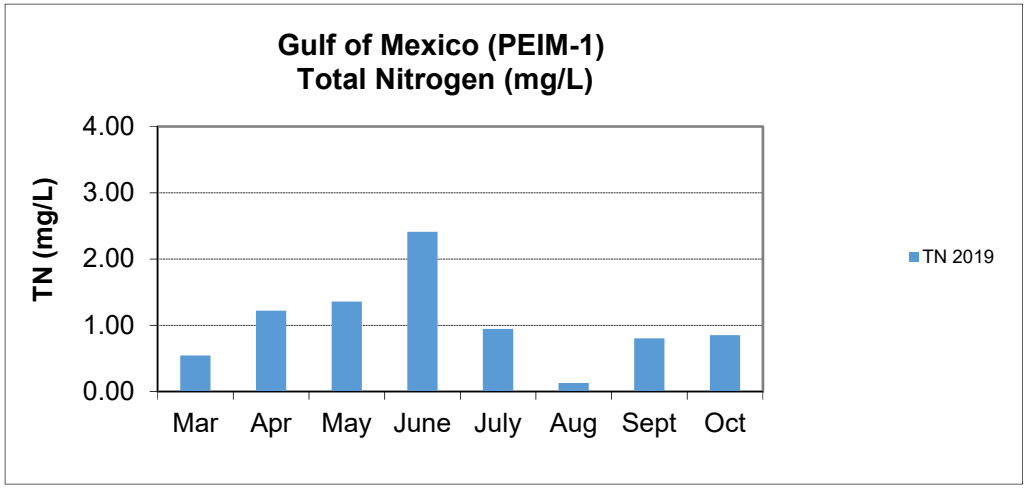
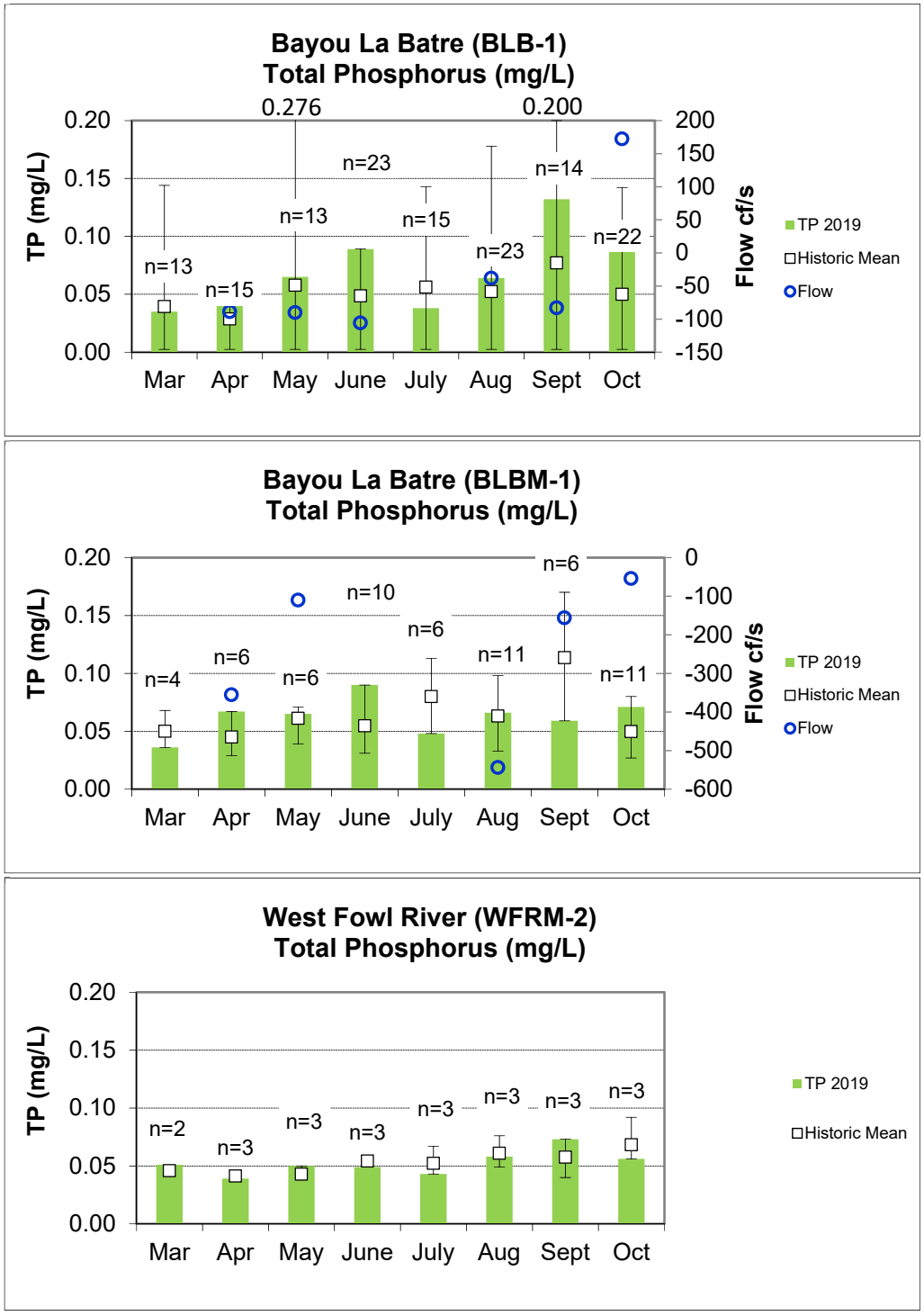


Figure 7. Monthly TP concentrations measured in the Mississippi Sound Sub-Watershed, March-October 2019. Each bar graph depicts changes in each station. The historic mean (1990-2019) and min/max ranges are also displayed for comparison. The "n" value equals the number of data points included in the monthly historic calculations. Flow is included for comparison, if conducted.



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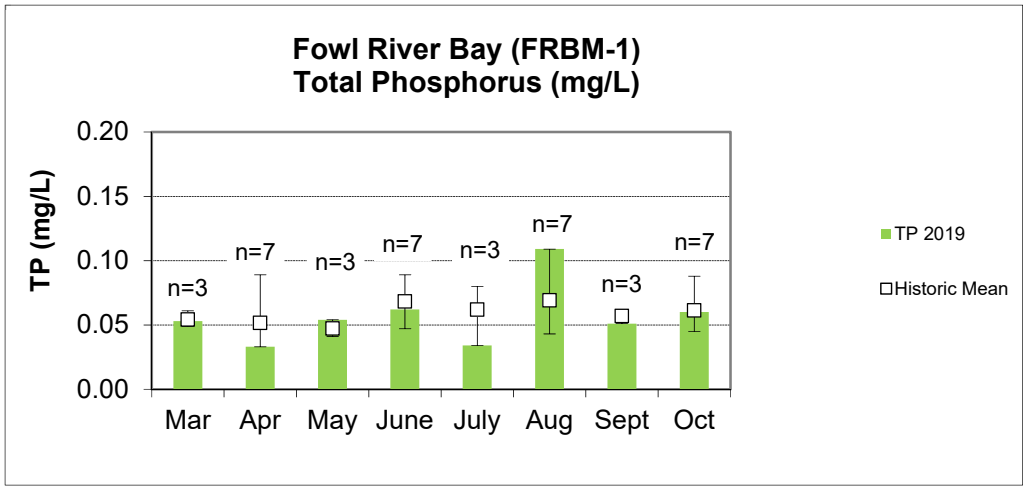
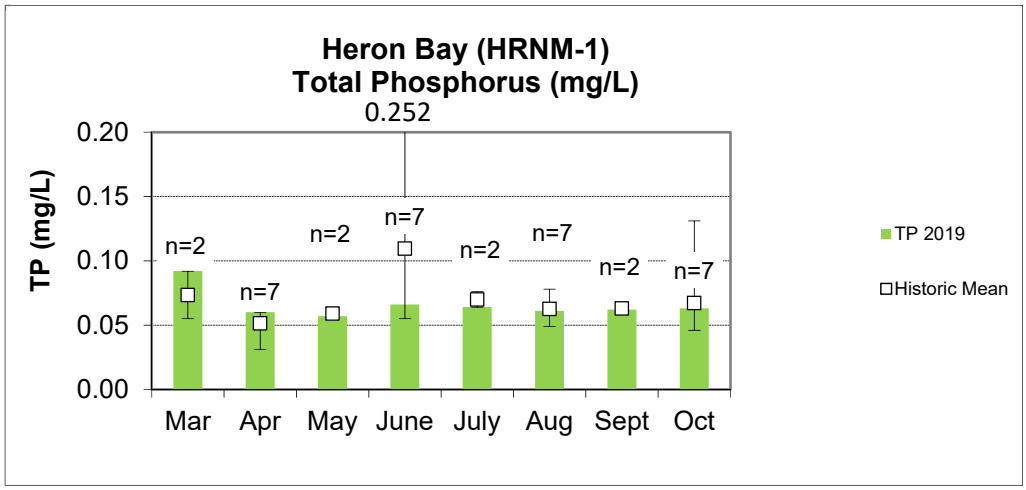




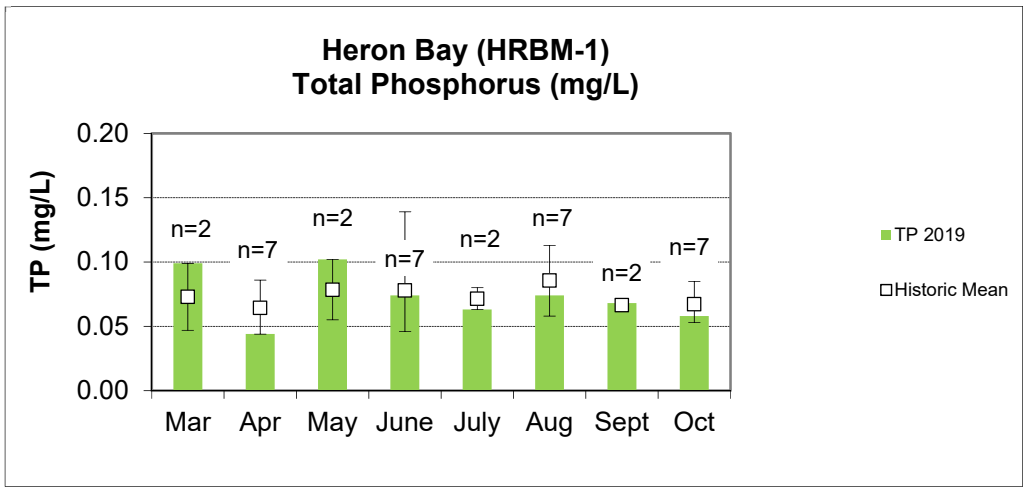
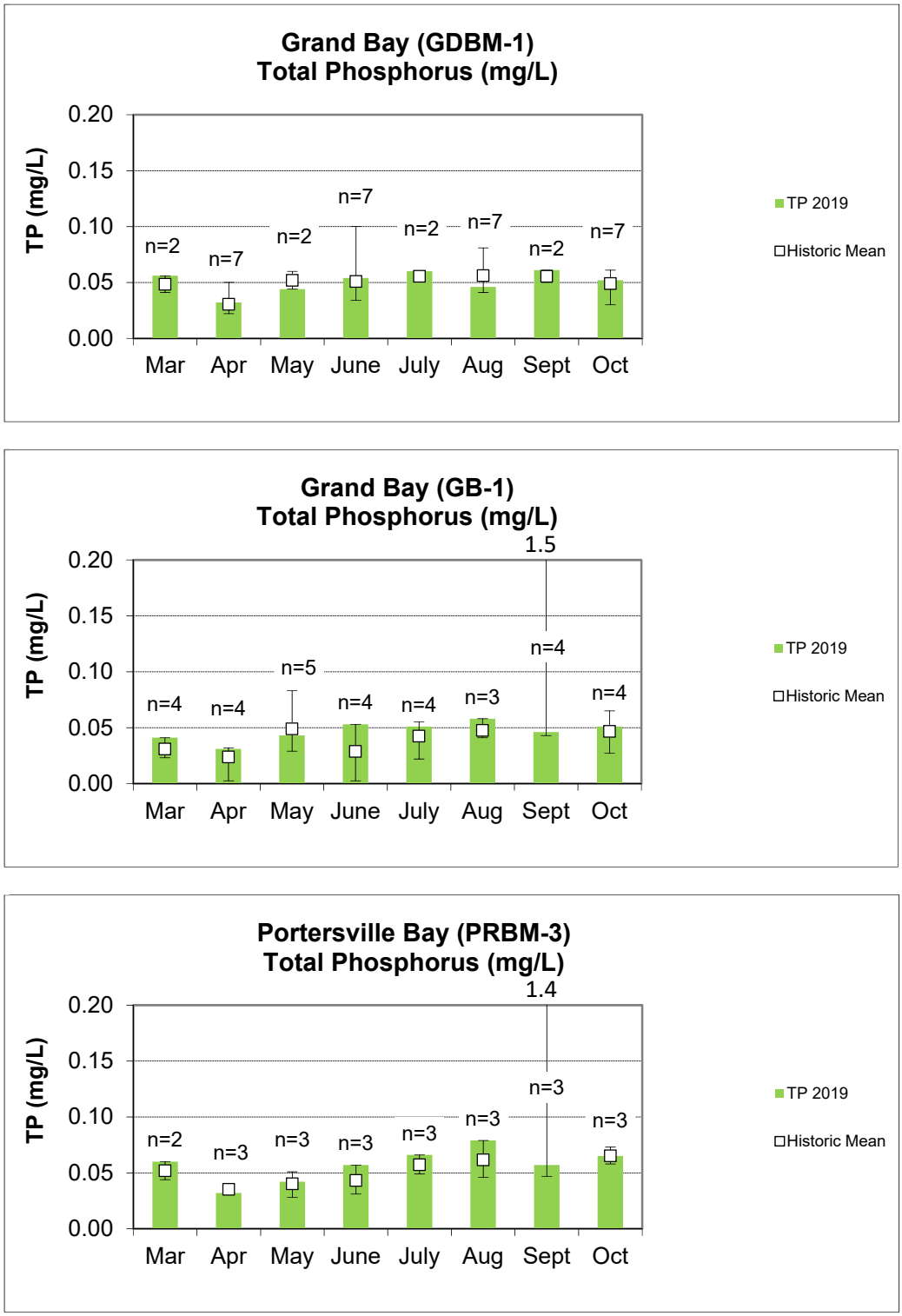


Figure 7. (continued)



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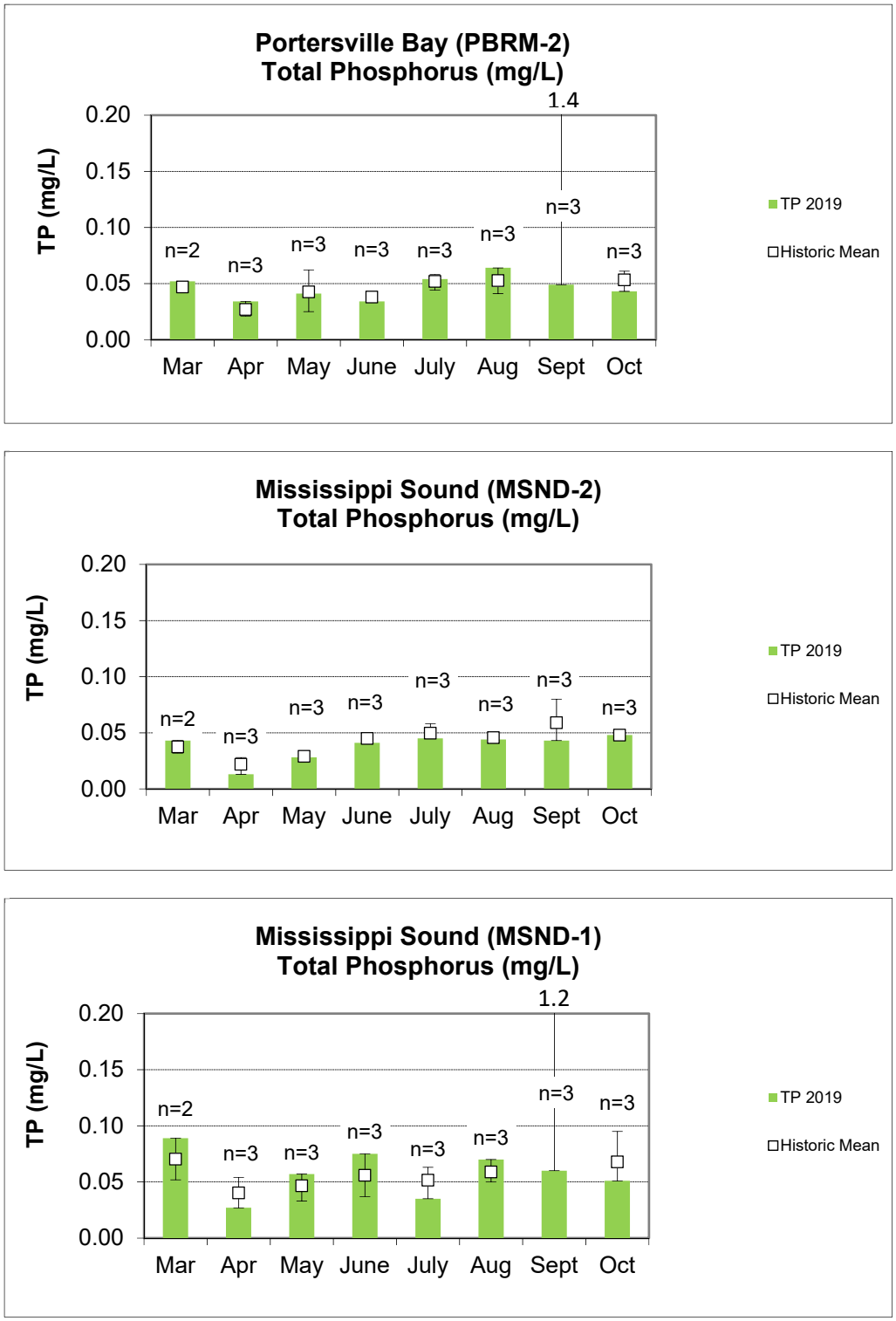

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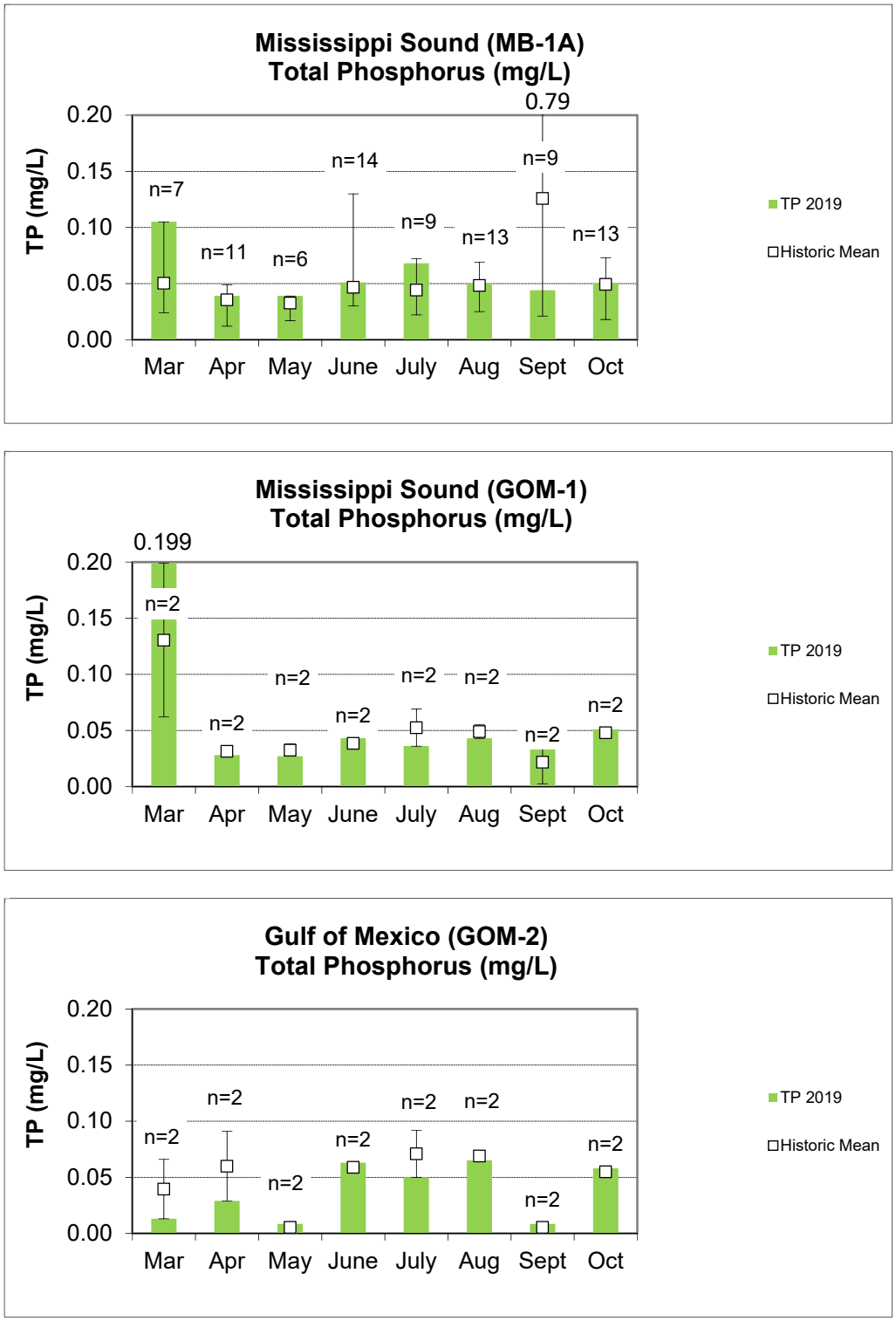

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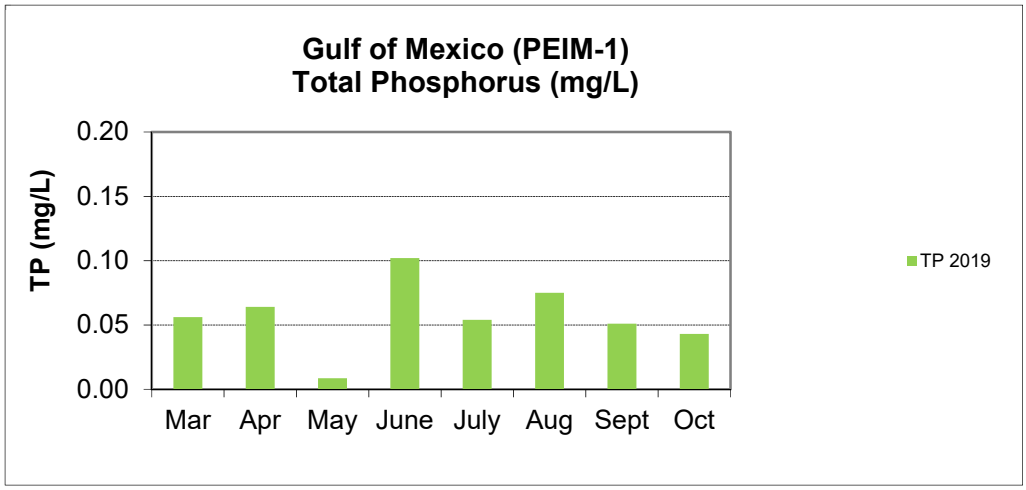
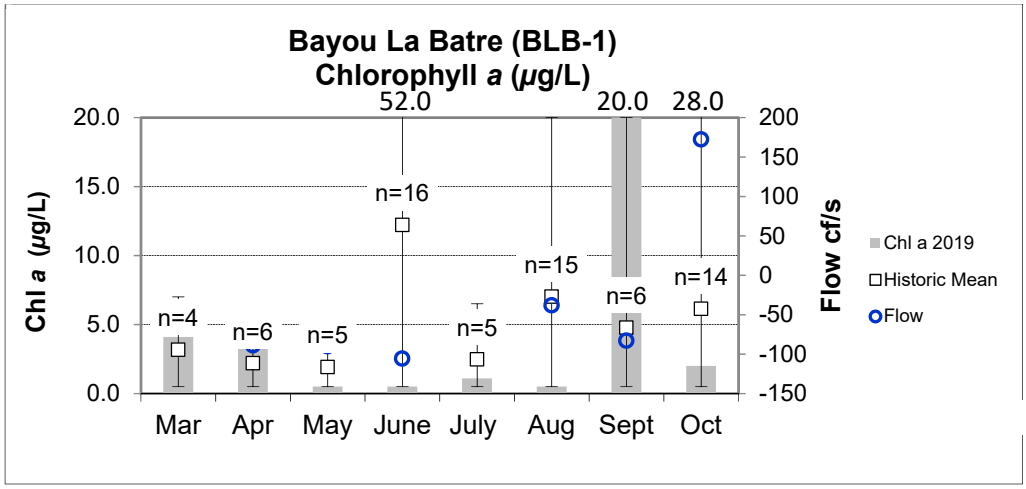
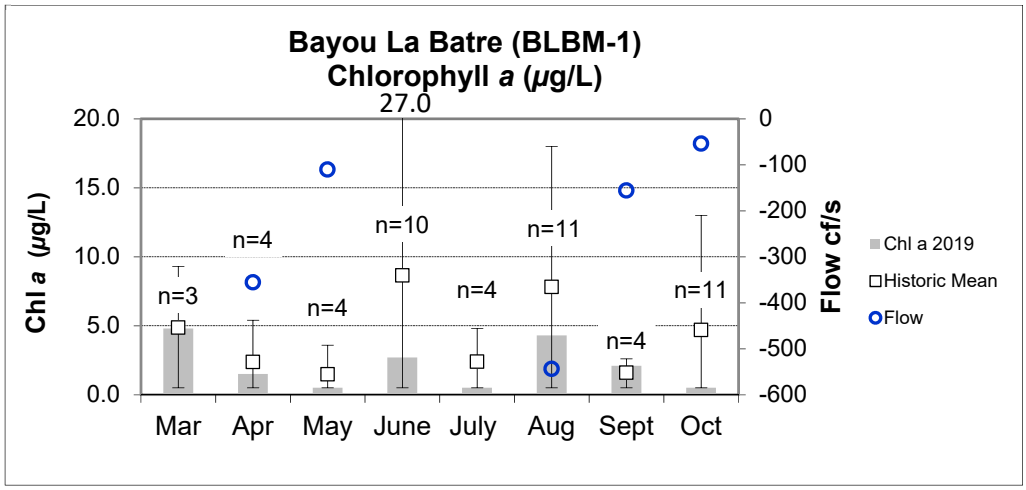
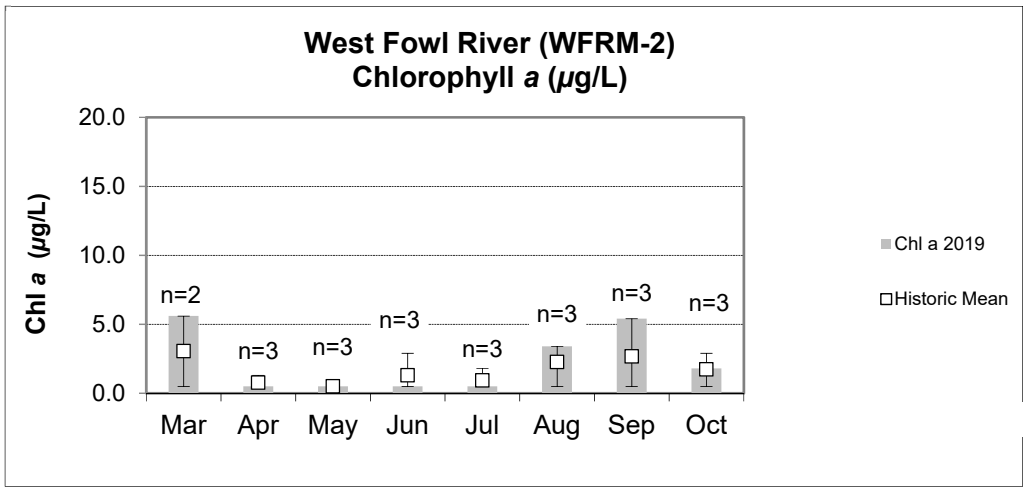


Figure 8. Monthly chl *a* concentrations measured in the Mississippi Sound Sub-Watershed, March-October 2019. Each graph depicts changes in each station. The historic mean (1990-2019) and min/max ranges are also displayed. The "n" value equals the number of data points included in the monthly historic calculations. Flow is included for comparison, if conducted.







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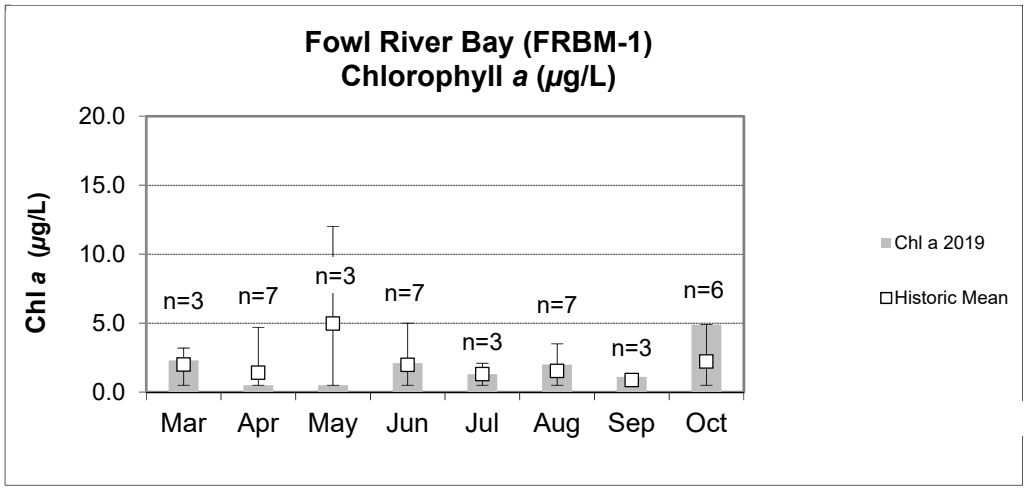

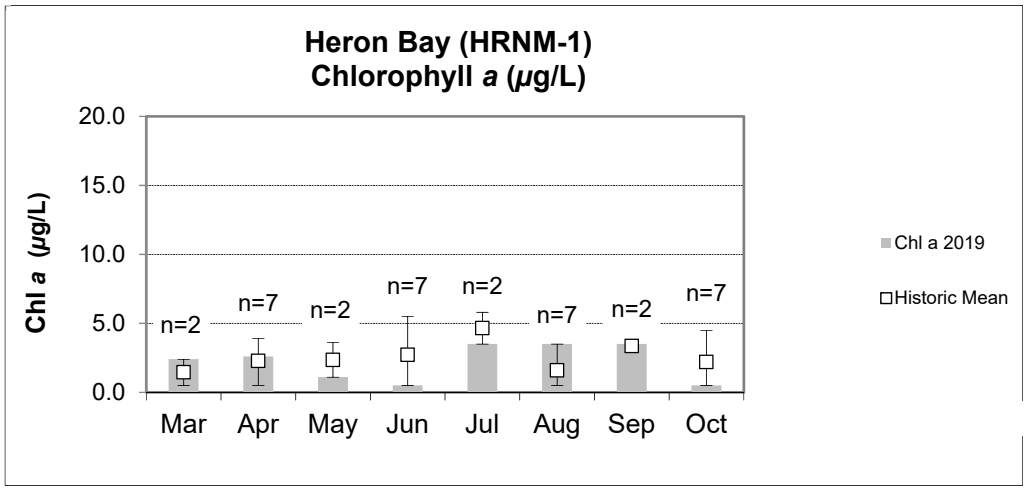

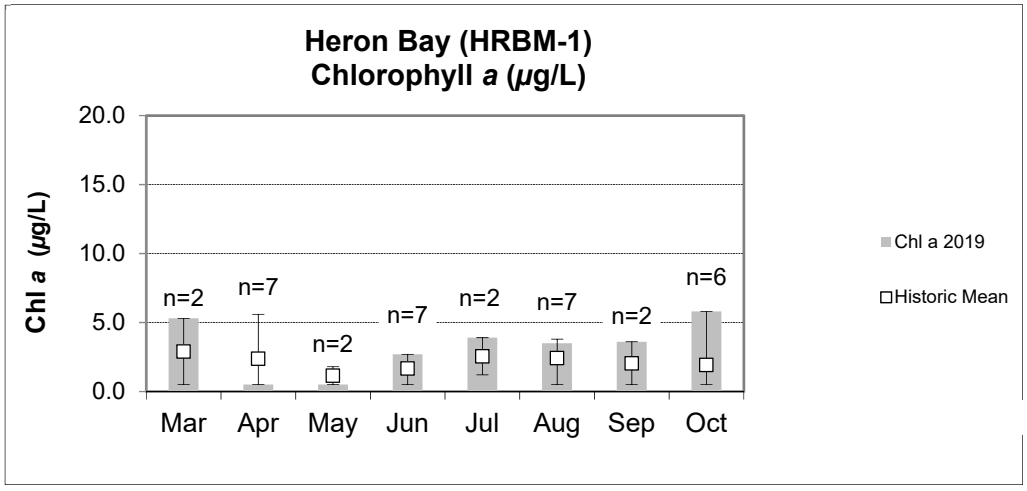

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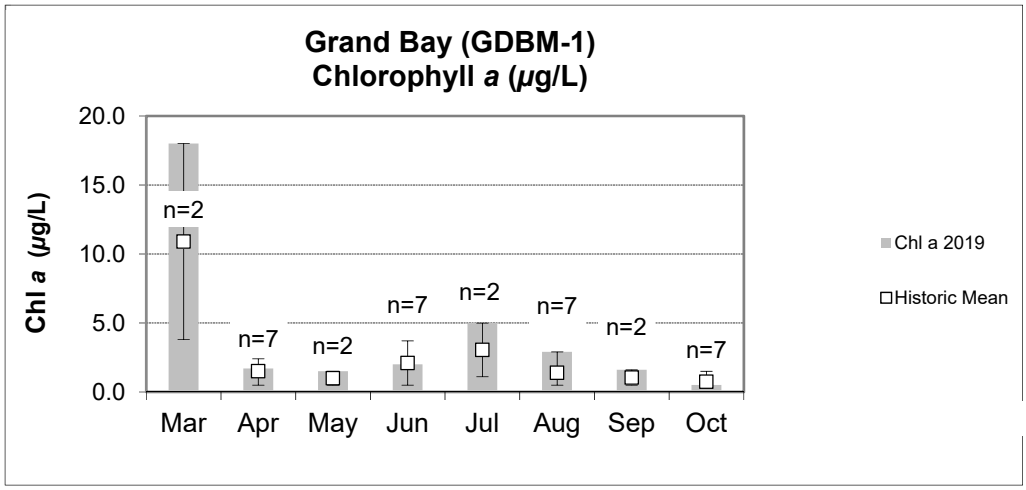

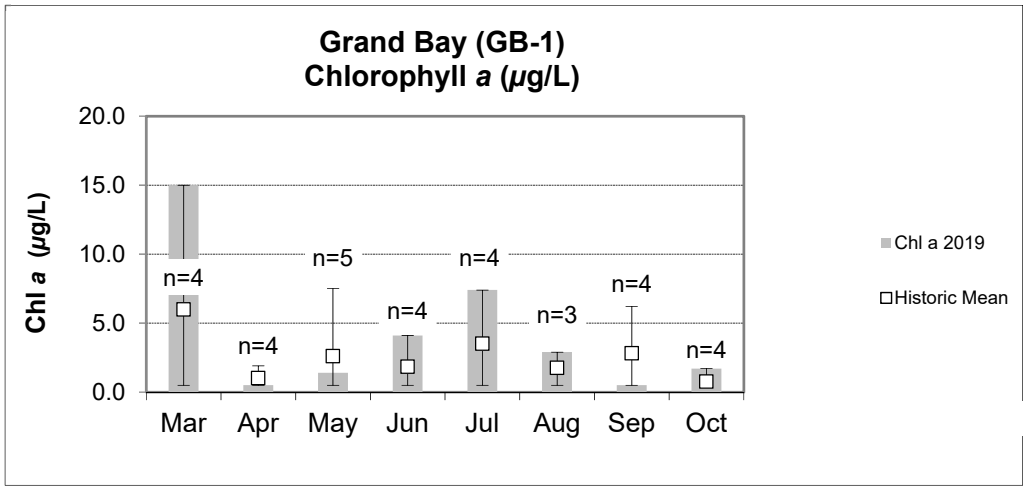

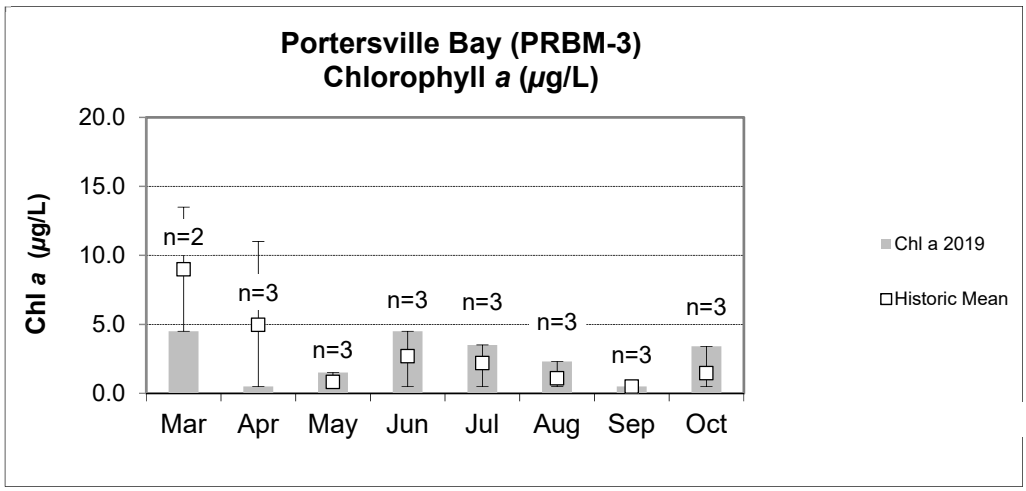

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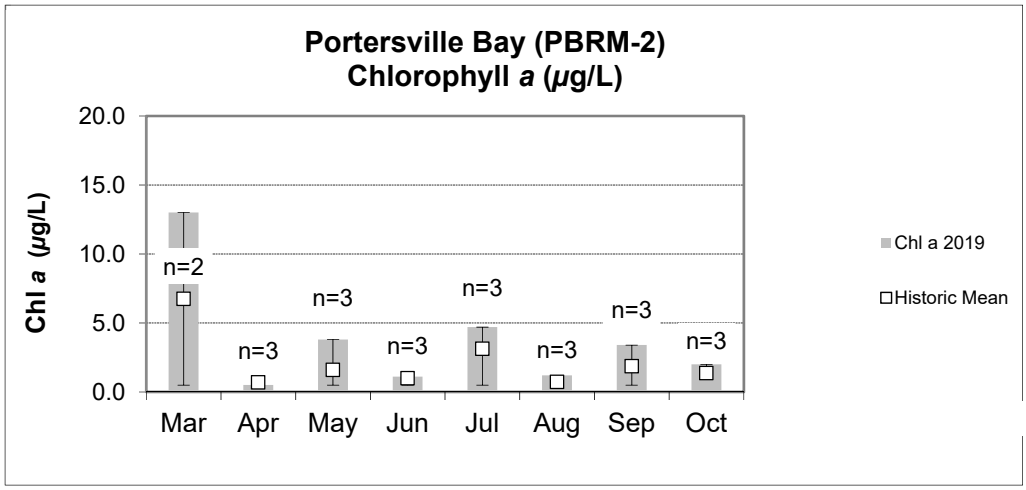

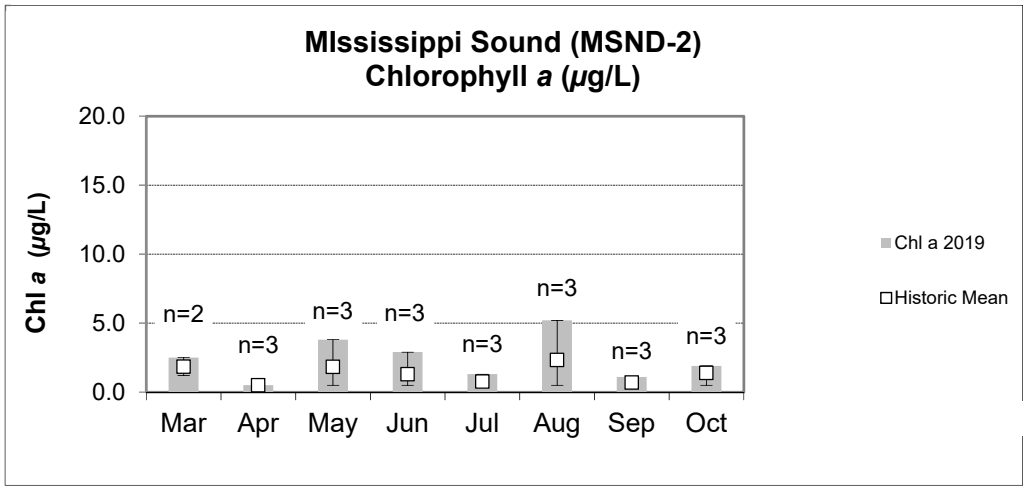

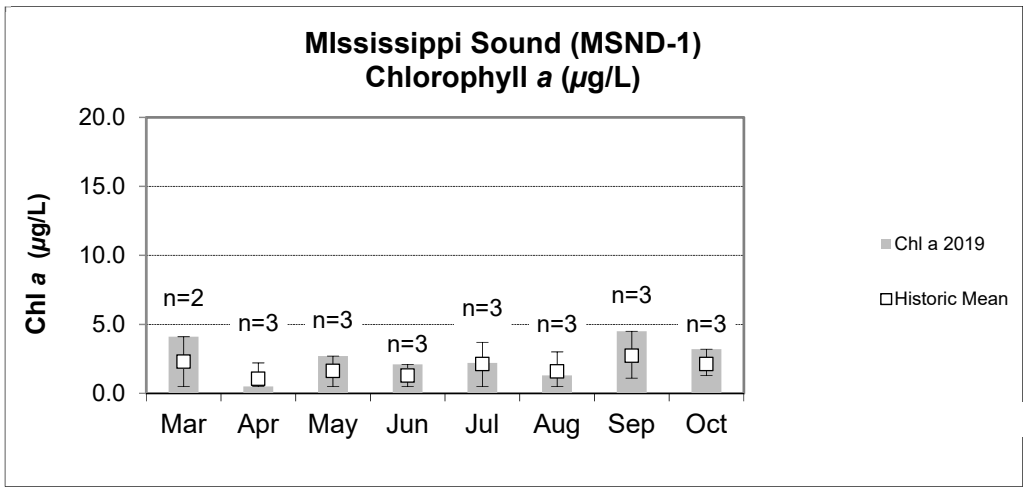

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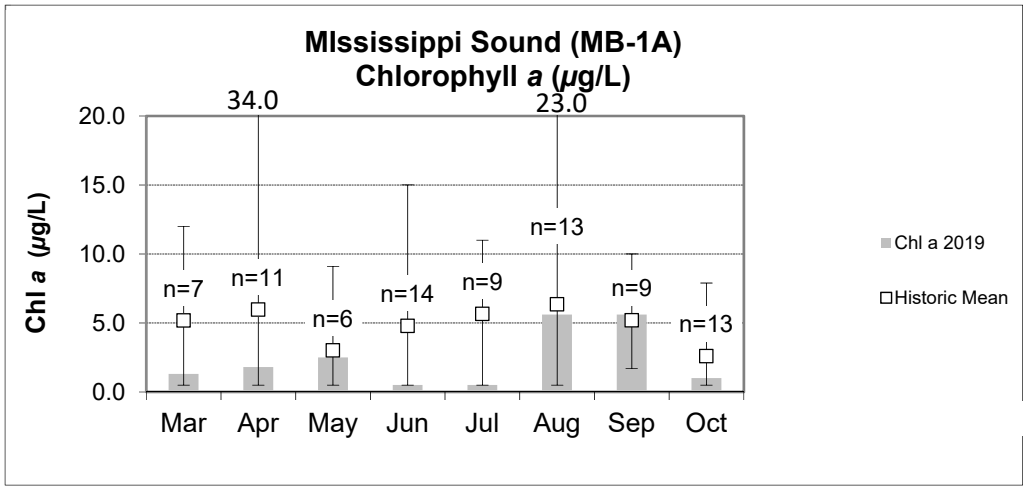

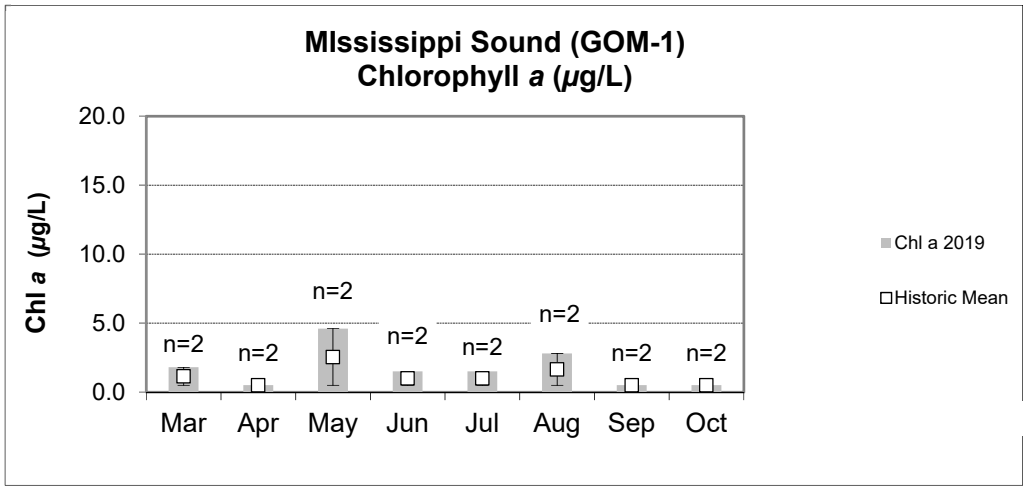

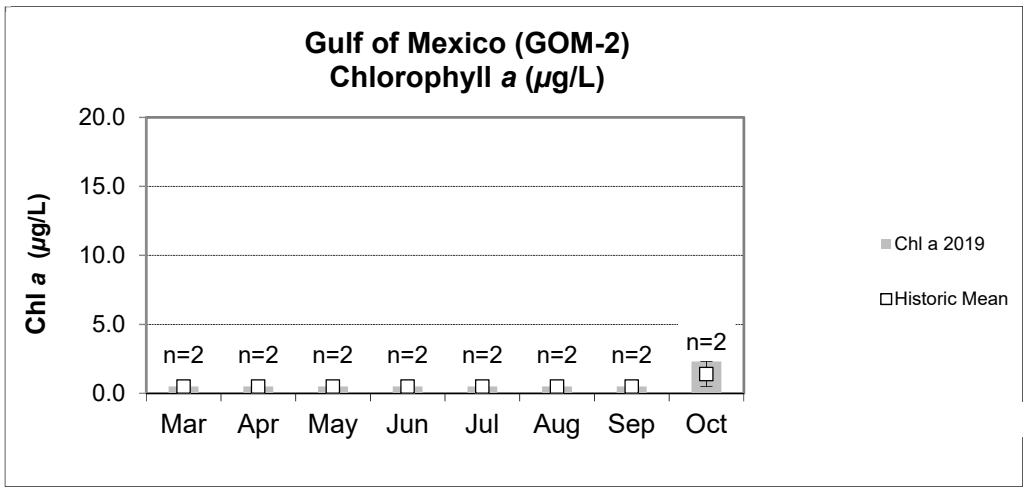

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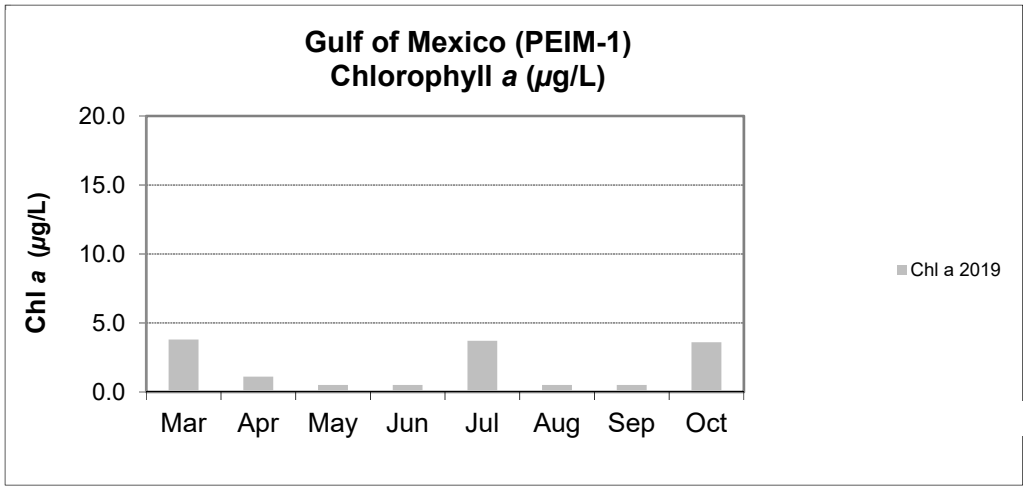
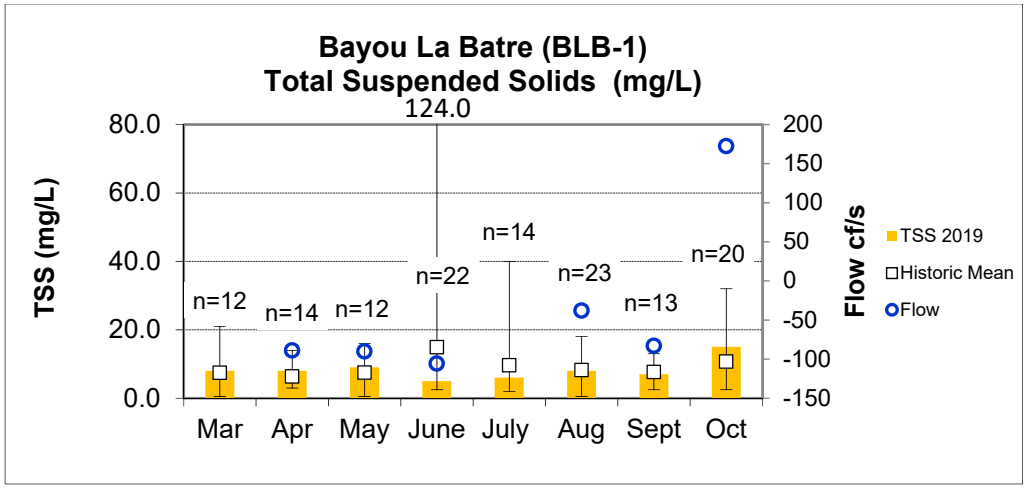
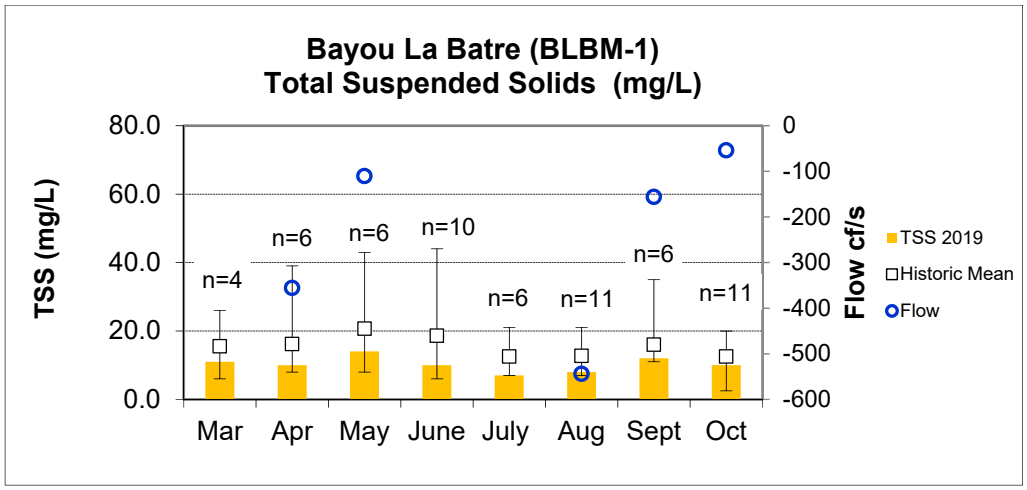
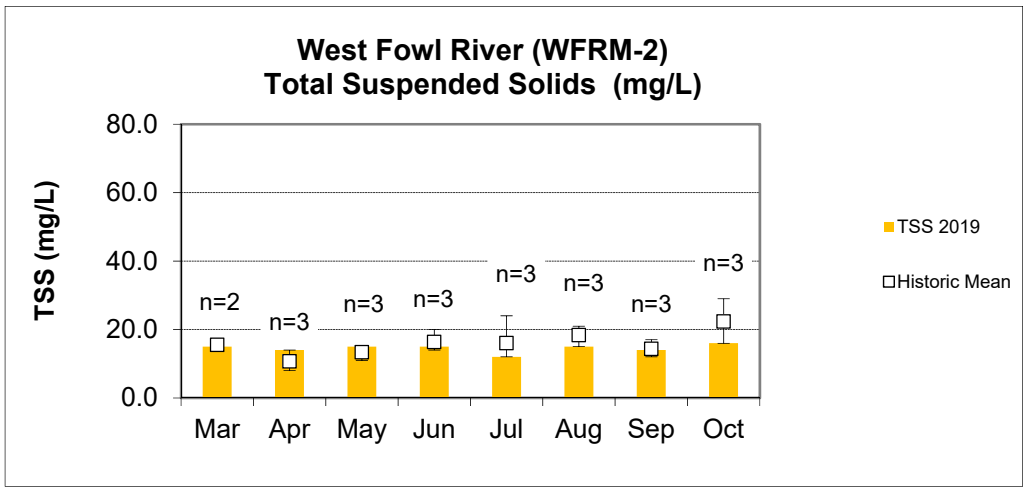


Figure 9. Monthly TSS concentrations measured in the Mississippi Sound Sub-Watershed, March-October 2019. Each bar graph depicts changes in each station. The historic mean (1990-2019) and min/max ranges are also displayed. The "n" value equals the number of data points included in the monthly historic calculations. Flow is included for comparison, if conducted.







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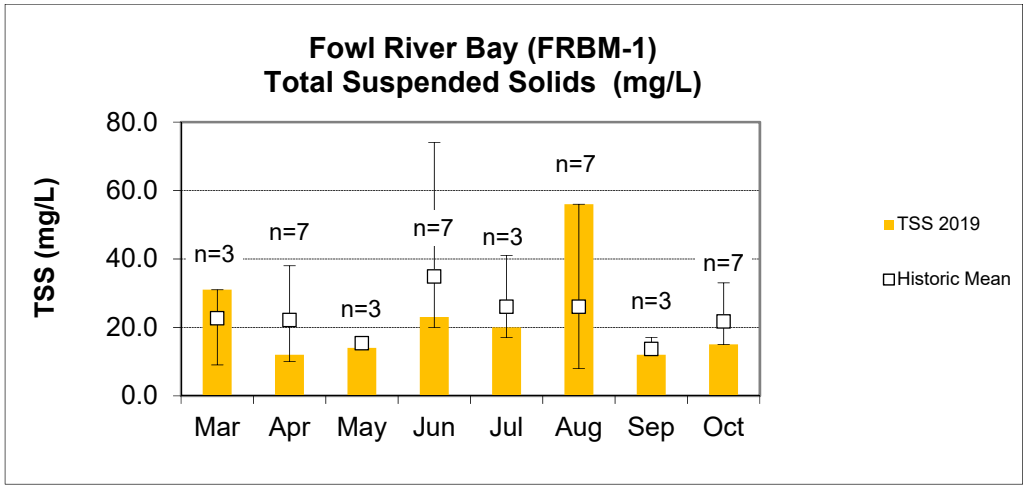

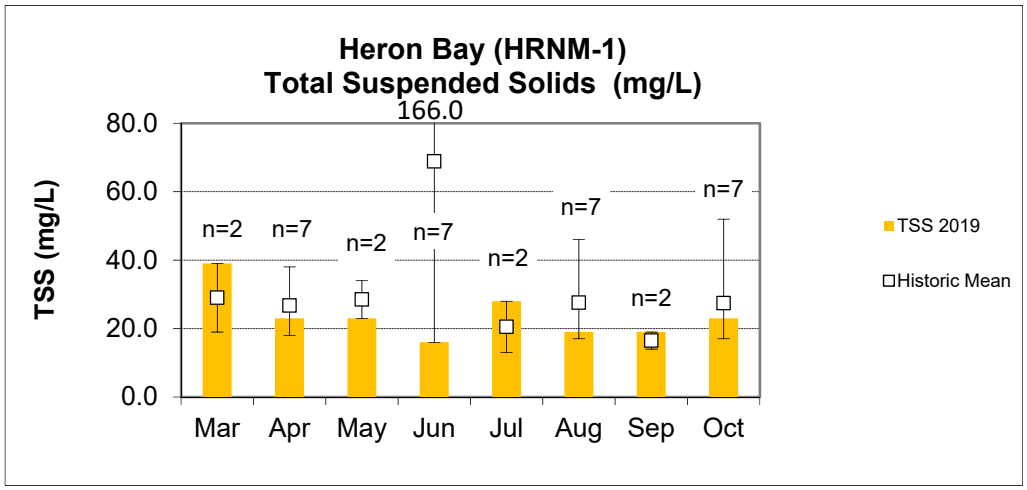

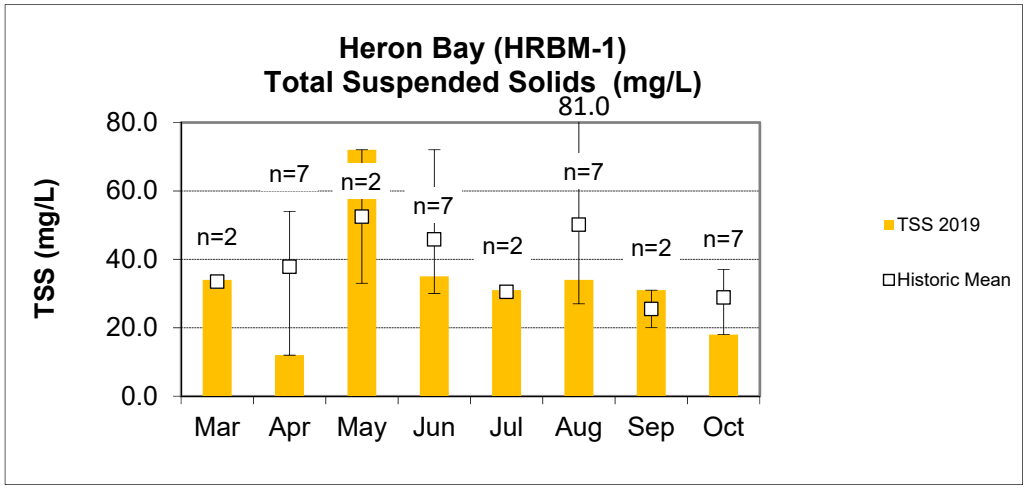

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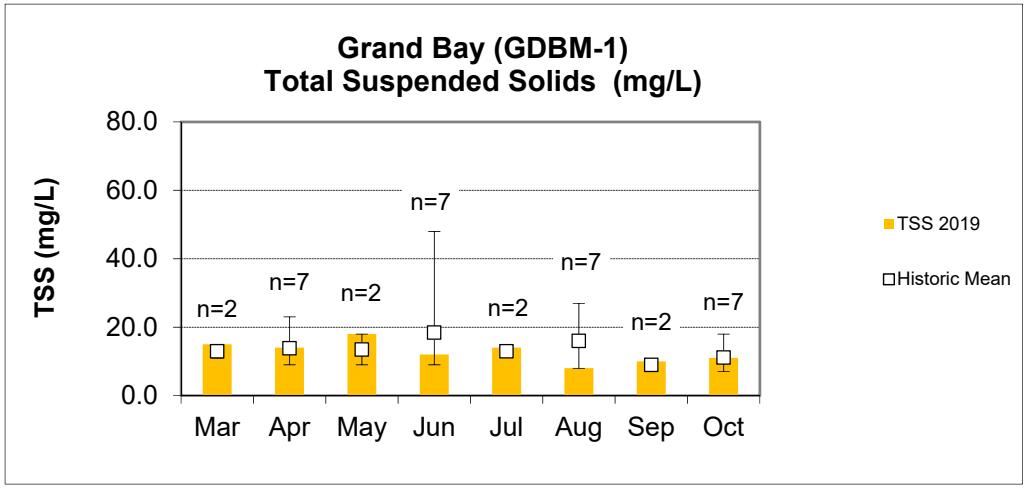

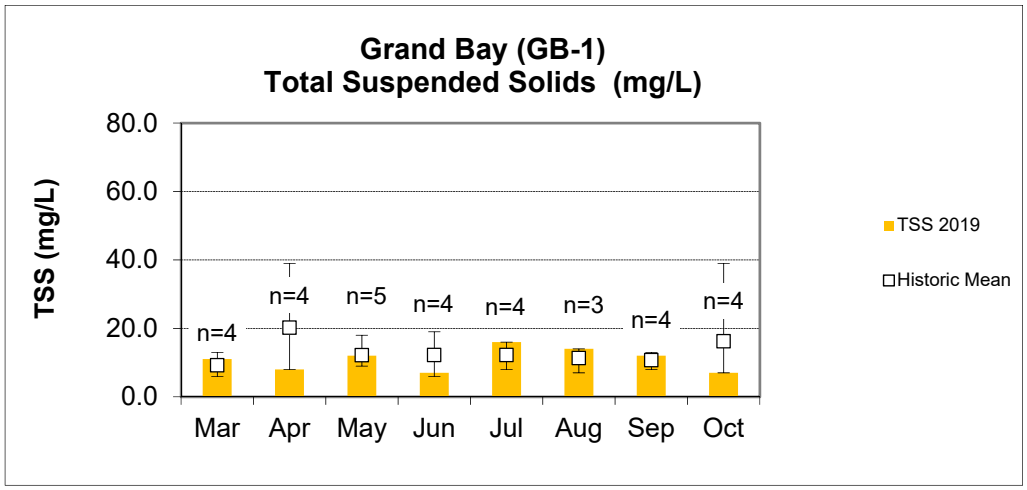

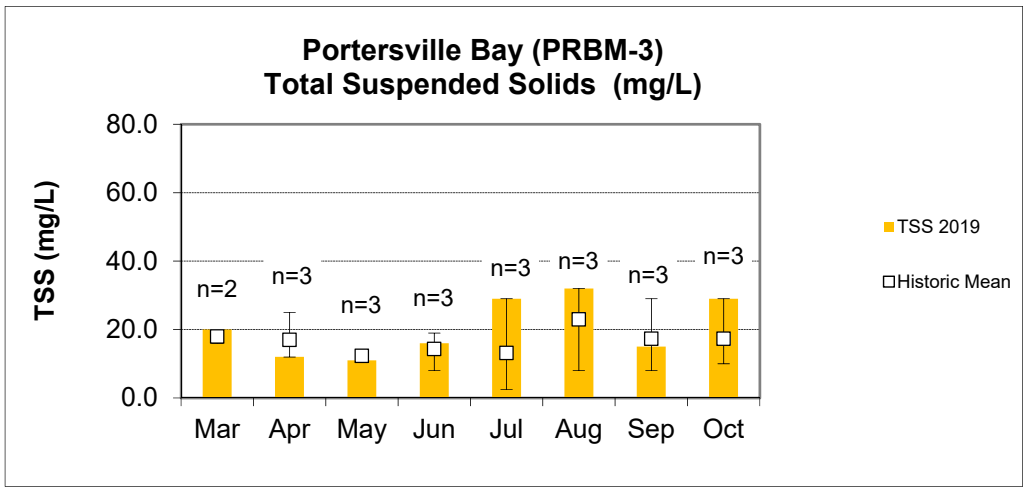

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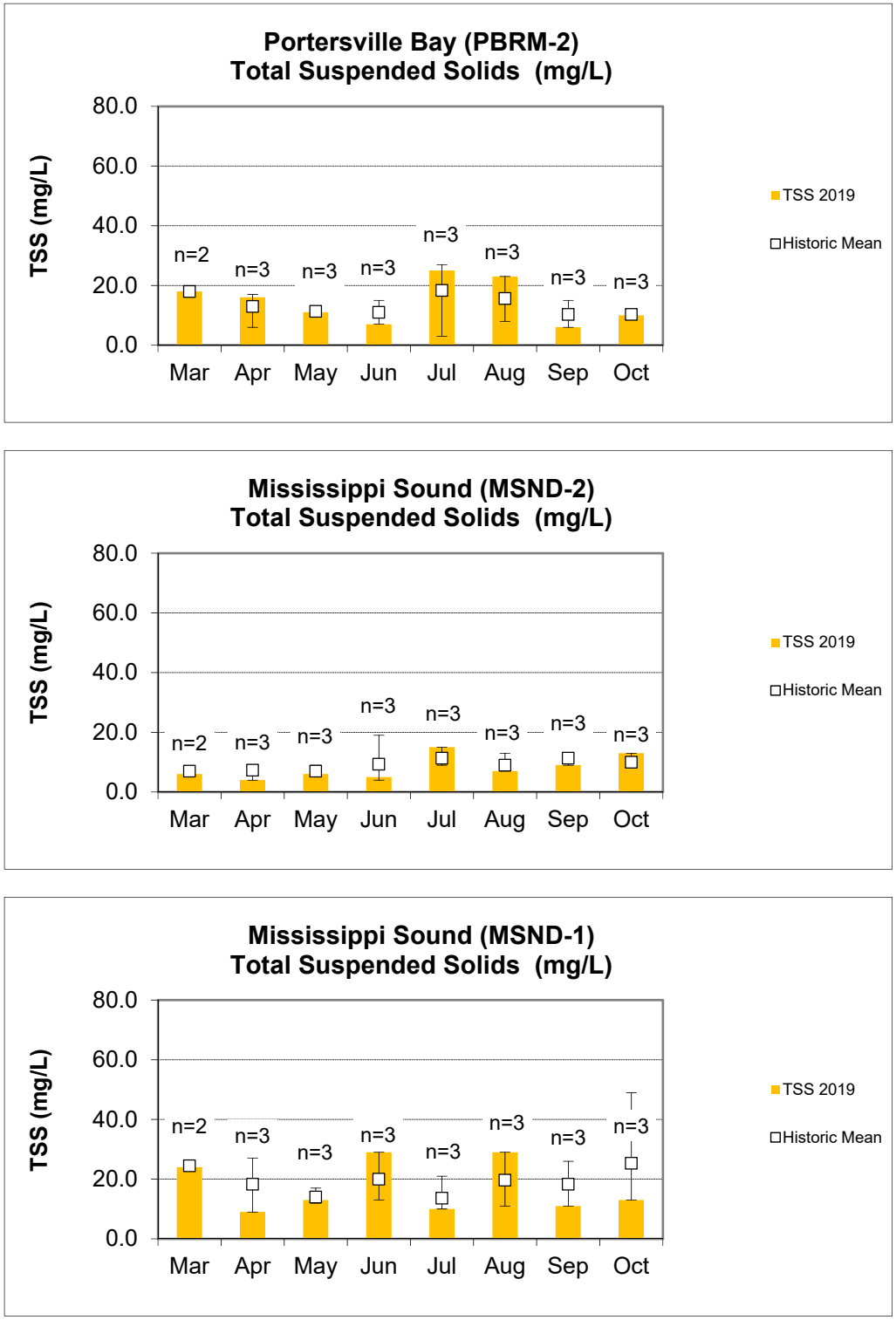

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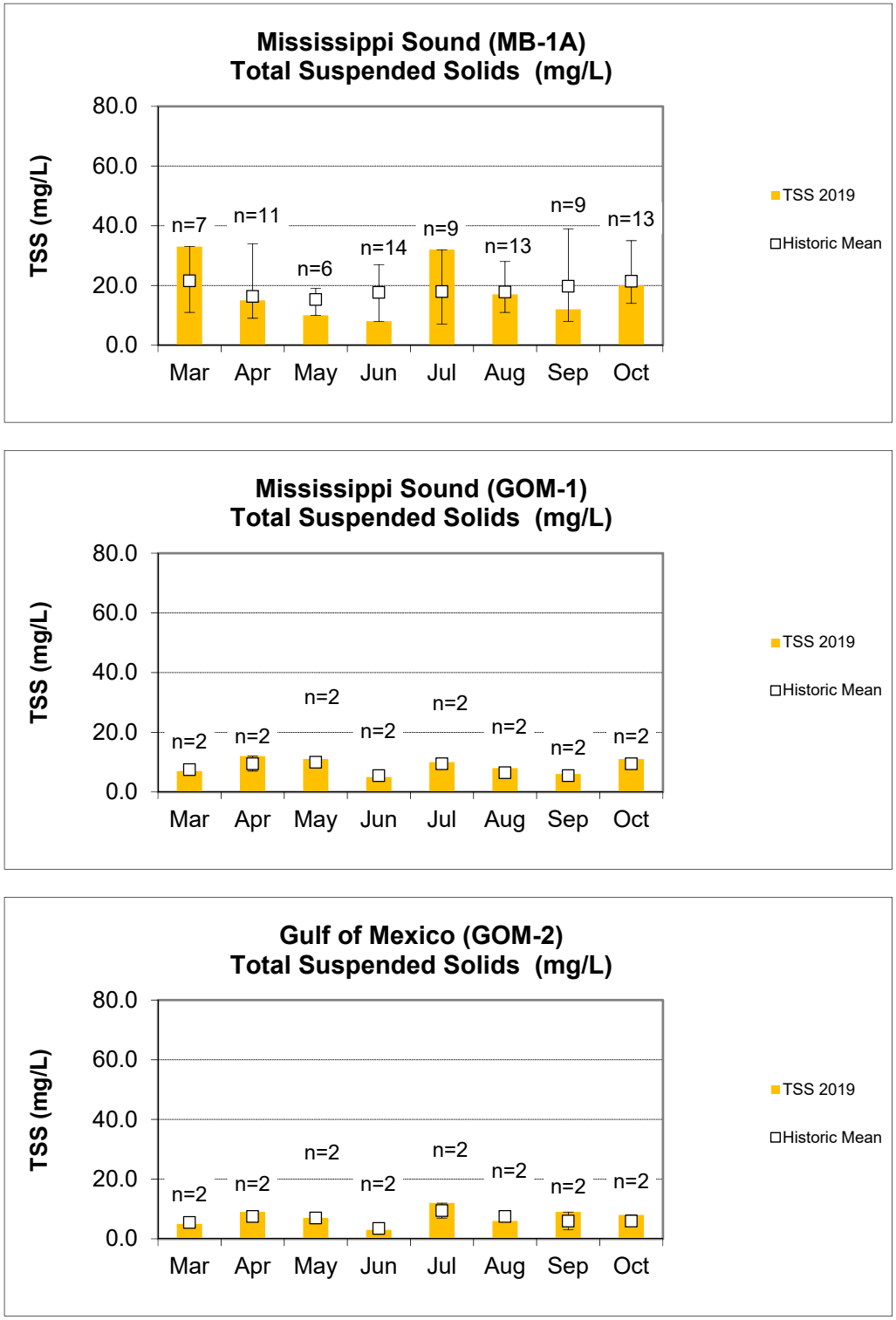

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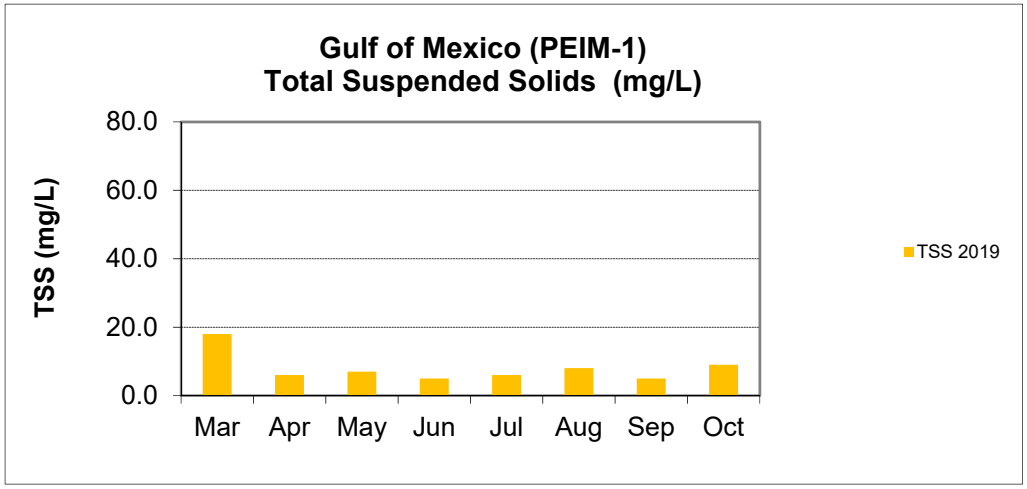


Figure 10. Monthly DO, Temperature, and Salinity concentrations at 1.5 m (5 ft), or mid-depth, for the Mississippi Sound Sub-Watershed stations collected March-October 2019. ADEM Water Quality Criteria requires a DO concentration of 5.0 mg/L at this depth (ADEM 2018). Flow is included for comparison, if conducted.

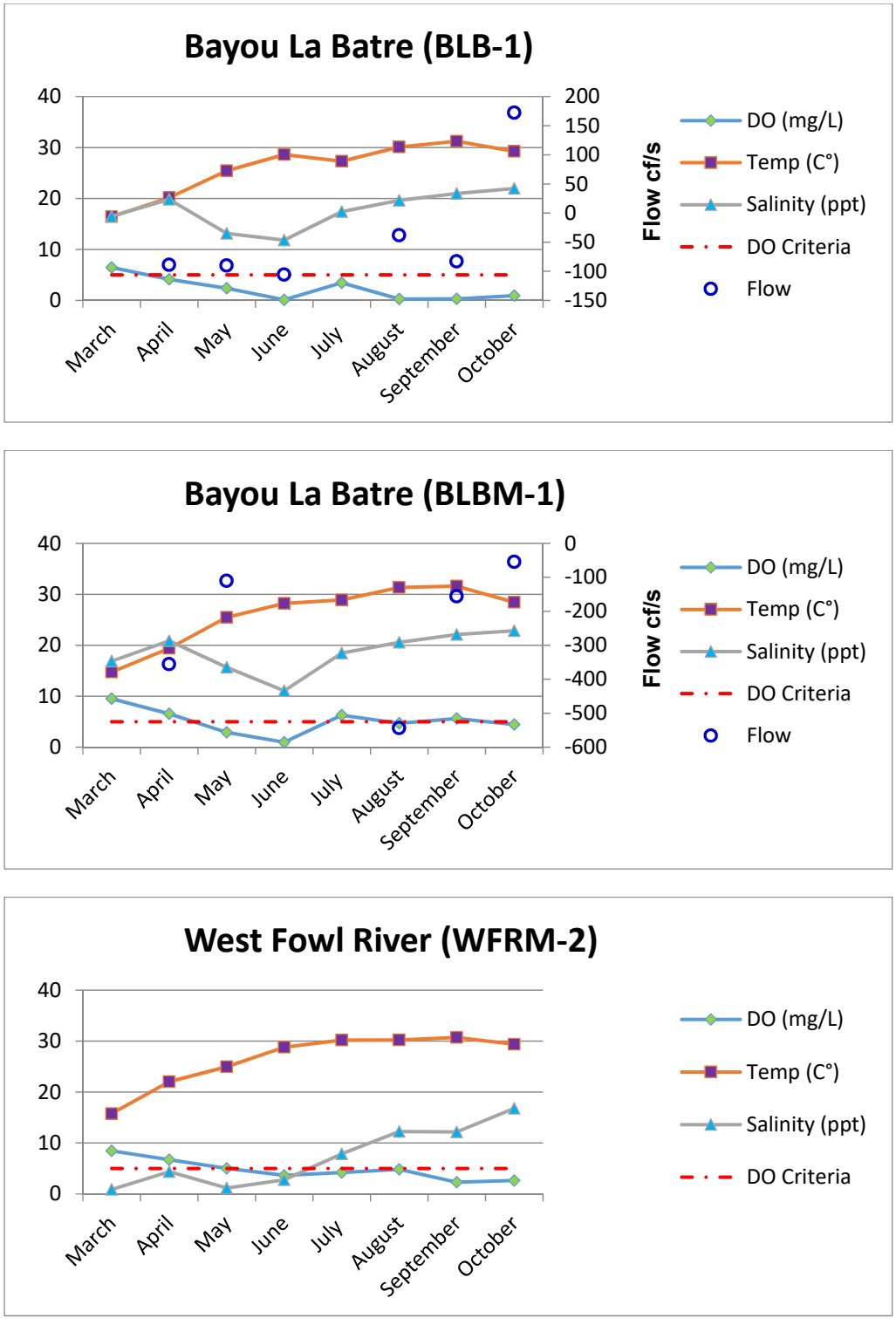


Figure 10. (continued)

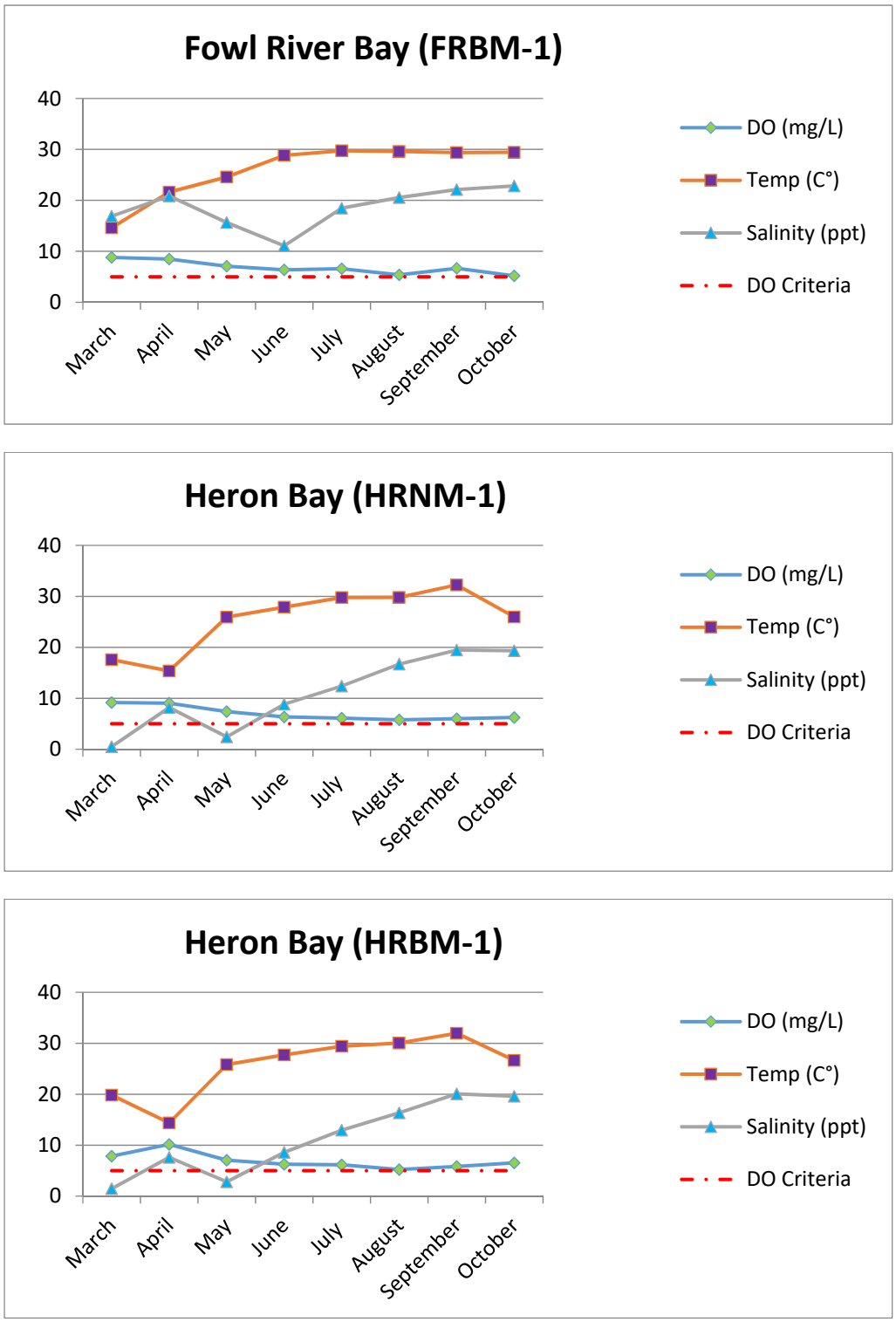
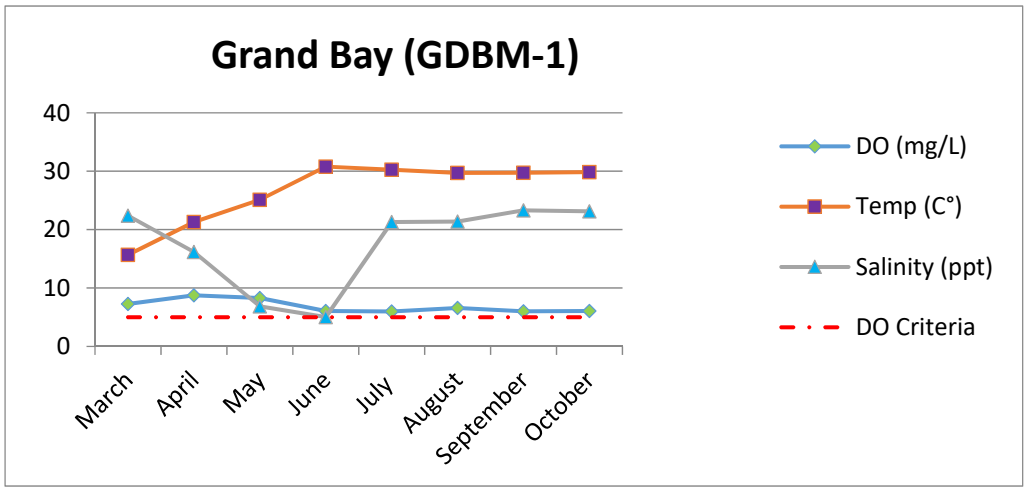
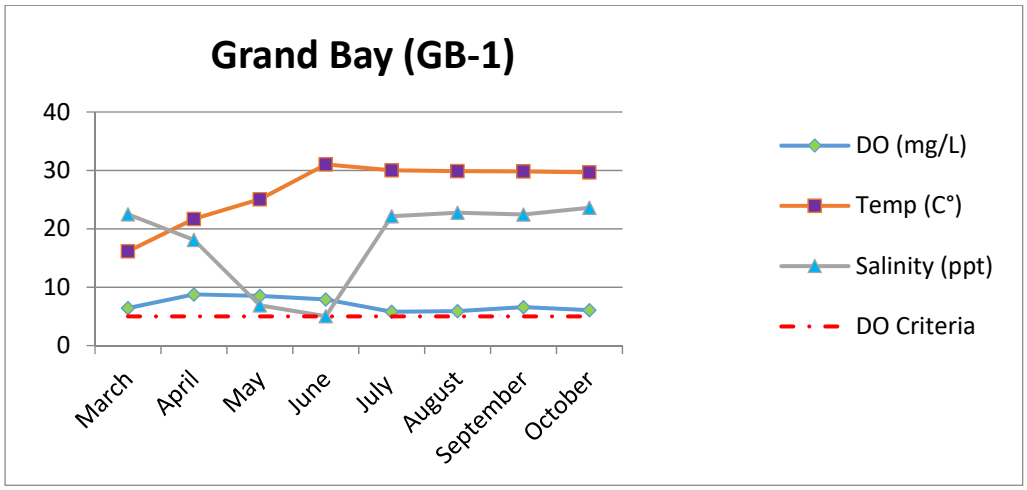


Figure 10. (continued)





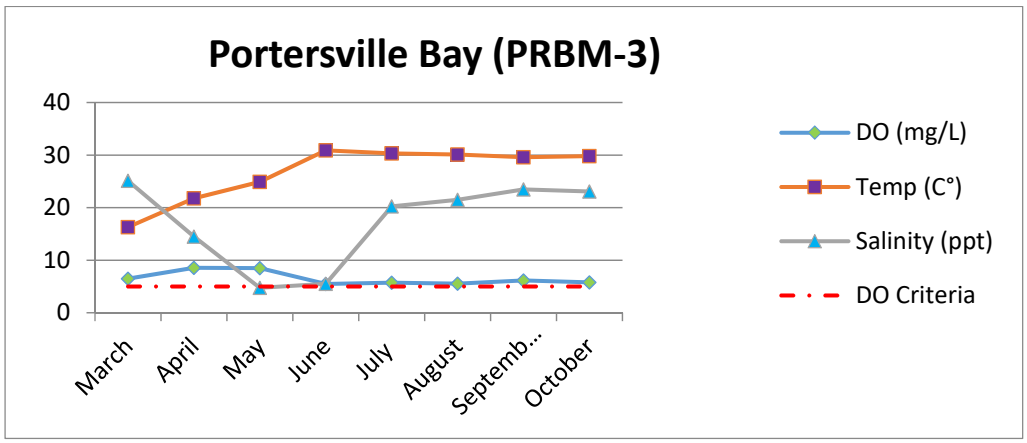


Figure 10. (continued)

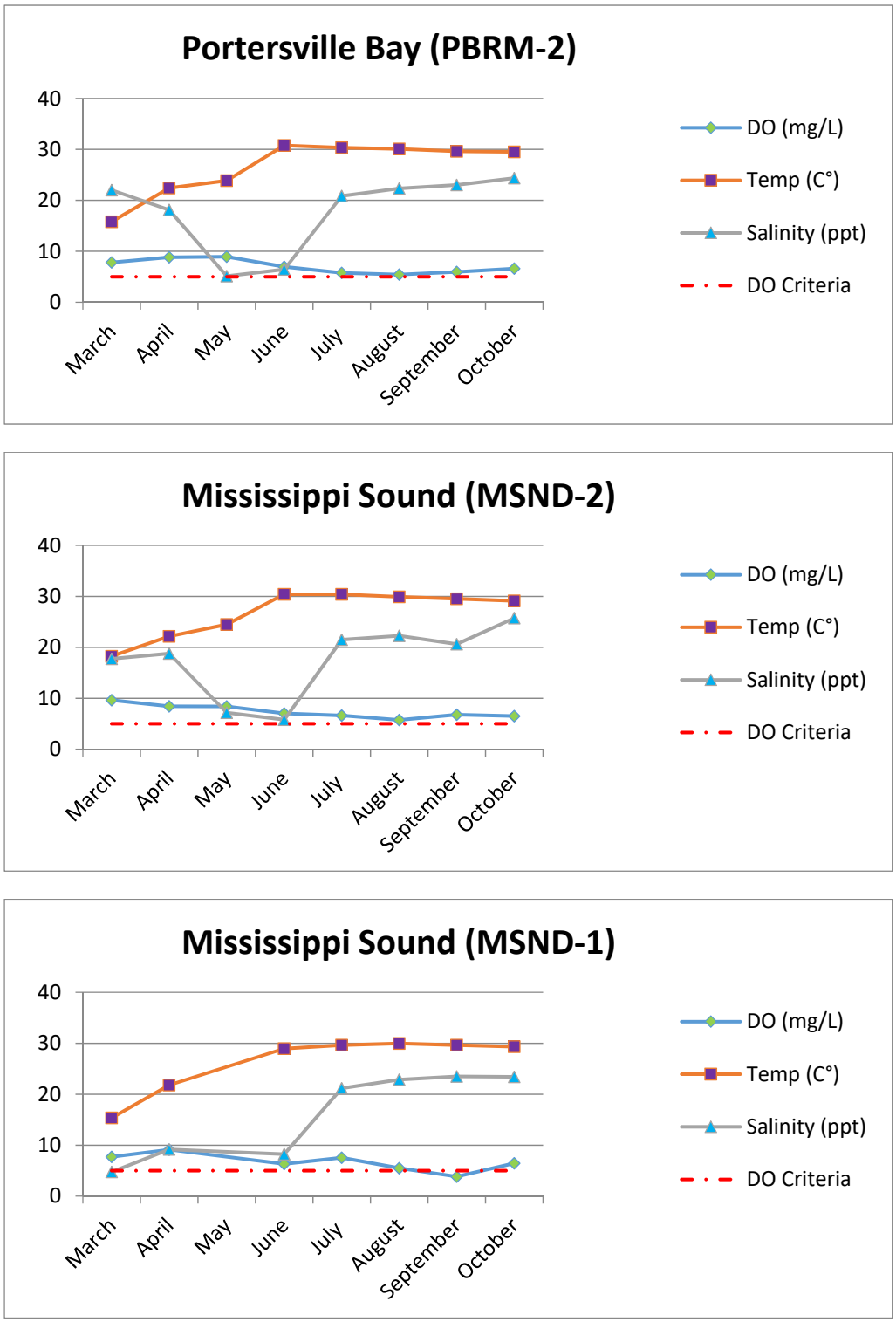


Figure 10. (continued)

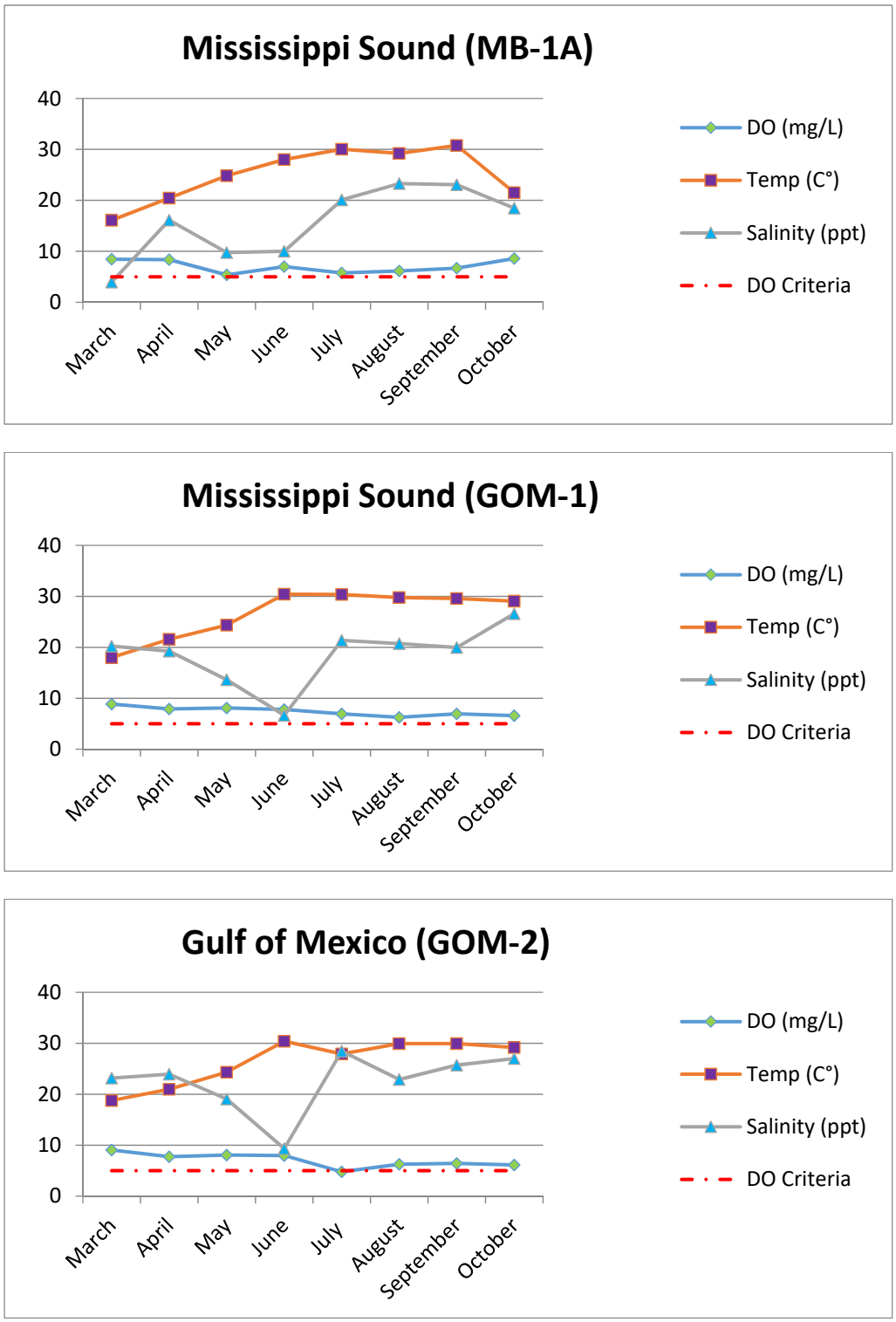


Figure 10. (continued)

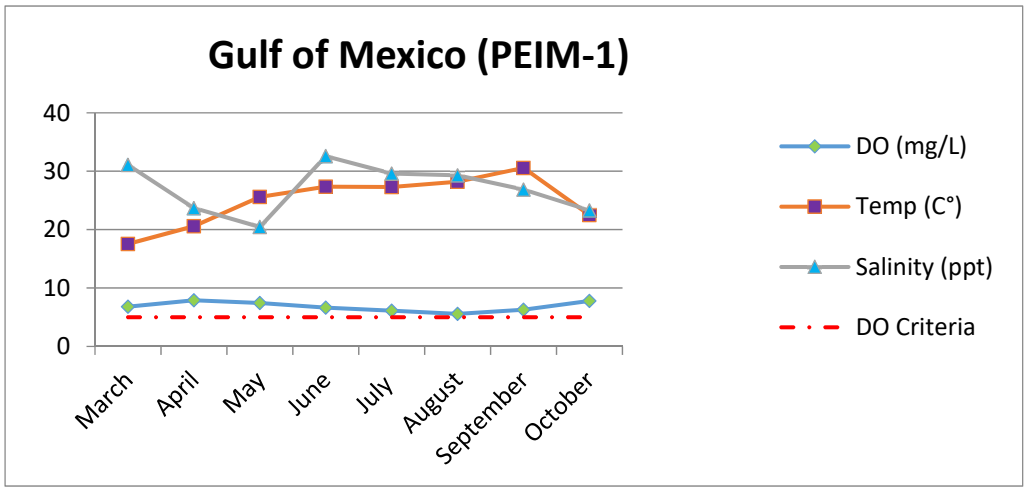


Figure 11. Monthly depth profiles of Dissolved Oxygen, Temperature, and Salinity for Mississippi Sound Sub-Watershed, March-October 2019.

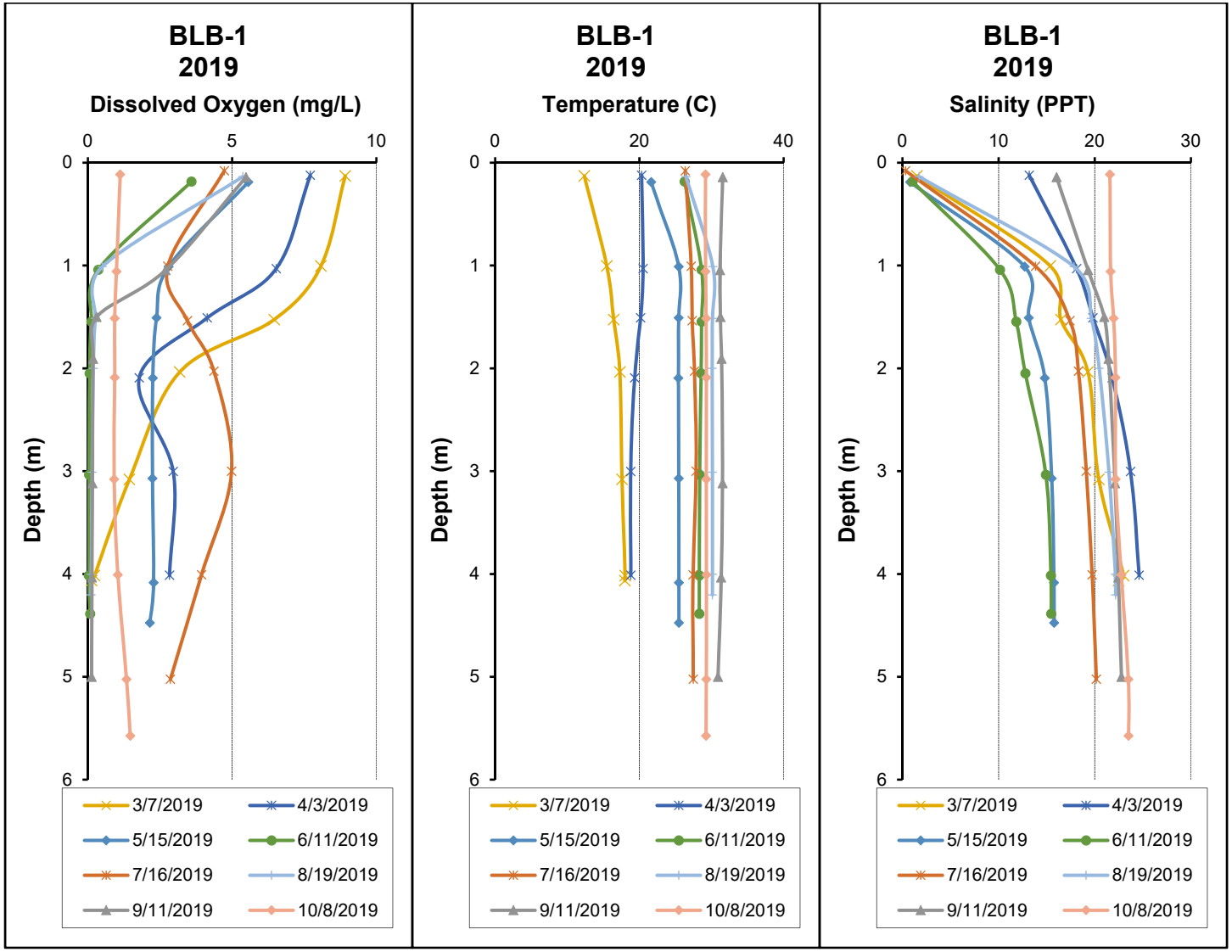


Figure 11. (continued)

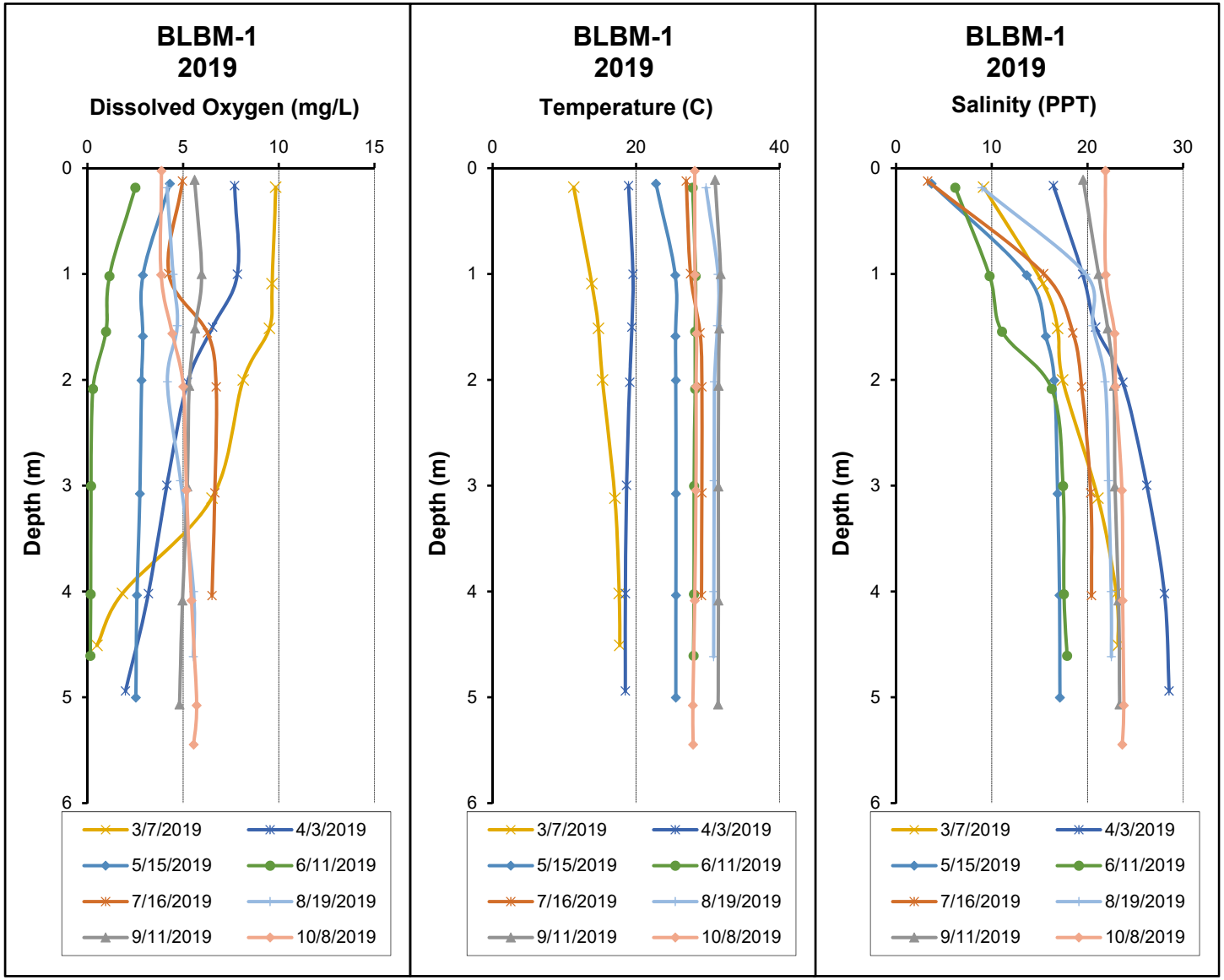


Figure 11. (continued)

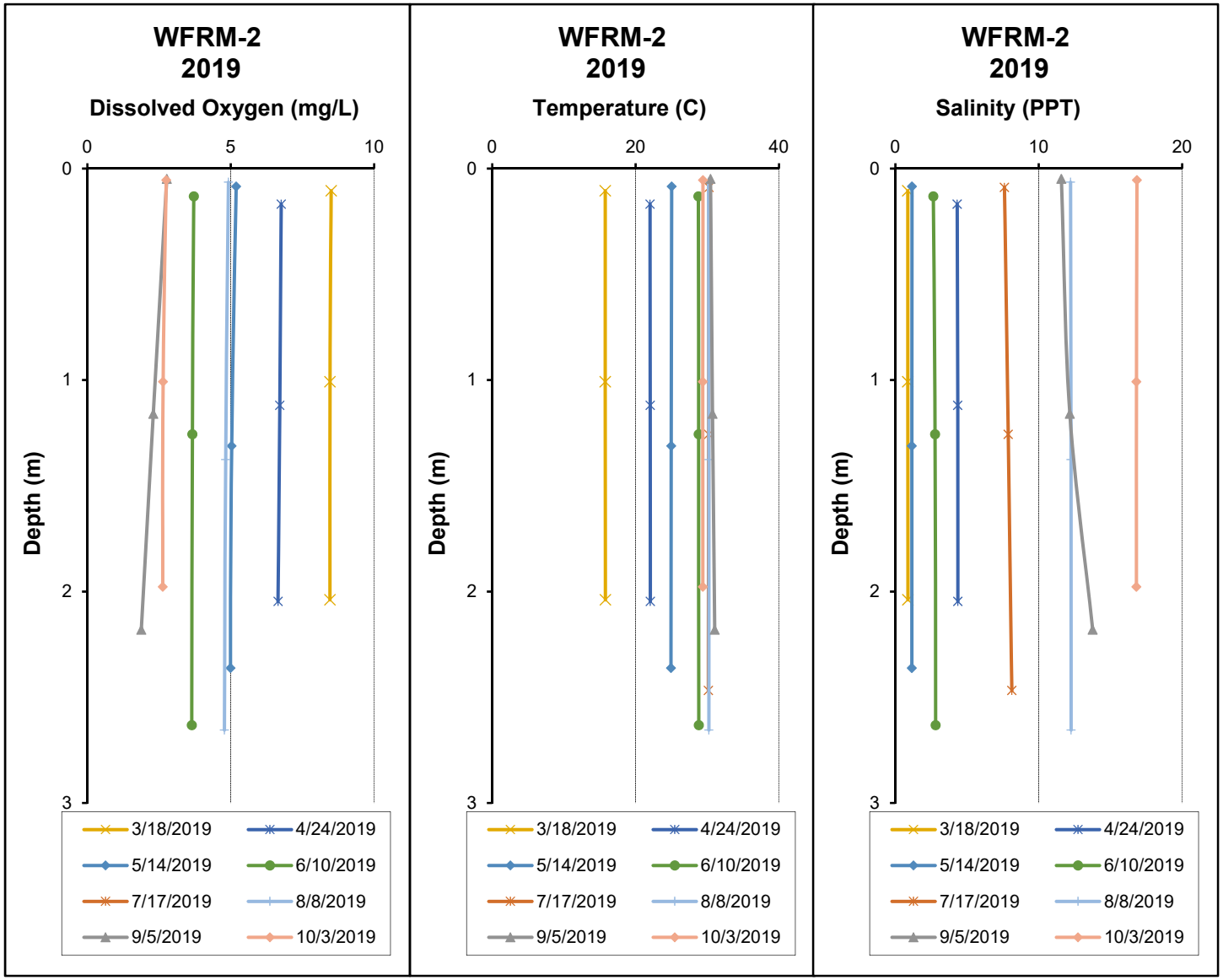


Figure 11. (continued)

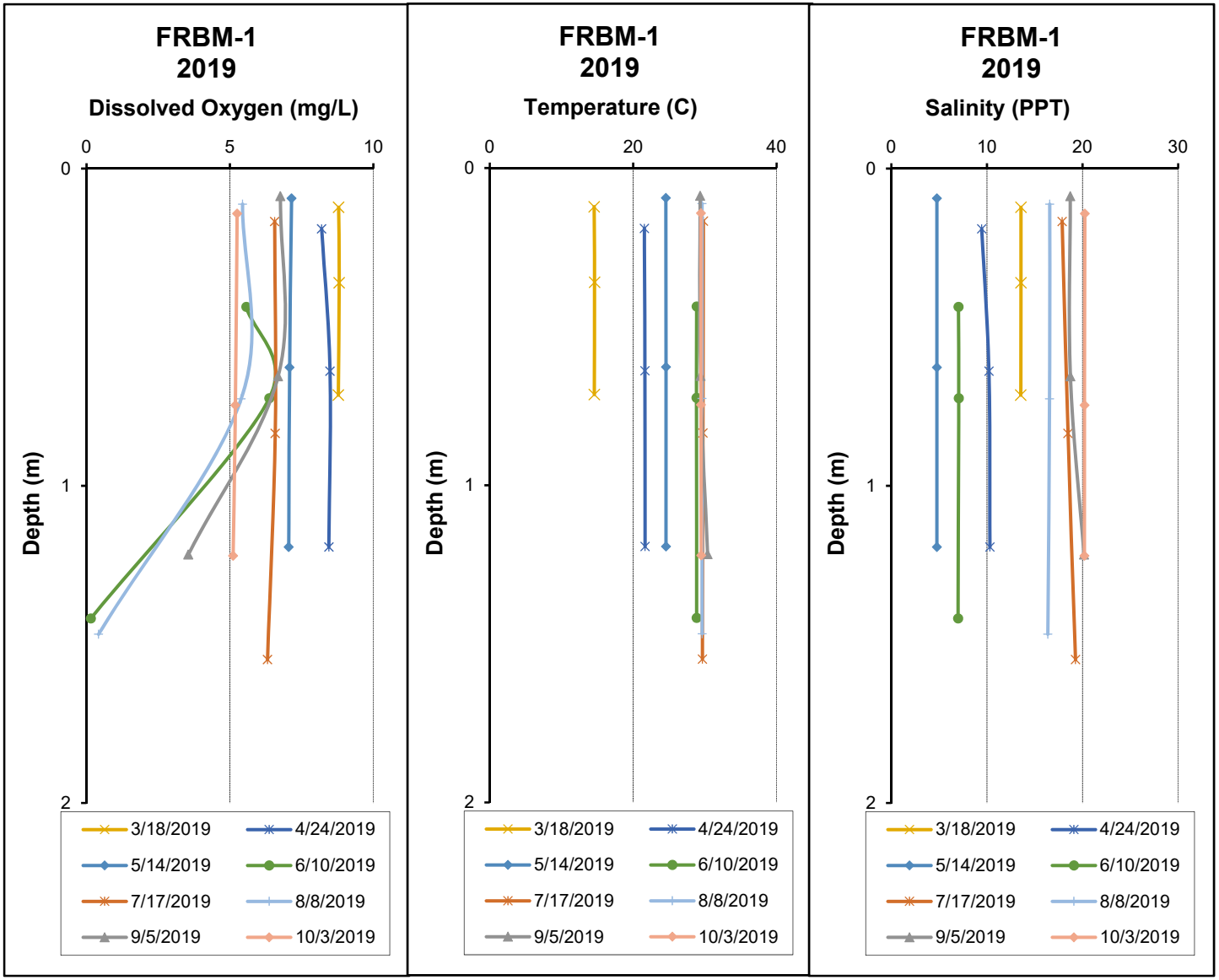


Figure 11. (continued)

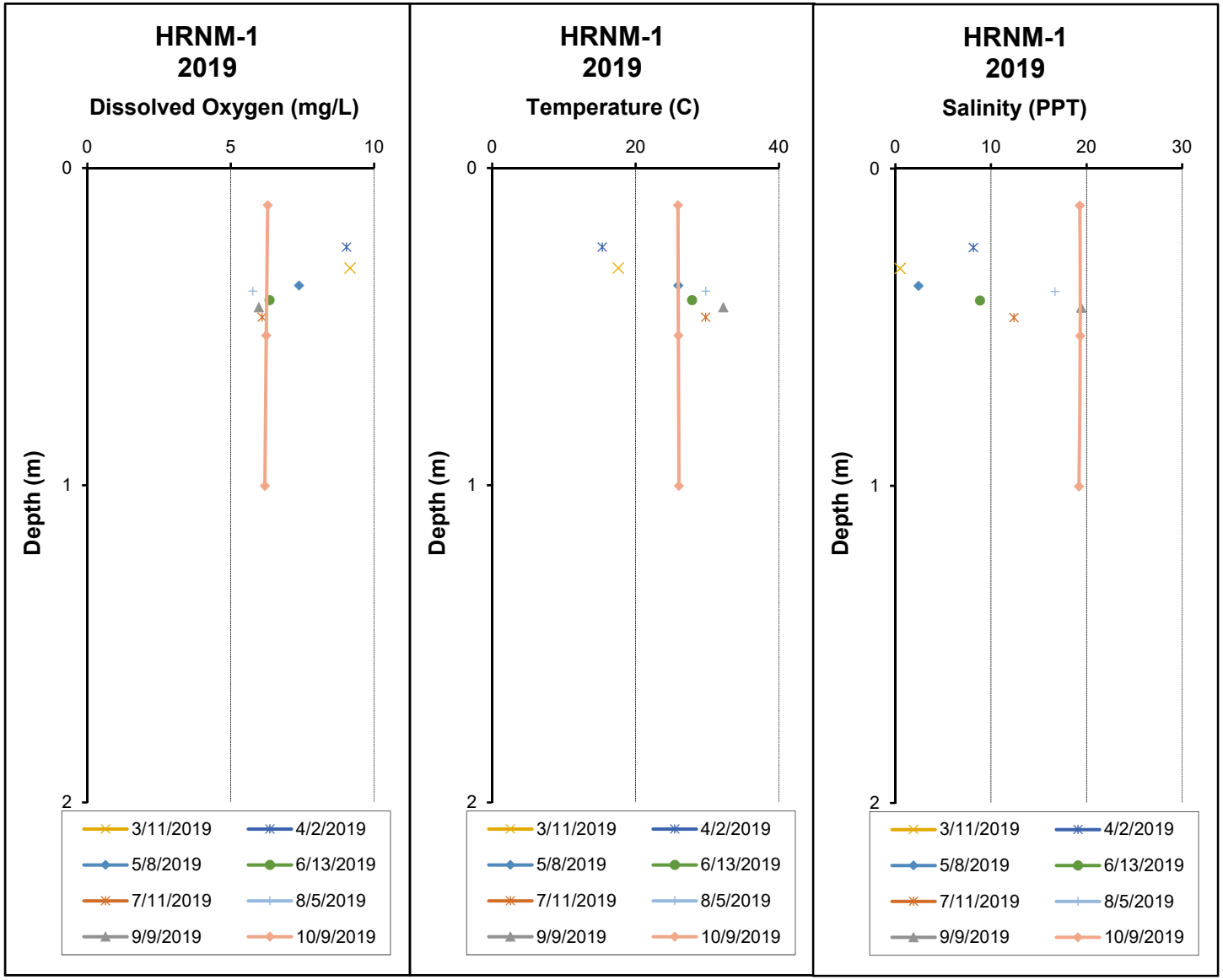


Figure 11. (continued)

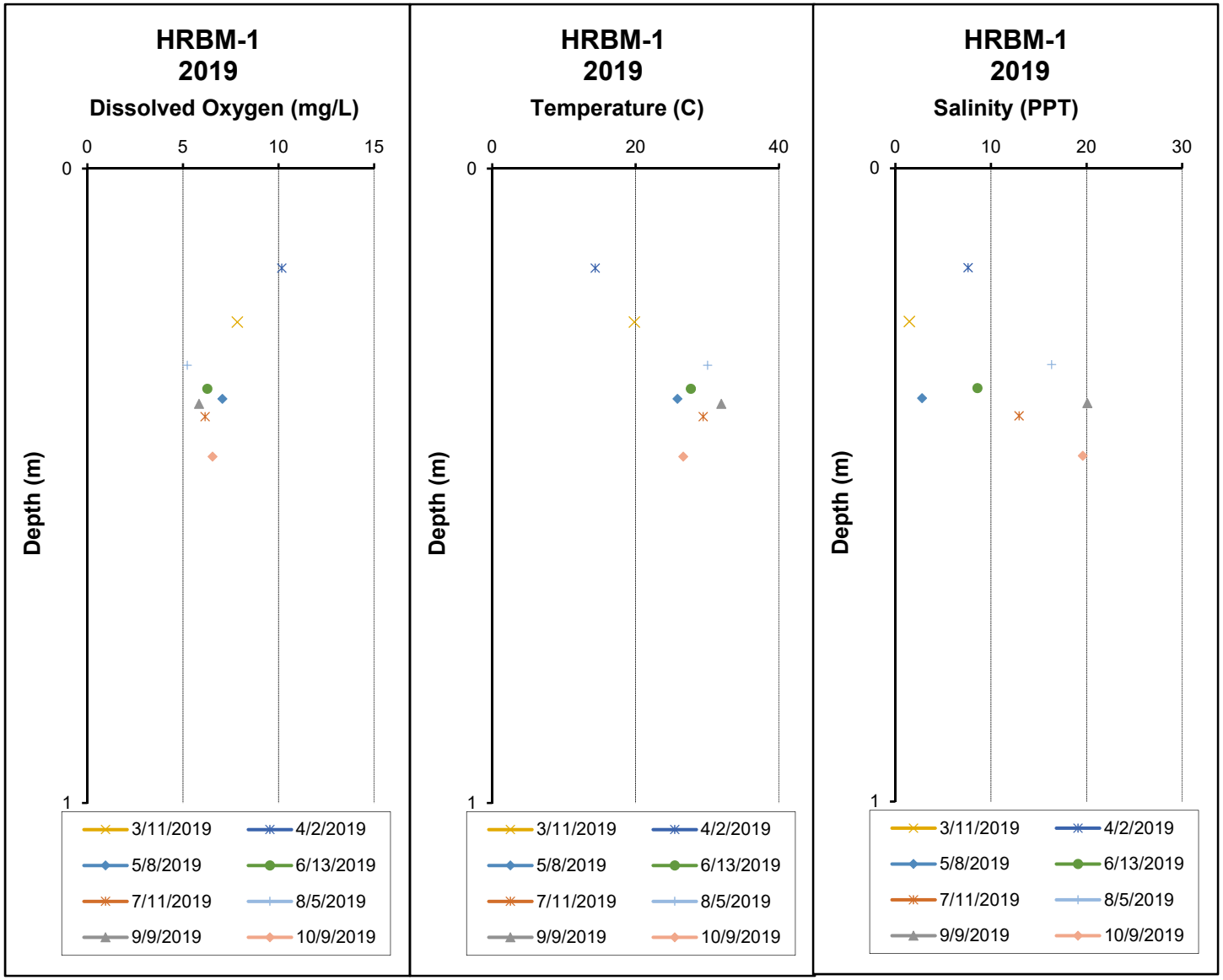


Figure 11. (continued)

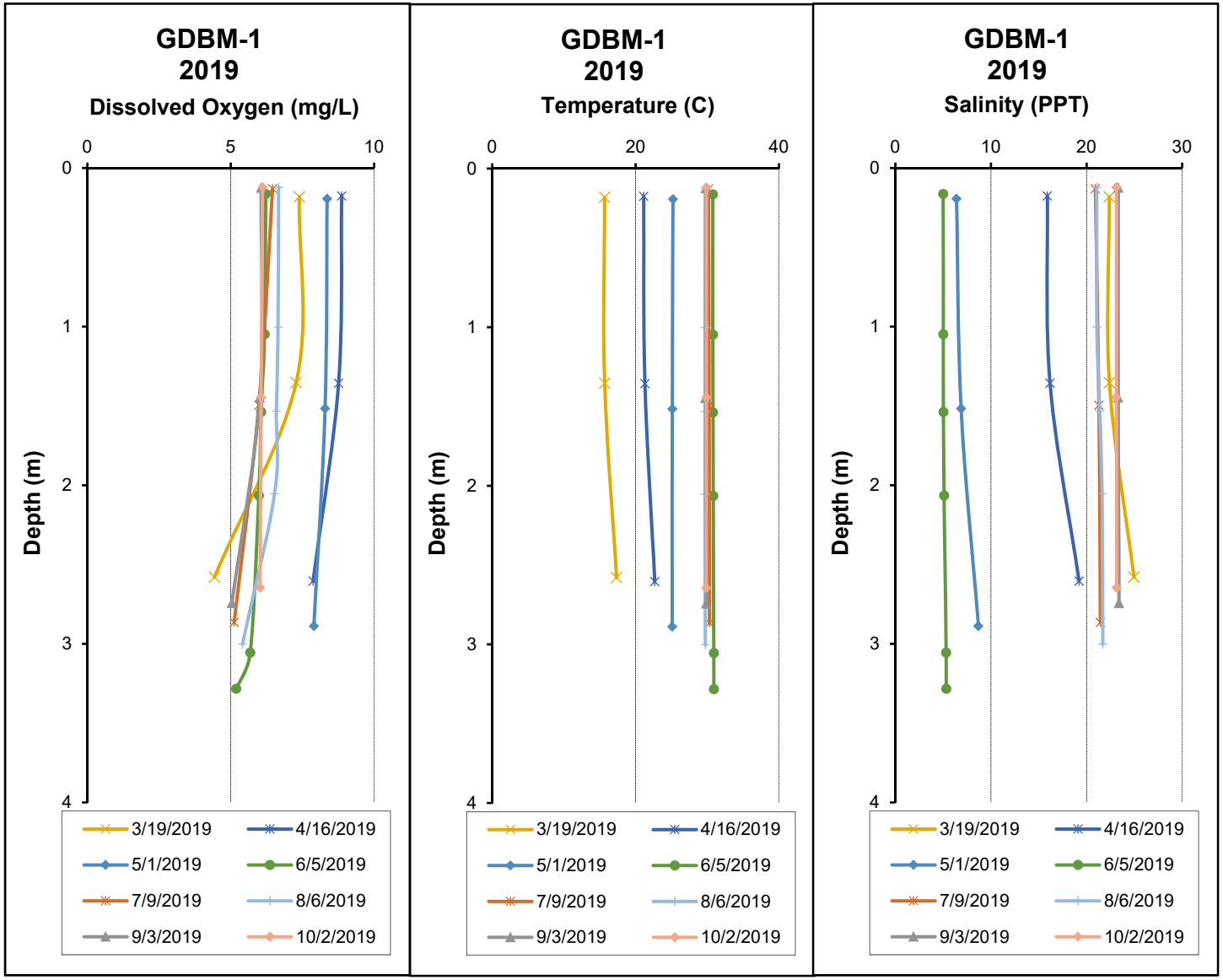
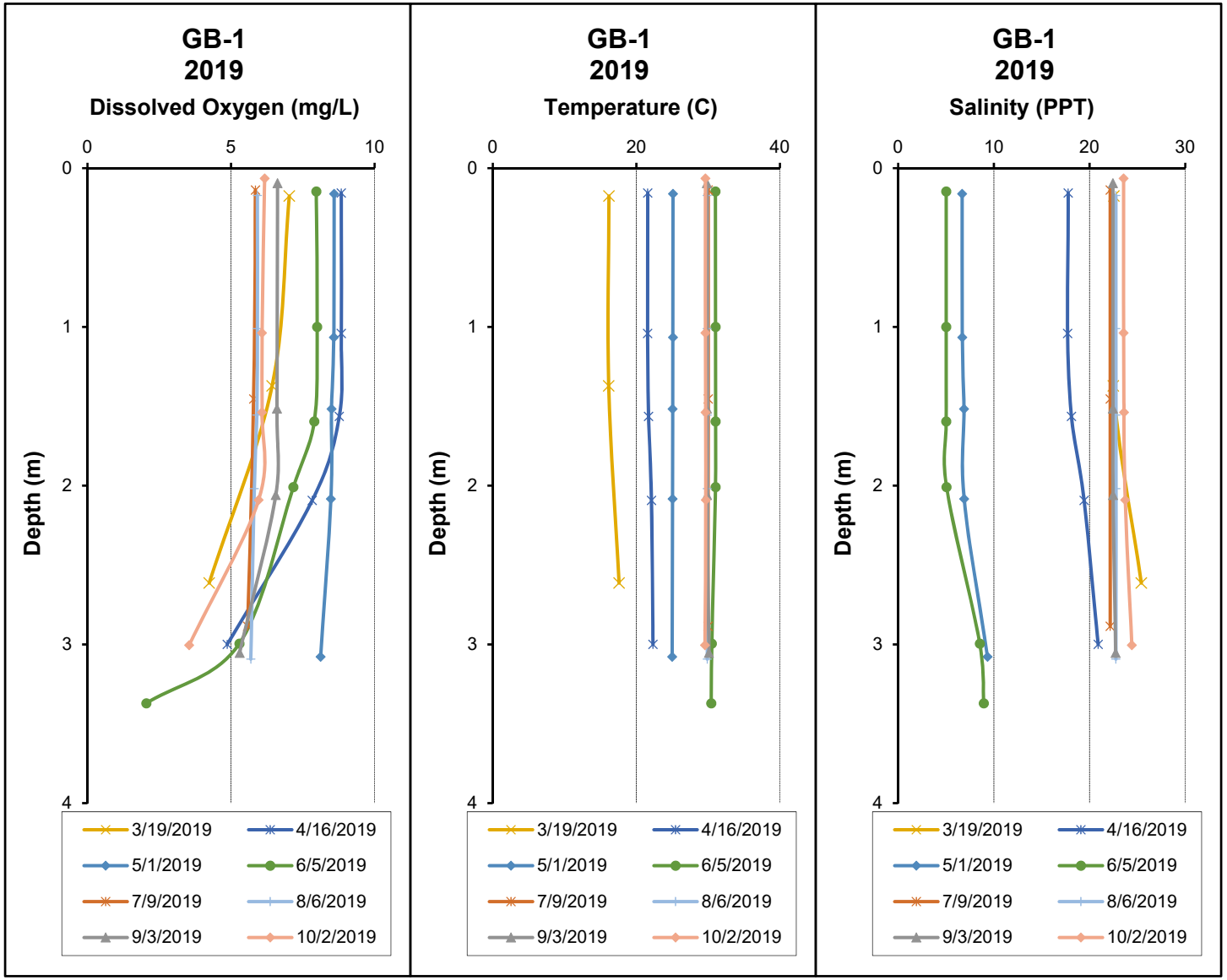


Figure 11. (continued)



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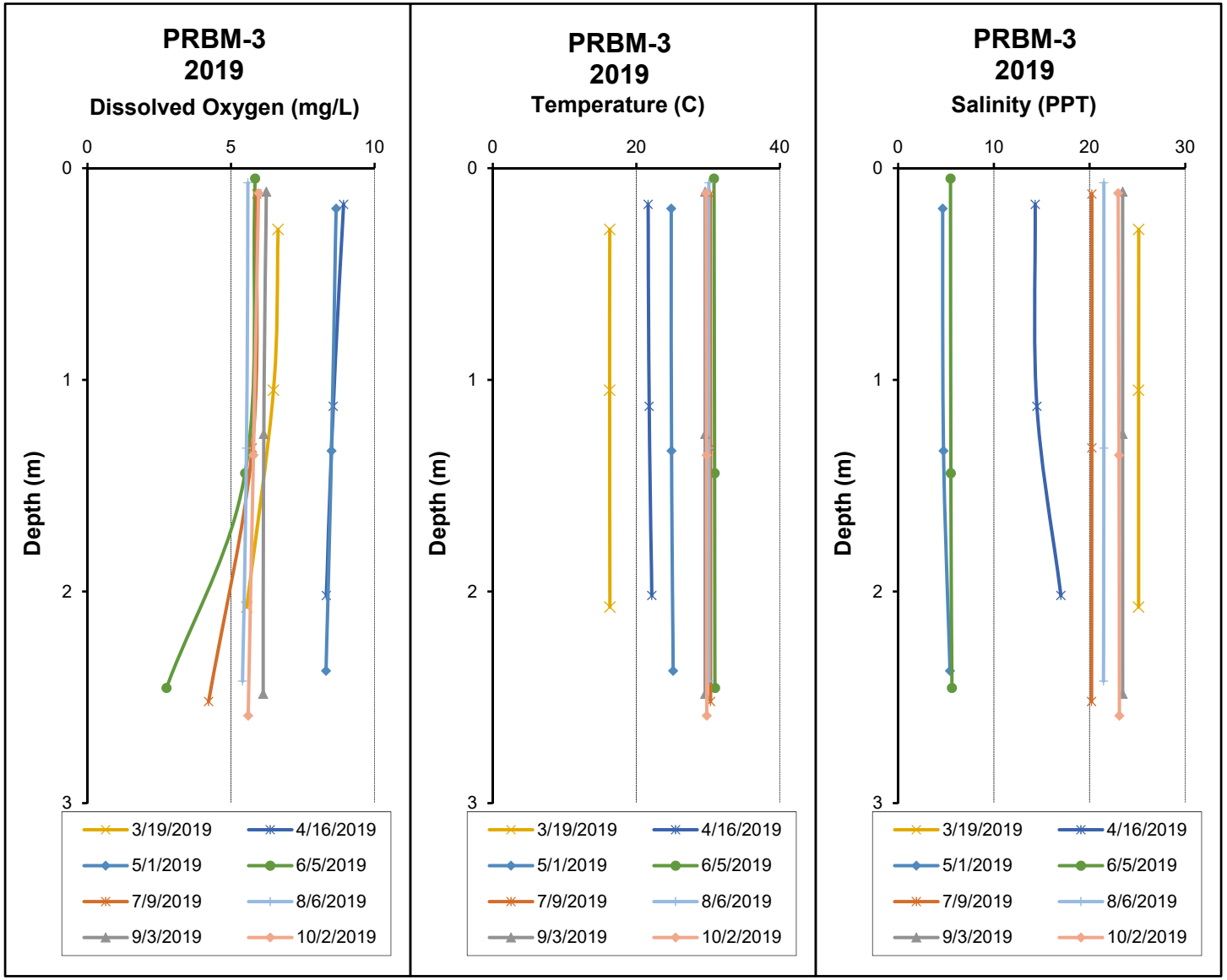
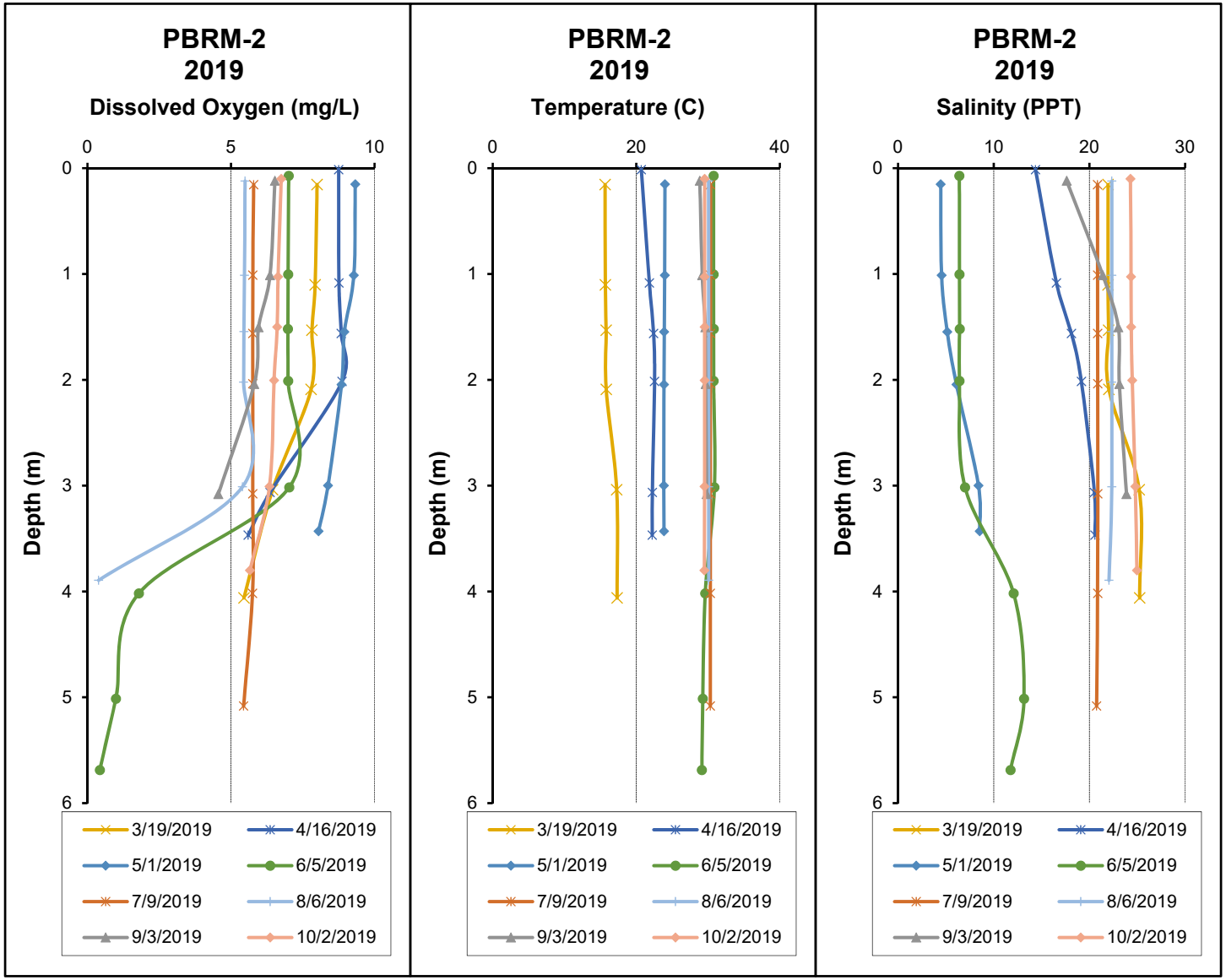


Figure 11. (continued)



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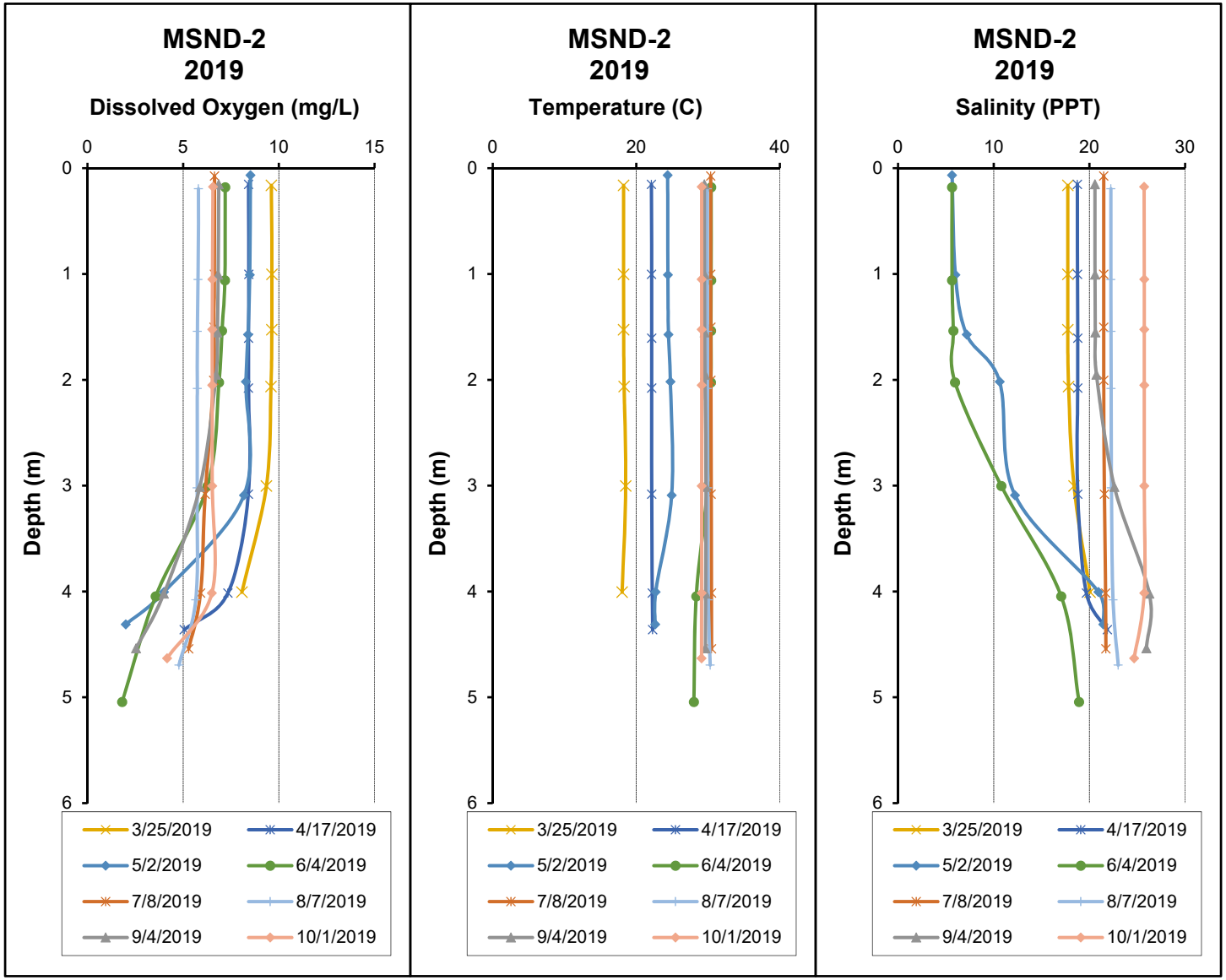

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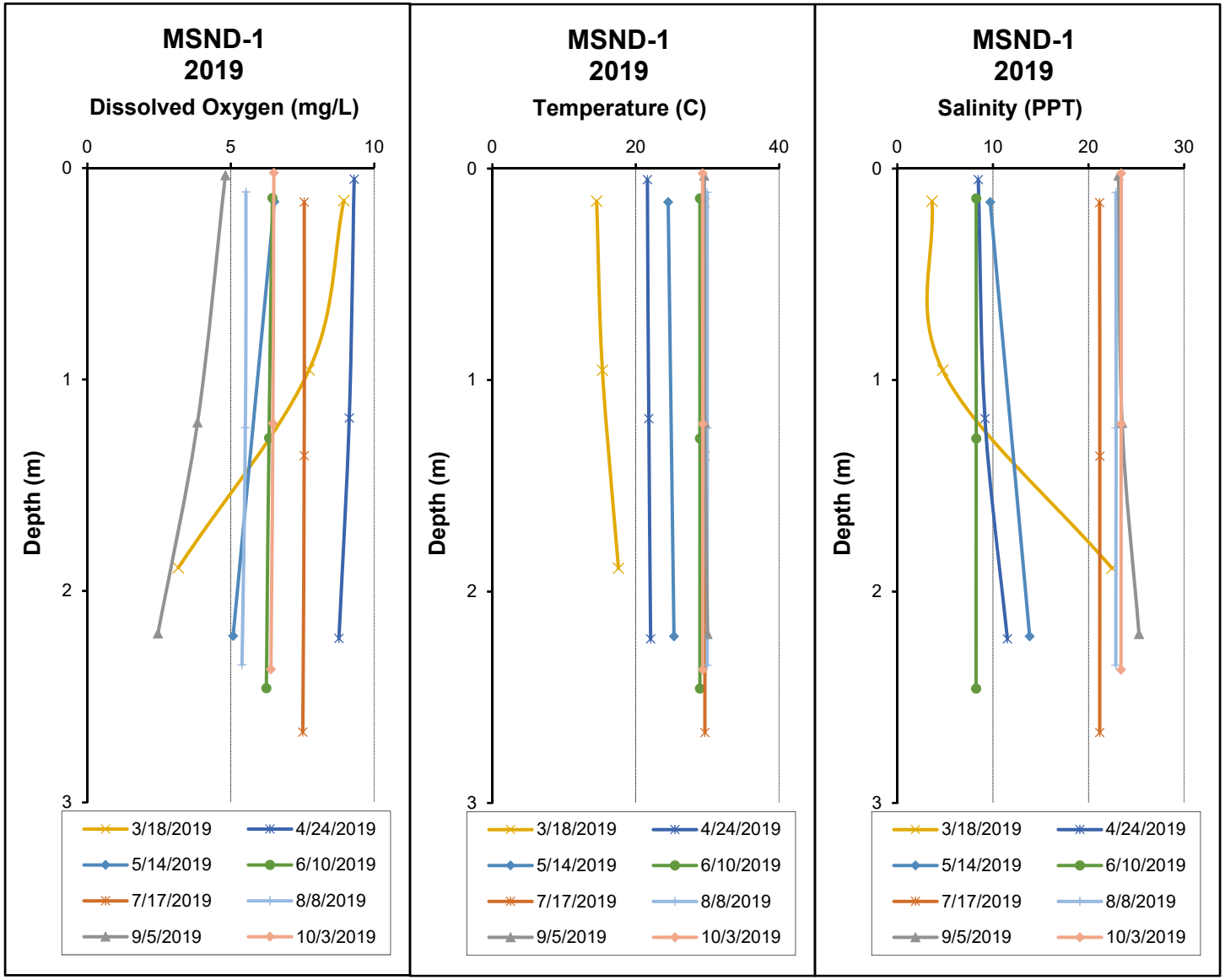

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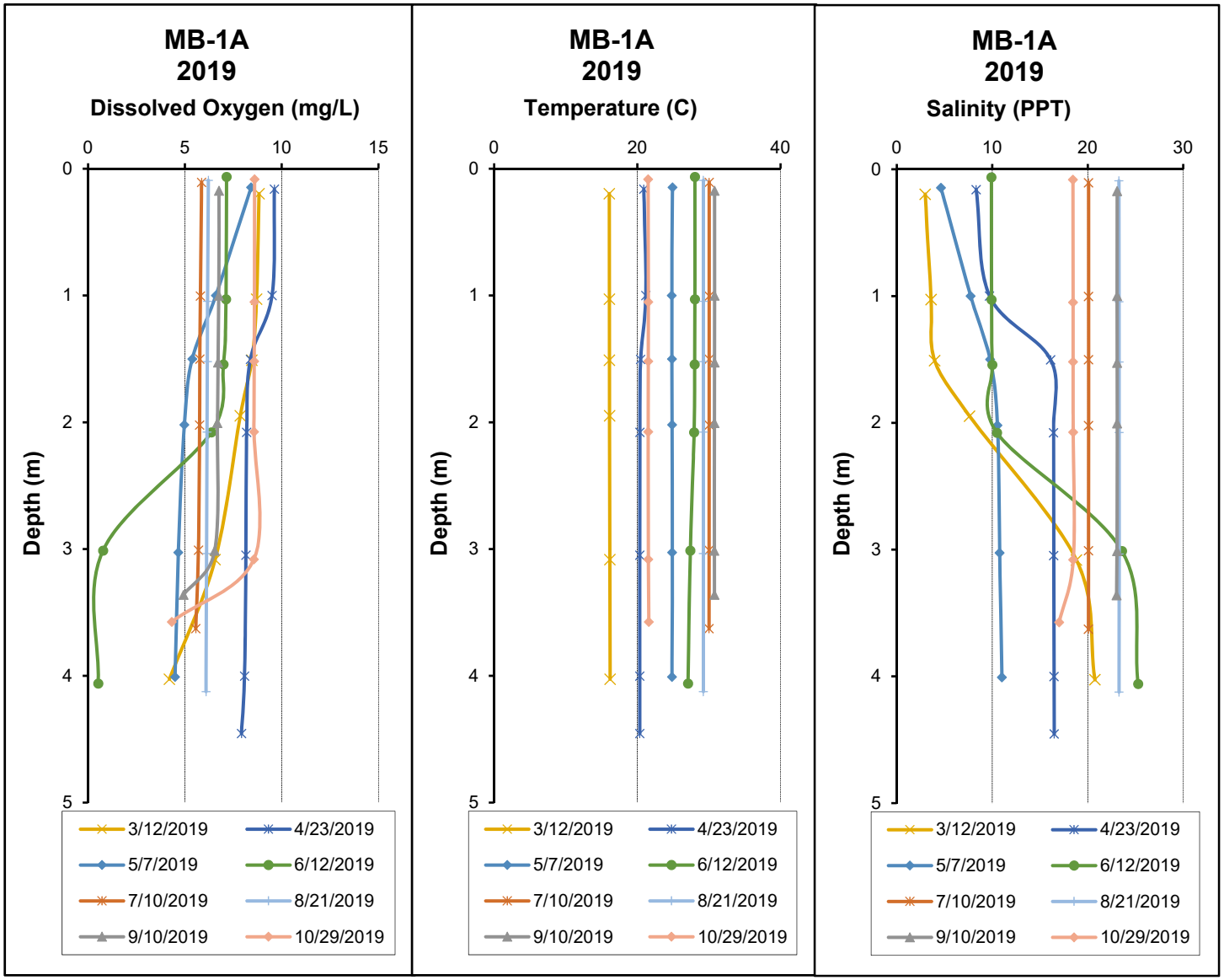
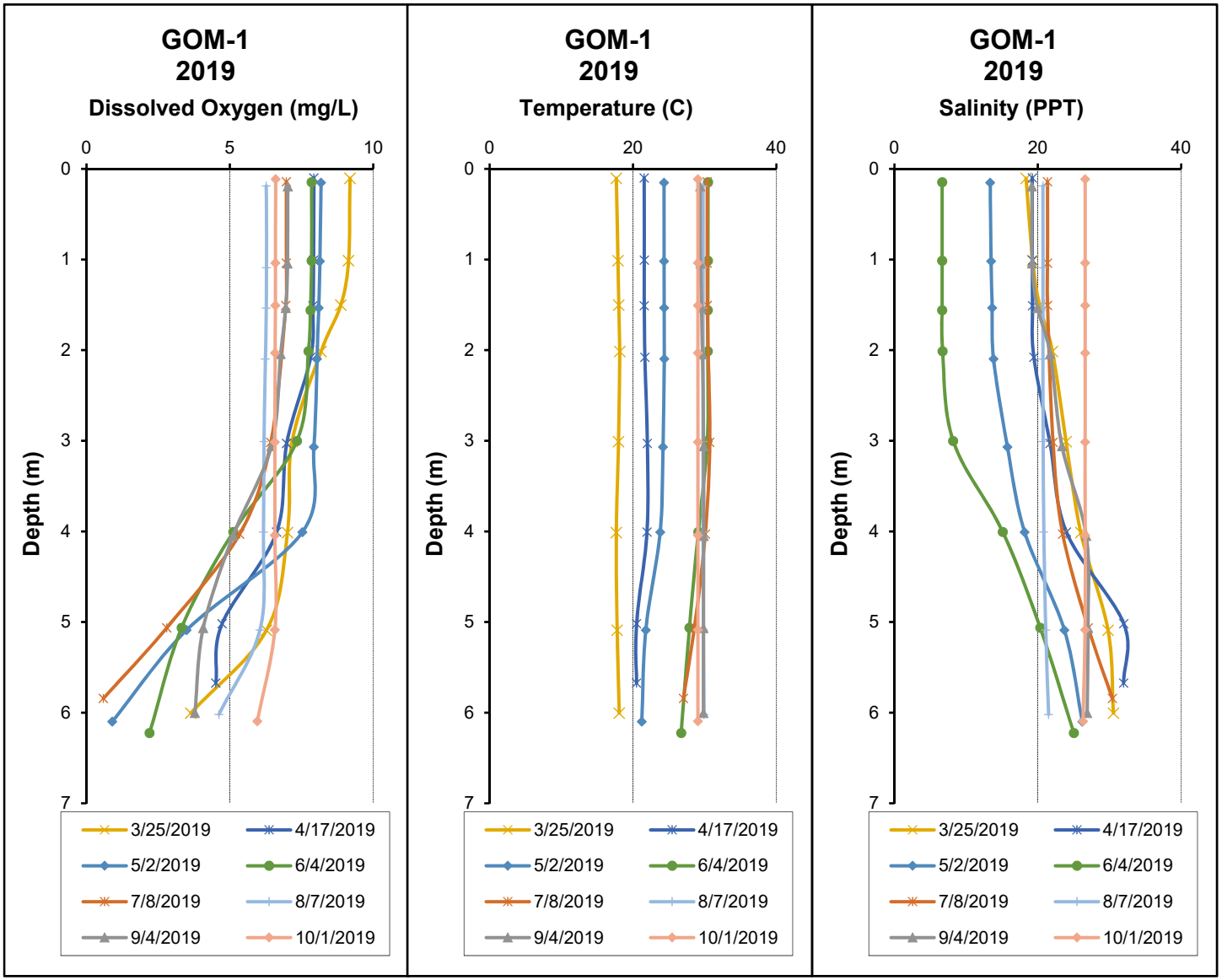


Figure 11. (continued)



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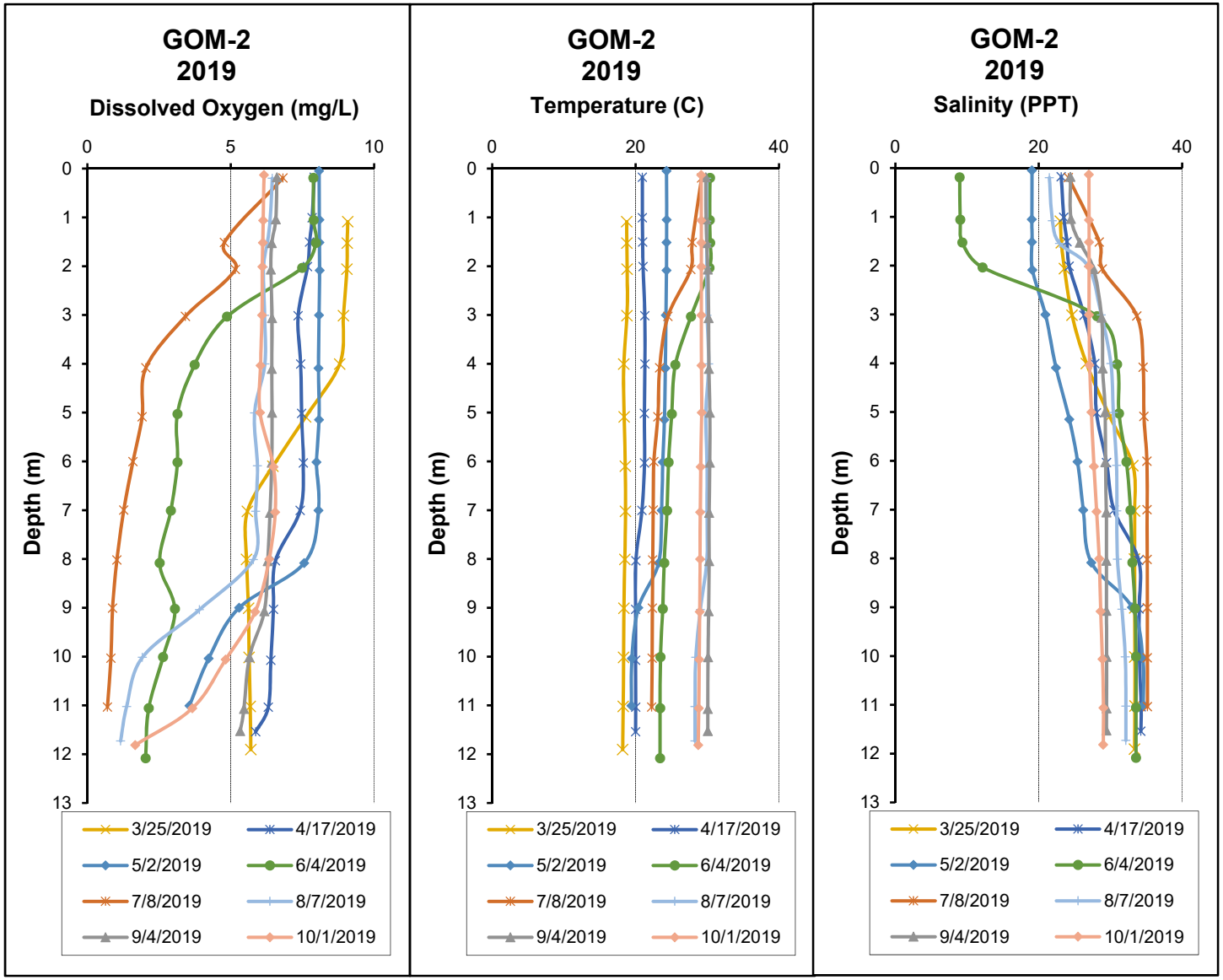

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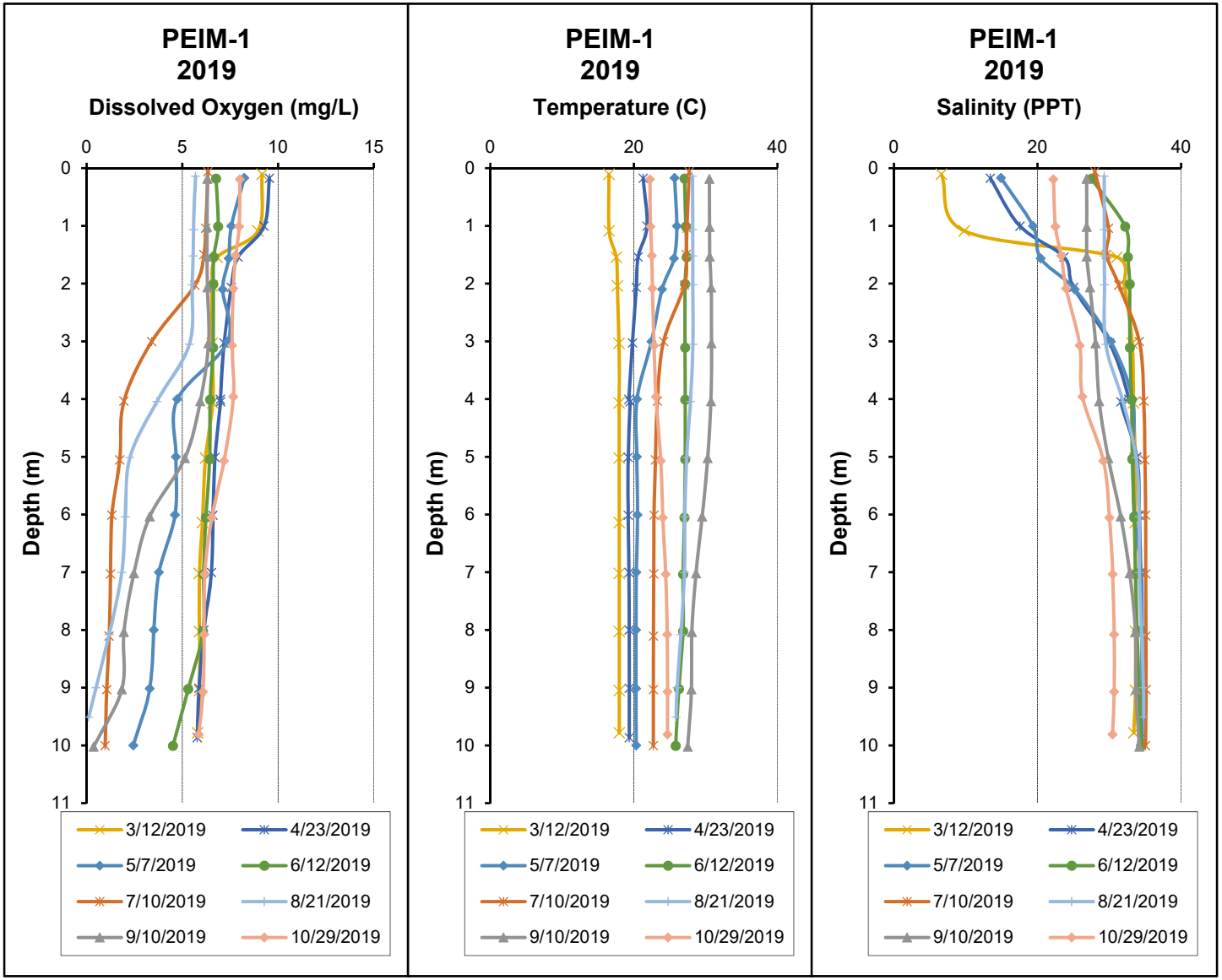

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APPENDIX

Appendix Table 1. Summary of Mississippi Sound Sub-Watershed water quality data collected during the 2019 sampling season. Minimum (min) and maximum (max) values calculated using minimum detection limits when results were less than this value. Median (med), mean, and standard deviation (SD) values were calculated by multiplying the MDL by 0.5 when results were less than this value.

		N	Min	Max	Med	Avg	SD	E	Q
BLB-1	**Physical**								
	Temperature (°C)	8	16.4	31.2	28.0	26.1	5.2		
	Turbidity (NTU)	8	3.3	8.6	6.0	6.1	1.8		
	Total Dissolved Solids (mg/L)	8	2080.0	24300.0	12400.0	12715.0	7097.5		
	Total Suspended Solids (mg/L)	8	5.0	15.0	8.0	8.2	3.0		
	Specific Conductance	8	19868.3	34919.7	29971.0	28593.8	5452.1		
	Hardness (mg/L)	3	1330.0	2970.0	1590.0	1963.3	881.4		
	Alkalinity (mg/L)	8	32.5	102.0	63.2	65.1	24.2		
	Color (CU)	8	10	100	35	42	31		
	Measured Stream Flow (cfs)	6	-106.2	172.4	-86.0	-39.1	106.0		
	Chemical								
	Dissolved Oxygen (mg/L)	8	0.1 [C]	6.5	1.6	2.2	2.3	7	
	pH (SU)	8	6.9	7.6	7.2	7.2	0.2		
[J]	Ammonia Nitrogen (mg/L)	8	< 0.029	0.200	0.072	0.092	0.076		
[J]	Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.020	0.109	0.028	0.042	0.037		
[J]	Total Kjeldahl Nitrogen (mg/L)	8	0.470	1.300	0.830	0.881	0.290		
[J]	Total Nitrogen (mg/L)	8	< 0.579	1.330	0.889	0.923	0.276		
	Dis Reactive Phosphorus (mg/L)	8	0.019	0.040	0.030	0.030	0.007		
[J]	Total Phosphorus (mg/L)	8	0.035	0.132	0.064	0.073	0.033		
[J]	Dissolved Organic Carbon (mg/L)	8	< 1.0	< 45.8	14.0	12.7	10.9		
[J]	CBOD-5 (mg/L)	8	< 2.0	6.4	1.0	1.7	1.9		
	Chlorides (mg/L)	8	4400.0	13000.0	9750.0	8800.0	3186.1		
	Total Metals								
	Aluminum (T) (mg/L)	3	0.315	0.570	0.512	0.466	0.134		
[J]	Iron (T) (mg/L)	3	0.103	0.414	0.360	0.292	0.166		
[J]	Manganese (T) (mg/L)	3	0.027	0.115	0.030	0.057	0.050		
	Dissolved Metals								
[J]	Aluminum (mg/L)	3	0.054	0.354	0.180	0.196	0.151		
	Antimony (µg/L)	3	< 0.554	< 5.540	1.385	1.477	1.249		
[J]	Arsenic (µg/L)	3	< 1.620	< 7.380	1.845	2.385	1.136		
	Cadmium (µg/L)	3	< 0.687	< 6.870	1.715	1.831	1.549		
[J]	Chromium (µg/L)	3	< 0.815	< 8.150	2.035	2.172	1.838		
[J]	Copper (µg/L)	3	5.310	31.000	19.600	18.637	12.872		
	Iron (mg/L)	3	< 0.056	0.264	0.028	0.107	0.136		
	Lead (µg/L)	3	< 0.653	< 6.530	1.630	1.740	1.472		
[J]	Manganese (mg/L)	3	0.020	0.065	0.023	0.036	0.025		
[J]	Nickel (µg/L)	3	< 0.671	< 6.330	1.580	1.805	1.262		
	Selenium (µg/L)	3	9.040	22.000 [A]	18.000	16.347	6.636	3	
	Silver (µg/L)	3	< 0.666	< 6.660	1.665	1.776	1.502		
	Thallium (µg/L)	3	< 0.623	< 6.230	1.560	1.662	1.404		
[J]	Zinc (µg/L)	3	< 8.470	< 84.700	21.200	22.595	19.096		
	Biological								
	Chlorophyll a (mg/m³)	8	< 1.00	20.00	1.55	4.09	6.60		
[J,L]	Enterococci (MPN/DL)	8	10	140	30	47	42		

A=*F&W* aquatic life use criterion exceeded; C=*F&W* criterion violated; E=# samples that exceeded criteria; H=*F&W* human health criterion exceeded; J= estimate; L= estimate; N=# samples; Q=number of samples that have uncertain exceedances; S=*F&W* aquatic life use criterion exceeded.

		N	Min	Max	Med	Avg	SD	E	Q
BLBM-1	**Physical**								
	Temperature (°C)	8	14.8	31.6	28.3	26.0	6.0		
	Turbidity (NTU)	8	5.6	10.4	6.3	7.0	1.5		
	Total Dissolved Solids (mg/L)	8	9680.0	25900.0	17850.0	18047.5	5857.3		
	Total Suspended Solids (mg/L)	8	7.0	14.0	10.0	10.2	2.2		
	Specific Conductance	8	18674.7	36140.0	31463.3	29915.9	5829.5		
	Hardness (mg/L)	3	1760.0	3390.0	2010.0	2386.7	877.8		
	Alkalinity (mg/L)	8	39.8	104.0	79.3	76.8	22.4		
	Color (CU)	8	5	100	23	33	32		
	Measured Stream Flow (cfs)	5	-546.0	-55.7	-157.9	-245.9	202.5		
	Chemical								
	Dissolved Oxygen (mg/L)	8	1.0 [C]	9.5	5.2	5.1	2.6	4	
	pH (SU)	8	7.0	8.1	7.8	7.7	0.4		
	[J] Ammonia Nitrogen (mg/L)	8	< 0.029	< 0.090	0.045	0.040	0.018		
	[J] Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.020	0.062	0.021	0.027	0.016		
	[J] Total Kjeldahl Nitrogen (mg/L)	8	< 0.120	1.500	0.740	0.834	0.442		
	[J] Total Nitrogen (mg/L)	8	< 0.070	1.536	0.781	0.860	0.447		
	Dis Reactive Phosphorus (mg/L)	8	< 0.005	0.041	0.026	0.024	0.014		
	[J] Total Phosphorus (mg/L)	8	0.036	0.090	0.066	0.063	0.016		
	[J] Dissolved Organic Carbon (mg/L)	8	< 0.9	< 45.8	13.6	12.5	11.2		
	[J] CBOD-5 (mg/L)	8	< 2.0	2.6	1.0	1.4	0.7		
	Chlorides (mg/L)	8	5300.0	16000.0	10500.0	10475.0	3751.8		
	Total Metals								
	Aluminum (T) (mg/L)	3	0.180	0.690	0.515	0.462	0.259		
	[J] Iron (T) (mg/L)	3	0.191	0.420	0.366	0.326	0.120		
	[J] Manganese (T) (mg/L)	3	0.028	0.053	0.040	0.040	0.012		
	Dissolved Metals								
	[J] Aluminum (mg/L)	3	0.097	0.319	0.140	0.185	0.118		
	Antimony (µg/L)	3	< 0.554	< 5.540	1.385	1.477	1.249		
	[J] Arsenic (µg/L)	3	< 1.850	< 7.380	3.690	3.173	1.155		
	Cadmium (µg/L)	3	< 0.687	< 6.870	1.715	1.831	1.549		
	[J] Chromium (µg/L)	3	< 0.815	< 8.150	2.035	2.172	1.838		
	[J] Copper (µg/L)	3	7.240	34.000	26.700	22.647	13.833		
	[J] Iron (mg/L)	3	< 0.056	0.161	0.028	0.072	0.077		
	Lead (µg/L)	3	< 0.653	< 6.530	1.630	1.740	1.472		
	[J] Manganese (mg/L)	3	< 0.005	0.024	0.010	0.012	0.011		
	[J] Nickel (µg/L)	3	< 0.748	< 6.330	1.580	1.831	1.228		
	Selenium (µg/L)	3	10.200	30.000 [A]	23.700	21.300	10.116	3	
	Silver (µg/L)	3	< 0.666	< 6.660	1.665	1.776	1.502		
	Thallium (µg/L)	3	< 0.623	< 6.230	1.560	1.662	1.404		
	[J] Zinc (µg/L)	3	< 8.470	< 84.700	21.200	22.595	19.096		
	Biological								
	Chlorophyll a (mg/m³)	8	< 1.00	4.80	1.80	2.11	1.71		
	[J,L] Enterococci (MPN/DL)	8	10	100	30	37	31		

A=*F&W* aquatic life use criterion exceeded; C=*F&W* criterion violated; E=# samples that exceeded criteria; H=*F&W* human health criterion exceeded; J= estimate; L= estimate; N=# samples; Q=number of samples that have uncertain exceedances; S=*F&W* aquatic life use criterion exceeded.

		N	Min	Max	Med	Avg	SD	E	Q
FRBM-1	**Physical**								
	Temperature (°C)	8	14.6	29.7	29.1	26.0	5.5		
	Turbidity (NTU)	8	7.1	39.4	13.8	16.5	10.5		
	Total Dissolved Solids (mg/L)	8	4930.0	23100.0	15600.0	14513.8	6661.8		
	Total Suspended Solids (mg/L)	8	12.0	56.0	17.5	22.9	14.9		
	Specific Conductance	8	8566.3	32380.4	24729.2	22537.7	8923.4		
	Hardness (mg/L)	3	809.0	3060.0	2880.0	2249.7	1250.9		
	Alkalinity (mg/L)	8 <	0.6	101.0	77.0	69.2	32.0		
	Color (CU)	8	10	25	15	16	5		
	Chemical								
	Dissolved Oxygen (mg/L)	8	5.2	8.8	6.6	6.8	1.3		
	pH (SU)	8	7.4	8.2	7.8	7.8	0.3		
	J Ammonia Nitrogen (mg/L)	8 <	0.029	< 0.090	0.045	0.034	0.016		
	J Nitrate+Nitrite Nitrogen (mg/L)	8 <	0.020	< 0.039	0.010	0.014	0.005		
	J Total Kjeldahl Nitrogen (mg/L)	8	0.500	1.200	0.840	0.830	0.257		
	J Total Nitrogen (mg/L)	8 <	0.520	1.210	0.850	0.844	0.253		
	Dis Reactive Phosphorus (mg/L)	8 <	0.005	0.011	0.002	0.004	0.003		
	J Total Phosphorus (mg/L)	8	0.033	0.109	0.054	0.057	0.024		
	J Dissolved Organic Carbon (mg/L)	8 <	1.2	< 45.8	8.0	9.4	9.0		
	J CBOD-5 (mg/L)	8 <	2.0	< 2.0	1.0	1.0	0.0		
	J Chlorides (mg/L)	8	2900.0	13000.0	10350.0	8537.5	3777.4		
	Total Metals								
	Aluminum (T) (mg/L)	3	0.356	0.910	0.546	0.604	0.282		
	Iron (T) (mg/L)	3	0.312	0.690	0.379	0.460	0.202		
	J Manganese (T) (mg/L)	3	0.022	0.080	0.048	0.050	0.029		
	Dissolved Metals								
	J Aluminum (mg/L)	3	0.052	0.200	0.092	0.115	0.076		
	Antimony (µg/L)	3 <	2.770	< 5.540	1.385	1.847	0.800		
	Arsenic (µg/L)	3 <	6.850	< 8.000	6.850	6.180	2.232		
	J Cadmium (µg/L)	3 <	3.430	< 6.870	1.715	2.288	0.993		
	J Chromium (µg/L)	3 <	4.070	< 8.150	2.035	2.715	1.178		
	J Copper (µg/L)	3	23.000	47.300	39.200	36.500	12.373		
	Iron (mg/L)	3 <	0.056	< 0.056	0.028	0.028	0.000		
	Lead (µg/L)	3 <	3.260	< 6.530	1.630	2.175	0.944		
	J Manganese (mg/L)	3 <	0.001	< 0.005	0.002	0.002	0.001		
	J Nickel (µg/L)	3 <	3.160	< 6.330	3.165	2.725	1.000		
	Selenium (µg/L)	3	7.600	46.300 A	45.500	33.133	22.116	3	
	Silver (µg/L)	3 <	3.330	< 6.660	1.665	2.220	0.961		
	Thallium (µg/L)	3 <	3.120	< 6.230	1.560	2.078	0.898		
	J Zinc (µg/L)	3 <	42.400	< 84.700	21.200	28.250	12.211		
	Biological								
	Chlorophyll a (mg/m³)	8 <	1.00	4.90	1.65	1.84	1.42		
	J,L Enterococci (MPN/DL)	8	10	10	5	6	2		

A=*SH,S,F&W* aquatic life use criterion exceeded; C=*SH,S,F&W* criterion violated; E=# samples that exceeded criteria; H=*SH,S,F&W* human health criterion exceeded; J= estimate; L= estimate; N=# samples; Q=number of samples that have uncertain exceedances; S=*SH,S,F&W* aquatic life use criterion exceeded.

		N	Min	Max	Med	Avg	SD	E	Q
GB-1	**Physical**								
	Temperature (°C)	8	16.1	31.0	29.7	26.7	5.3		
	Turbidity (NTU)	8	3.1	12.7	7.5	7.4	3.0		
	Total Dissolved Solids (mg/L)	8	5500.0	26700.0	23950.0	19715.0	8557.0		
	Total Suspended Solids (mg/L)	8	7.0	16.0	11.5	10.9	3.3		
	Specific Conductance	8	9029.9	37271.1	35335.2	28724.0	11527.0		
	Hardness (mg/L)	3	1100.0	3500.0	3320.0	2640.0	1336.7		
	Alkalinity (mg/L)	8 <	0.6	104.0	80.6	70.7	32.9		
	Color (CU)	8	5	25	10	11	6		
	Chemical								
	Dissolved Oxygen (mg/L)	8	5.8	8.8	6.5	7.0	1.2		
	pH (SU)	8	7.9	8.5	8.1	8.1	0.2		
	J Ammonia Nitrogen (mg/L)	8 <	0.029	< 0.090	0.045	0.034	0.016		
	J Nitrate+Nitrite Nitrogen (mg/L)	8 <	0.020	< 0.039	0.010	0.014	0.005		
	J Total Kjeldahl Nitrogen (mg/L)	8	0.610	1.200	0.875	0.875	0.190		
	J Total Nitrogen (mg/L)	8 <	0.630	< 1.210	0.885	0.888	0.189		
	J Dis Reactive Phosphorus (mg/L)	8 <	0.005	0.047	0.003	0.010	0.016		
	J Total Phosphorus (mg/L)	8	0.031	0.058	0.048	0.047	0.008		
	J Dissolved Organic Carbon (mg/L)	8 <	0.8	< 45.8	16.4	13.5	10.4		
	J CBOD-5 (mg/L)	8 <	2.0	3.2	1.0	1.3	0.8		
	Chlorides (mg/L)	8	3100.0	21000.0	13000.0	11775.0	5833.6		
	Total Metals								
	Aluminum (T) (mg/L)	3	0.129	0.860	0.167	0.385	0.412		
	J Iron (T) (mg/L)	3	0.135	0.520	0.190	0.282	0.208		
	J Manganese (T) (mg/L)	3 <	0.001	0.027	0.024	0.017	0.014		
	Dissolved Metals								
	J Aluminum (mg/L)	3	0.054	0.108	0.060	0.074	0.030		
	Antimony (µg/L)	3 <	2.770	< 5.540	1.385	1.847	0.800		
	Arsenic (µg/L)	3 <	7.380	10.100	9.340	7.710	3.502		
	Cadmium (µg/L)	3 <	3.430	< 6.870	1.715	2.288	0.993		
	J Chromium (µg/L)	3 <	4.070	< 8.150	2.035	2.715	1.178		
	J Copper (µg/L)	3	22.000	43.500	40.200	35.233	11.578		
	Iron (mg/L)	3 <	0.056	< 0.056	0.028	0.028	0.000		
	Lead (µg/L)	3 <	3.260	< 6.530	1.630	2.175	0.944		
	J Manganese (mg/L)	3 <	0.001	< 0.005	0.002	0.002	0.001		
	J Nickel (µg/L)	3 <	3.160	< 6.330	3.165	3.168	1.590		
	Selenium (µg/L)	3	19.000	58.600 A	58.000	45.200	22.692	3	
	J Silver (µg/L)	3 <	3.330	< 6.660	3.330	3.165	1.425		
	Thallium (µg/L)	3 <	3.120	< 6.230	1.560	2.078	0.898		
	J Zinc (µg/L)	3 <	42.400	< 84.700	21.200	28.250	12.211		
	Biological								
	Chlorophyll a (mg/m³)	8 <	1.00	15.00	2.30	4.19	4.93		
	J,L Enterococci (MPN/DL)	8	10	10	5	6	2		

A=*SH,S,F&W* aquatic life use criterion exceeded; C=*SH,S,F&W* criterion violated; E=# samples that exceeded criteria; H=*SH,S,F&W* human health criterion exceeded; J= estimate; L= estimate; N=# samples; Q=number of samples that have uncertain exceedances; S=*SH,S,F&W* aquatic life use criterion exceeded.

		N	Min		Max	Med	Avg	SD	E	Q
GDBM-1	**Physical**									
	Temperature (°C)	8	15.7		30.8	29.7	26.6	5.5		
	Turbidity (NTU)	8	4.6		13.2	8.0	8.8	2.6		
	Total Dissolved Solids (mg/L)	8	5370.0		25100.0	24250.0	19101.2	8383.7		
	Total Suspended Solids (mg/L)	8	8.0		18.0	13.0	12.8	3.2		
	Specific Conductance	8	9031.3		36864.2	34038.6	28017.8	11327.2		
	Hardness (mg/L)	3	1060.0		3610.0	3000.0	2556.7	1331.6		
	[J] Alkalinity (mg/L)	8	9.4		99.3	77.8	72.1	28.7		
	Color (CU)	8	5		30	10	11	8		
	Chemical									
	Dissolved Oxygen (mg/L)	8	6.0		8.8	6.3	6.9	1.1		
	pH (SU)	8	7.8		8.2	8.0	8.0	0.1		
	[J] Ammonia Nitrogen (mg/L)	8	< 0.029	<	0.090	0.045	0.034	0.016		
	[J] Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.020	<	0.039	0.010	0.014	0.005		
	[J] Total Kjeldahl Nitrogen (mg/L)	8	0.550		1.200	0.720	0.820	0.245		
	[J] Total Nitrogen (mg/L)	8	< 0.570		1.210	0.735	0.834	0.242		
	Dis Reactive Phosphorus (mg/L)	8	< 0.005		0.047	0.003	0.010	0.016		
	[J] Total Phosphorus (mg/L)	8	0.032		0.061	0.053	0.051	0.010		
	[J] Dissolved Organic Carbon (mg/L)	8	< 0.8	<	45.8	16.4	13.6	10.3		
	[J] CBOD-5 (mg/L)	8	< 2.0		4.8	1.0	1.5	1.3		
	Chlorides (mg/L)	8	3000.0		22000.0	12000.0	11225.0	5976.6		
	Total Metals									
	Aluminum (T) (mg/L)	3	0.307		0.830	0.343	0.493	0.292		
	Iron (T) (mg/L)	3	0.264		0.550	0.375	0.396	0.144		
	[J] Manganese (T) (mg/L)	3	< 0.001		0.050	0.030	0.027	0.025		
	Dissolved Metals									
	[J] Aluminum (mg/L)	3	0.048		0.130	0.082	0.087	0.041		
	Antimony (µg/L)	3	< 2.770	<	5.540	1.385	1.847	0.800		
	Arsenic (µg/L)	3	< 7.380		10.600	8.940	7.743	3.607		
	[J] Cadmium (µg/L)	3	< 3.430	<	6.870	1.715	2.288	0.993		
	[J] Chromium (µg/L)	3	< 4.070	<	8.150	2.035	2.715	1.178		
	[J] Copper (µg/L)	3	22.000		60.200	56.000	46.067	20.948		
	Iron (mg/L)	3	< 0.056	<	0.056	0.028	0.028	0.000		
	Lead (µg/L)	3	< 3.260	<	6.530	1.630	2.175	0.944		
	[J] Manganese (mg/L)	3	< 0.001	<	0.005	0.002	0.002	0.001		
	[J] Nickel (µg/L)	3	< 3.200	<	6.330	3.200	3.922	1.280		
	Selenium (µg/L)	3	17.000		59.200 [A]	51.400	42.533	22.454	3	
	Silver (µg/L)	3	< 3.330	<	6.660	1.665	2.220	0.961		
	Thallium (µg/L)	3	< 3.120	<	6.230	1.560	2.078	0.898		
	[J] Zinc (µg/L)	3	< 42.400	<	84.700	21.200	28.250	12.211		
	Biological									
	Chlorophyll a (mg/m³)	8	< 1.00		18.00	1.85	4.15	5.75		
	[L] Enterococci (MPN/DL)	8	10		10	5	5	0		

A=*SH,S,F&W* aquatic life use criterion exceeded; C=*SH,S,F&W* criterion violated; E=# samples that exceeded criteria; H=*SH,S,F&W* human health criterion exceeded; J= estimate; L= estimate; N=# samples; Q=number of samples that have uncertain exceedances; S=*SH,S,F&W* aquatic life use criterion exceeded.

		N	Min	Max	Med	Avg	SD	E	Q
GOM-1	**Physical**								
	Temperature (°C)	8	18.0	30.4	29.3	26.6	4.8		
	Turbidity (NTU)	8	1.9	7.1	3.3	3.7	1.6		
	Total Dissolved Solids (mg/L)	8	7060.0	29600.0	23000.0	21195.0	6842.4		
	Total Suspended Solids (mg/L)	8	5.0	12.0	9.0	8.8	2.6		
	Specific Conductance	8	11721.5	41484.6	32110.0	29744.3	8924.6		
	Hardness (mg/L)	8	1150.0	5110.0	3270.0	3200.0	1172.1		
	Alkalinity (mg/L)	8	39.4	103.0	80.0	78.4	20.1		
	Color (CU)	8	5	20	8	9	5		
	Chemical								
	Dissolved Oxygen (mg/L)	8	6.3	8.9	7.4	7.4	0.9		
	pH (SU)	8	8.1	8.6 C	8.2	8.2	0.2	1	
	J Ammonia Nitrogen (mg/L)	8 <	0.029	1.500 P	0.045	0.219	0.518	1	
	J Nitrate+Nitrite Nitrogen (mg/L)	8 <	0.020	0.271	0.020	0.052	0.090		
	J Total Kjeldahl Nitrogen (mg/L)	8	0.270	1.100	0.800	0.770	0.252		
	J Total Nitrogen (mg/L)	8 <	0.290	< 1.110	0.848	0.822	0.270		
	J Dis Reactive Phosphorus (mg/L)	8 <	0.005	0.018	0.002	0.004	0.005		
	J Total Phosphorus (mg/L)	8	0.027	0.199	0.042	0.058	0.057		
	J Dissolved Organic Carbon (mg/L)	8 <	0.7	< 45.8	22.9	15.4	10.5		
	J CBOD-5 (mg/L)	8 <	2.0	< 2.0	1.0	1.0	0.0		
	Chlorides (mg/L)	8	4300.0	13000.0	11500.0	10237.5	3050.5		
	Total Metals								
	J Aluminum (T) (mg/L)	8 <	0.003	0.471	0.230	0.234	0.162		
	J Iron (T) (mg/L)	8 <	0.056	0.370	0.094	0.123	0.110		
	J Manganese (T) (mg/L)	8 <	0.001	0.030	0.015	0.014	0.011		
	Dissolved Metals								
	J Aluminum (mg/L)	8	0.020	0.129	0.084	0.080	0.037		
	Antimony (µg/L)	8 <	2.770	< 5.540	2.770	2.251	0.717		
	Arsenic (µg/L)	8 <	7.380	10.900	9.535	8.431	2.977		
	J Cadmium (µg/L)	8 <	3.430	< 6.870	3.435	2.790	0.890		
	J Chromium (µg/L)	8 <	4.070	< 8.150	4.075	3.310	1.056		
	J Copper (µg/L)	8	12.000	152.000	54.000	64.338	42.323		
	J Iron (mg/L)	8 <	0.056	< 0.056	0.028	0.028	0.000		
	Lead (µg/L)	8 <	3.260	< 6.530	3.265	2.652	0.846		
	J Manganese (mg/L)	8 <	0.001	< 0.013	0.002	0.003	0.002		
	J Nickel (µg/L)	8 <	4.120	43.000	3.642	8.885	13.830		
	Selenium (µg/L)	8	12.000	64.800 A	57.800	50.512	17.841	8	
	Silver (µg/L)	8 <	3.330	< 6.660	3.330	2.706	0.862		
	Thallium (µg/L)	8 <	3.120	< 6.230	3.115	2.532	0.805		
	J Zinc (µg/L)	8 <	42.400	< 84.700	42.350	34.419	10.946		
	Biological								
	Chlorophyll a (mg/m³)	8 <	1.00	4.60	1.50	1.71	1.42		
	L Enterococci (MPN/DL)	8	10	10	5	5	0		

A=*SH,S,F&W* aquatic life use criterion exceeded; C=*SH,S,F&W* criterion violated; E=# samples that exceeded criteria; H=*SH,S,F&W* human health criterion exceeded; J= estimate; L= estimate; N=# samples; P=pH and temperature-adjusted SH,S,F&W criteria exceeded; Q=number of samples that have uncertain exceedances; S=*SH,S,F&W* aquatic life use criterion exceeded.

		N	Min	Max	Med	Avg	SD	E	Q
GOM-2	**Physical**								
	Temperature (°C)	8	18.8	30.4	28.5	26.4	4.5		
	Turbidity (NTU)	8	0.5	6.2	1.4	2.0	1.8		
	Total Dissolved Solids (mg/L)	8	23800.0	35200.0	29500.0	29512.5	3580.7		
	[J] Total Suspended Solids (mg/L)	8	3.0	12.0	7.5	7.4	2.8		
	Specific Conductance	8	16028.0	44023.6	36948.4	35396.2	8843.7		
	Hardness (mg/L)	3	3630.0	4840.0	4340.0	4270.0	608.0		
	Alkalinity (mg/L)	8	64.4	113.0	96.6	93.2	18.1		
	Color (CU)	8	5	10	5	6	2		
	Chemical								
	Dissolved Oxygen (mg/L)	8	4.8 [C]	9.1	7.1	7.0	1.4	1	
	pH (SU)	8	8.0	8.6 [C]	8.2	8.2	0.2	1	
	[J] Ammonia Nitrogen (mg/L)	8	< 0.029	< 0.090	0.045	0.034	0.016		
	[J] Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.020	0.123	0.020	0.033	0.039		
	[J] Total Kjeldahl Nitrogen (mg/L)	8	0.160	1.200	1.035	0.939	0.340		
	[J] Total Nitrogen (mg/L)	8	< 0.180	< 1.210	1.106	0.971	0.344		
	Dis Reactive Phosphorus (mg/L)	8	< 0.005	0.067	0.003	0.011	0.023		
	[J] Total Phosphorus (mg/L)	8	< 0.017	0.065	0.040	0.037	0.025		
	[J] Dissolved Organic Carbon (mg/L)	8	< 0.5	53.6	22.9	21.1	16.6		
	[J] CBOD-5 (mg/L)	8	< 2.0	< 2.0	1.0	1.0	0.0		
	Chlorides (mg/L)	8	14000.0	19000.0	16500.0	16250.0	1669.0		
	Total Metals								
	Aluminum (T) (mg/L)	3	< 0.003	0.170	0.125	0.099	0.087		
	[J] Iron (T) (mg/L)	3	< 0.056	0.059	0.028	0.038	0.018		
	[J] Manganese (T) (mg/L)	3	< 0.001	0.015	0.002	0.006	0.008		
	Dissolved Metals								
	[J] Aluminum (mg/L)	3	0.035	0.090	0.056	0.060	0.028		
	Antimony (µg/L)	3	< 2.770	< 5.540	2.770	2.308	0.800		
	Arsenic (µg/L)	3	9.100	12.800	12.500	11.467	2.055		
	[J] Cadmium (µg/L)	3	< 3.430	< 6.870	3.435	2.862	0.993		
	[J] Chromium (µg/L)	3	< 4.070	< 8.150	4.075	3.395	1.178		
	[J] Copper (µg/L)	3	68.000	96.300	69.200	77.833	16.004		
	Iron (mg/L)	3	< 0.056	< 0.056	0.028	0.028	0.000		
	Lead (µg/L)	3	< 3.260	< 6.530	3.265	2.720	0.944		
	[J] Manganese (mg/L)	3	< 0.001	< 0.013	0.002	0.003	0.003		
	[J] Nickel (µg/L)	3	< 4.730	< 6.330	3.165	3.687	0.904		
	Selenium (µg/L)	3	15.700	78.700 [A]	54.000	49.467	31.744	3	
	Silver (µg/L)	3	< 3.330	< 6.660	3.330	2.775	0.961		
	Thallium (µg/L)	3	< 3.120	< 6.230	3.115	2.597	0.898		
	[J] Zinc (µg/L)	3	< 42.400	< 84.700	42.350	35.300	12.211		
	Biological								
	Chlorophyll a (mg/m³)	8	< 1.00	2.30	0.50	0.72	0.64		
	[L] Enterococci (MPN/DL)	8	10	10	5	5	0		

A=*SH,S,F&W* aquatic life use criterion exceeded; C=*SH,S,F&W* criterion violated; E=# samples that exceeded criteria; H=*SH,S,F&W* human health criterion exceeded; J= estimate; L= estimate; N=# samples; Q=number of samples that have uncertain exceedances; S=*SH,S,F&W* aquatic life use criterion exceeded.

		N	Min	Max	Med	Avg	SD	E	Q
HRBM-1	**Physical**								
	Temperature (°C)	8	14.4	32.0 C	27.2	25.7	5.8	1	
	Turbidity (NTU)	8	11.1	53.7	21.5	26.6	16.6		
	Total Dissolved Solids (mg/L)	8	1050.0	22400.0	10485.0	11876.2	8196.0		
	Total Suspended Solids (mg/L)	8	12.0	72.0	32.5	33.4	17.7		
	Specific Conductance	8	2796.0	32299.2	18183.9	18491.7	11350.8		
	Hardness (mg/L)	3	470.0	3240.0	2040.0	1916.7	1389.1		
	Alkalinity (mg/L)	8	36.5	120.0	67.3	71.9	27.1		
	Color (CU)	8	10	40	18	21	11		
	Chemical								
	Dissolved Oxygen (mg/L)	8	5.2	10.2	6.4	6.9	1.5		
	pH (SU)	8	7.3	8.1	7.8	7.7	0.3		
	J Ammonia Nitrogen (mg/L)	8	< 0.029	< 0.090	0.045	0.034	0.016		
	J Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.020	0.187	0.010	0.034	0.062		
	J Total Kjeldahl Nitrogen (mg/L)	8	0.410	1.200	1.000	0.885	0.255		
	J Total Nitrogen (mg/L)	8	< 0.430	< 1.210	1.010	0.920	0.232		
	J Dis Reactive Phosphorus (mg/L)	8	< 0.005	0.044	0.008	0.015	0.017		
	Total Phosphorus (mg/L)	8	0.044	0.102	0.071	0.073	0.020		
	J Dissolved Organic Carbon (mg/L)	8	< 1.8	56.5	22.9	20.1	17.4		
	J CBOD-5 (mg/L)	8	< 2.0	< 2.0	1.0	1.0	0.0		
	J Chlorides (mg/L)	8	580.0	12000.0	6650.0	6560.0	4232.5		
	Total Metals								
	Aluminum (T) (mg/L)	3	0.860	2.700	1.350	1.637	0.953		
	Iron (T) (mg/L)	3	0.905	3.000	1.230	1.712	1.128		
	Manganese (T) (mg/L)	3	0.094	0.150	0.098	0.114	0.031		
	Dissolved Metals								
	J Aluminum (mg/L)	3	0.058	0.190	0.062	0.103	0.075		
	Antimony (µg/L)	3	< 0.554	< 2.770	1.385	1.016	0.640		
	J Arsenic (µg/L)	3	1.700	8.560	5.080	5.113	3.430		
	J Cadmium (µg/L)	3	< 0.687	< 3.430	1.715	1.258	0.792		
	J Chromium (µg/L)	3	< 0.815	< 4.070	2.035	1.492	0.940		
	J Copper (µg/L)	3	5.000	44.700	32.300	27.333	20.311		
	Iron (mg/L)	3	< 0.056	< 0.056	0.028	0.028	0.000		
	Lead (µg/L)	3	< 0.653	< 3.260	1.630	1.196	0.752		
	J Manganese (mg/L)	3	< 0.002	0.016	0.002	0.007	0.008		
	J Nickel (µg/L)	3	< 1.100	3.770	1.580	2.150	1.423		
	Selenium (µg/L)	3	6.700	48.000 A	27.800	27.500	20.652	3	
	Silver (µg/L)	3	< 0.666	< 3.330	1.665	1.221	0.769		
	Thallium (µg/L)	3	< 0.623	< 3.120	1.560	1.144	0.721		
	J Zinc (µg/L)	3	< 8.470	< 42.400	21.200	15.545	9.795		
	Biological								
	J Chlorophyll a (mg/m³)	8	< 1.00	5.80	3.55	3.22	1.95		
	J,L Enterococci (MPN/DL)	8	10	10	5	6	2		

A=*SH,S,F&W* aquatic life use criterion exceeded; C=*SH,S,F&W* criterion violated; E=# samples that exceeded criteria; H=*SH,S,F&W* human health criterion exceeded; J= estimate; L= estimate; N=# samples; Q=number of samples that have Uncertain exceedances; S=*SH,S,F&W* aquatic life use criterion exceeded.

		N	Min		Max	Med	Avg	SD	E	Q
HRNM-1	**Physical**									
	Temperature (°C)	8	15.4		32.2 [C]	26.9	25.6	6.0	1	
	Turbidity (NTU)	8	14.1		56.3	17.5	22.2	14.2		
	Total Dissolved Solids (mg/L)	8	563.0		21600.0	11075.0	11857.9	8105.0		
	Total Suspended Solids (mg/L)	8	16.0		39.0	23.0	23.8	7.1		
	Specific Conductance	8	1005.3		31392.7	17982.8	18142.3	11561.7		
	Hardness (mg/L)	3	415.0		3150.0	1930.0	1831.7	1370.1		
	Alkalinity (mg/L)	8	31.5		101.0	66.0	66.3	22.7		
	Color (CU)	8	10		40	15	18	10		
	Chemical									
	Dissolved Oxygen (mg/L)	8	5.8		9.2	6.3	7.0	1.4		
	pH (SU)	8	7.2		8.1	7.8	7.8	0.3		
	[J] Ammonia Nitrogen (mg/L)	8	< 0.029	<	0.090	0.045	0.034	0.016		
	[J] Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.020		0.141	0.015	0.031	0.045		
	[J] Total Kjeldahl Nitrogen (mg/L)	8	0.490		1.300	0.810	0.808	0.265		
	[J] Total Nitrogen (mg/L)	8	< 0.510	<	1.310	0.828	0.838	0.250		
	Dis Reactive Phosphorus (mg/L)	8	< 0.005		0.042	0.007	0.017	0.018		
	Total Phosphorus (mg/L)	8	0.057		0.092	0.062	0.066	0.011		
	[J] Dissolved Organic Carbon (mg/L)	8	< 1.6	<	45.8	22.9	15.9	9.7		
	[J] CBOD-5 (mg/L)	8	< 2.0	<	2.0	1.0	1.0	0.0		
	[J] Chlorides (mg/L)	8	260.0		11000.0	6300.0	6382.5	4191.4		
	Total Metals									
	Aluminum (T) (mg/L)	3	0.806		1.100	1.100	1.002	0.170		
	Iron (T) (mg/L)	3	0.711		1.020	0.860	0.864	0.154		
	Manganese (T) (mg/L)	3	0.060		0.119	0.087	0.089	0.030		
	Dissolved Metals									
	[J] Aluminum (mg/L)	3	0.076		0.180	0.095	0.117	0.055		
	Antimony (µg/L)	3	< 0.554	<	2.770	1.385	1.016	0.640		
	[J] Arsenic (µg/L)	3	1.400		9.250	4.640	5.097	3.945		
	[J] Cadmium (µg/L)	3	< 0.687	<	3.430	1.715	1.258	0.792		
	[J] Chromium (µg/L)	3	< 0.850	<	4.070	2.035	1.640	0.684		
	[J] Copper (µg/L)	3	7.900		47.100	29.600	28.200	19.637		
	Iron (mg/L)	3	< 0.056	<	0.056	0.028	0.028	0.000		
	Lead (µg/L)	3	< 0.653	<	3.260	1.630	1.196	0.752		
	[J] Manganese (mg/L)	3	< 0.002		0.007	0.002	0.004	0.003		
	[J] Nickel (µg/L)	3	< 1.400		3.700	1.580	2.227	1.279		
	Selenium (µg/L)	3	6.000		50.300 [A]	27.900	28.067	22.150	3	
	Silver (µg/L)	3	< 0.666	<	3.330	1.665	1.221	0.769		
	Thallium (µg/L)	3	< 0.623	<	3.120	1.560	1.144	0.721		
	[J] Zinc (µg/L)	3	< 8.470	<	42.400	21.200	15.545	9.795		
	Biological									
	[J] Chlorophyll a (mg/m³)	8	< 1.00		3.50	2.50	2.20	1.32		
	[J,L] Enterococci (MPN/DL)	8	10		10	5	6	2		

A=*SH,S,F&W* aquatic life use criterion exceeded; C=*SH,S,F&W* criterion violated; E=# samples that exceeded criteria; H=*SH,S,F&W* human health criterion exceeded; J= estimate; L= estimate; N=# samples; Q=number of samples that have uncertain exceedances; S=*SH,S,F&W* aquatic life use criterion exceeded.

		N	Min	Max	Med	Avg	SD	E	Q
MB-1A	**Physical**								
	Temperature (°C)	8	16.1	30.8	26.4	25.1	5.3		
	Turbidity (NTU)	8	2.4	54.2	10.4	16.8	16.2		
	Total Dissolved Solids (mg/L)	8	3110.0	25200.0	16100.0	15128.8	8442.4		
	Total Suspended Solids (mg/L)	8	8.0	33.0	16.0	18.4	9.5		
	Specific Conductance	8	7183.6	36803.5	27978.1	25331.8	10685.5		
	Hardness (mg/L)	8	510.0	3610.0	2430.0	2334.0	1260.8		
	Alkalinity (mg/L)	8	36.3	105.0	72.0	71.5	27.9		
	Color (CU)	8	5	25	10	12	8		
	Chemical								
	Dissolved Oxygen (mg/L)	8	5.4	8.6	6.8	7.0	1.3		
	pH (SU)	8	7.5	8.2	8.1	8.0	0.2		
	J Ammonia Nitrogen (mg/L)	8 <	0.029	< 0.090	0.045	0.034	0.016		
	J Nitrate+Nitrite Nitrogen (mg/L)	8 <	0.020	0.167	0.015	0.035	0.054		
	J Total Kjeldahl Nitrogen (mg/L)	8	0.220	0.940	0.640	0.609	0.226		
	J Total Nitrogen (mg/L)	8 <	0.230	0.971	0.655	0.643	0.219		
	J Dis Reactive Phosphorus (mg/L)	8 <	0.005	0.044	0.011	0.016	0.015		
	J Total Phosphorus (mg/L)	8	0.039	0.105	0.050	0.056	0.022		
	J Dissolved Organic Carbon (mg/L)	8 <	0.7	< 45.8	14.1	12.6	11.0		
	J CBOD-5 (mg/L)	8 <	2.0	< 2.0	1.0	1.0	0.0		
	Chlorides (mg/L)	8	1800.0	14000.0	9200.0	8787.5	4658.2		
	Total Metals								
	Aluminum (T) (mg/L)	8	0.424	2.500	0.715	0.962	0.677		
	Iron (T) (mg/L)	8	0.370	2.900	0.420	0.850	0.869		
	J Manganese (T) (mg/L)	8 <	0.001	0.055	0.046	0.036	0.022		
	Dissolved Metals								
	J Aluminum (mg/L)	8	0.032	0.200	0.128	0.124	0.068		
	J Antimony (µg/L)	8 <	0.538	< 5.540	1.385	1.698	0.964		
	J Arsenic (µg/L)	8 <	1.500	28.000	5.685	8.172	8.564		
	J Cadmium (µg/L)	8 <	0.614	< 6.870	1.715	2.012	1.311		
	J Chromium (µg/L)	8 <	0.700	< 11.000	2.488	3.612	3.194		
	J Copper (µg/L)	8	4.800	160.000 S	37.050	54.938	53.481	1	
	J Iron (mg/L)	8 <	0.056	0.150	0.028	0.043	0.043		
	J Lead (µg/L)	8 <	0.598	< 6.530	1.630	1.971	1.169		
	J Manganese (mg/L)	8 <	0.001	< 0.013	0.002	0.004	0.004		
	J Nickel (µg/L)	8 <	1.180	19.000	3.165	4.925	5.860		
	Selenium (µg/L)	8 <	3.030	148.000 A	25.500	41.064	47.470	7	
	J Silver (µg/L)	8 <	0.666	< 6.660	1.665	2.003	1.199		
	Thallium (µg/L)	8 <	0.493	< 6.230	1.560	1.823	1.194		
	J Zinc (µg/L)	8 <	3.110	< 84.700	21.200	22.011	14.946		
	Biological								
	Chlorophyll a (mg/m³)	8 <	1.00	5.60	1.55	2.35	2.11		
	J,L Enterococci (MPN/DL)	8	10	10	5	6	2		

A=*SH,S,F&W* aquatic life use criterion exceeded; C=*SH,S,F&W* criterion violated; E=# samples that exceeded criteria; H=*SH,S,F&W* human health criterion exceeded; J= estimate; L= estimate; N=# samples; Q=number of samples that have uncertain exceedances; S=*SH,S,F&W* aquatic life use criterion exceeded.

		N	Min		Max	Med	Avg	SD	E	Q
MSND-1	**Physical**									
	Temperature (°C)	7	15.4		30.0	29.3	26.4	5.6		
	Turbidity (NTU)	8	5.2		38.7	11.6	15.9	11.5		
	Total Dissolved Solids (mg/L)	8	5090.0		26200.0	16950.0	16666.2	9035.3		
	Total Suspended Solids (mg/L)	8	9.0		29.0	13.0	17.2	8.6		
	Specific Conductance	7	8490.2		37143.7	33939.8	26112.8	12666.0		
	Hardness (mg/L)	8	860.0		4450.0	2455.0	2541.2	1363.0		
	J Alkalinity (mg/L)	8	8.1		107.0	69.6	68.8	33.2		
	Color (CU)	8	5		25	10	12	8		
	Chemical									
	Dissolved Oxygen (mg/L)	7	3.8 C		9.1	6.5	6.6	1.7	1	
	pH (SU)	7	7.8		8.3	8.0	8.0	0.2		
	J Ammonia Nitrogen (mg/L)	8	< 0.029	<	0.090	0.045	0.034	0.016		
	J Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.020		0.192	0.010	0.035	0.064		
	J Total Kjeldahl Nitrogen (mg/L)	8	0.390		1.200	0.950	0.829	0.285		
	J Total Nitrogen (mg/L)	8	< 0.410	<	1.210	0.960	0.864	0.272		
	Dis Reactive Phosphorus (mg/L)	8	< 0.005		0.049	0.009	0.019	0.020		
	J Total Phosphorus (mg/L)	8	0.027		0.089	0.058	0.058	0.020		
	J Dissolved Organic Carbon (mg/L)	7	< 0.6		46.7	8.2	14.9	17.0		
	J CBOD-5 (mg/L)	8	< 2.0	<	2.0	1.0	1.0	0.0		
	Chlorides (mg/L)	8	3700.0		14000.0	9850.0	9487.5	4644.6		
	Total Metals									
	Aluminum (T) (mg/L)	8	0.300		1.800	0.708	0.874	0.568		
	J Iron (T) (mg/L)	8	0.190		1.900	0.496	0.713	0.578		
	J Manganese (T) (mg/L)	8	< 0.001		0.070	0.039	0.040	0.024		
	Dissolved Metals									
	J Aluminum (mg/L)	8	0.015		0.230	0.064	0.088	0.067		
	Antimony (µg/L)	8	< 2.770	<	5.540	2.770	2.251	0.717		
	Arsenic (µg/L)	8	< 7.380		11.300	6.725	7.065	3.634		
	J Cadmium (µg/L)	8	< 3.430	<	6.870	3.435	2.790	0.890		
	Chromium (µg/L)	8	< 4.070	<	8.150	4.075	3.310	1.056		
	Copper (µg/L)	8	17.000		69.900	39.850	40.950	20.608		
	J Iron (mg/L)	8	< 0.056		0.100	0.028	0.037	0.025		
	Lead (µg/L)	8	< 3.260	<	6.530	3.265	2.652	0.846		
	J Manganese (mg/L)	8	< 0.001		0.007	0.002	0.002	0.002		
	Nickel (µg/L)	8	< 5.690	<	6.330	3.165	4.201	1.433		
	Selenium (µg/L)	8	14.000		69.600 A	40.350	40.775	23.957	8	
	Silver (µg/L)	8	< 3.330	<	6.660	3.330	2.706	0.862		
	Thallium (µg/L)	8	< 3.120	<	6.230	3.115	2.532	0.805		
	J Zinc (µg/L)	8	< 42.400	<	84.700	42.350	34.419	10.946		
	Biological									
	Chlorophyll a (mg/m³)	8	< 1.00		4.50	2.45	2.58	1.35		
	J,L Enterococci (MPN/DL)	8	10		30	5	9	9		

A=*SH,S,F&W* aquatic life use criterion exceeded; C=*SH,S,F&W* criterion violated; E=# samples that exceeded criteria; H=*SH,S,F&W* human health criterion exceeded; J= estimate; L= estimate; N=# samples; Q=number of samples that have uncertain exceedances; S=*SH,S,F&W* aquatic life use criterion exceeded.

		N	Min	Max	Med	Avg	SD	E	Q
MSND-2	**Physical**								
	Temperature (°C)	8	18.2	30.4	29.3	26.8	4.6		
	Turbidity (NTU)	8	2.9	8.6	4.2	5.0	2.0		
	Total Dissolved Solids (mg/L)	8	7640.0	28400.0	22600.0	19900.0	7945.8		
	J Total Suspended Solids (mg/L)	8	4.0	15.0	6.5	8.1	3.9		
	Specific Conductance	8	10282.4	40259.6	31540.4	28036.9	10882.7		
	Hardness (mg/L)	8	1240.0	4910.0	3290.0	3006.2	1225.2		
	Alkalinity (mg/L)	8	< 0.6	99.8	78.8	70.4	31.4		
	Color (CU)	8	5	25	10	11	7		
	Chemical								
	Dissolved Oxygen (mg/L)	8	5.7	9.6	6.9	7.4	1.3		
	pH (SU)	8	8.0	8.3	8.2	8.2	0.1		
	J Ammonia Nitrogen (mg/L)	8	< 0.029	< 0.090	0.045	0.034	0.016		
	J Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.020	< 0.039	0.010	0.014	0.005		
	J Total Kjeldahl Nitrogen (mg/L)	8	0.420	1.200	0.685	0.741	0.231		
	J Total Nitrogen (mg/L)	8	< 0.440	1.210	0.700	0.755	0.228		
	Dis Reactive Phosphorus (mg/L)	7	< 0.005	< 0.006	0.002	0.003	0.000		
	J Total Phosphorus (mg/L)	8	< 0.026	0.048	0.043	0.038	0.012		
	J Dissolved Organic Carbon (mg/L)	8	< 0.8	< 45.8	15.5	13.4	10.4		
	J CBOD-5 (mg/L)	8	< 2.0	< 2.0	1.0	1.0	0.0		
	Chlorides (mg/L)	8	4500.0	17000.0	11500.0	10550.0	4154.8		
	Total Metals								
	Aluminum (T) (mg/L)	8	< 0.003	0.479	0.290	0.277	0.165		
	J Iron (T) (mg/L)	8	0.070	0.348	0.140	0.180	0.105		
	J Manganese (T) (mg/L)	8	< 0.001	0.030	0.014	0.014	0.012		
	Dissolved Metals								
	J Aluminum (mg/L)	8	0.020	0.140	0.082	0.081	0.038		
	Antimony (µg/L)	8	< 2.770	< 5.540	2.770	2.251	0.717		
	Arsenic (µg/L)	8	< 7.380	11.100	8.425	7.916	2.892		
	J Cadmium (µg/L)	8	< 3.430	< 6.870	3.435	2.790	0.890		
	J Chromium (µg/L)	8	< 4.070	< 8.150	4.075	3.310	1.056		
	J Copper (µg/L)	8	14.200	86.000	47.750	48.912	27.746		
	J Iron (mg/L)	8	< 0.056	< 0.056	0.028	0.028	0.000		
	Lead (µg/L)	8	< 3.260	< 6.530	3.265	2.652	0.846		
	J Manganese (mg/L)	8	< 0.001	< 0.013	0.002	0.003	0.002		
	J Nickel (µg/L)	8	< 3.330	339.000	4.775	46.726	118.115		
	Selenium (µg/L)	8	10.200	64.700 A	45.500	39.962	22.088	8	
	Silver (µg/L)	8	< 3.330	< 6.660	3.330	2.706	0.862		
	Thallium (µg/L)	8	< 3.120	< 6.230	3.115	2.532	0.805		
	J Zinc (µg/L)	8	< 42.400	116.000	42.350	49.862	30.924		
	Biological								
	Chlorophyll a (mg/m³)	8	< 1.00	5.20	2.20	2.40	1.55		
	L Enterococci (MPN/DL)	8	10	10	5	5	0		

A=*SH,S,F&W* aquatic life use criterion exceeded; C=*SH,S,F&W* criterion violated; E=# samples that exceeded criteria; H=*SH,S,F&W* human health criterion exceeded; J= estimate; L= estimate; N=# samples; Q=number of samples that have uncertain exceedances; S=*SH,S,F&W* aquatic life use criterion exceeded.

		N	Min	Max	Med	Avg	SD	E	Q
PBRM-2	**Physical**								
	Temperature (°C)	8	15.8	30.8	29.6	26.6	5.4		
	Turbidity (NTU)	8	3.1	18.0	10.2	10.5	5.4		
	Total Dissolved Solids (mg/L)	8	5110.0	26900.0	22800.0	19360.0	8575.9		
	Total Suspended Solids (mg/L)	8	6.0	25.0	13.5	14.5	7.2		
	Specific Conductance	8	9155.7	38343.8	34047.6	28505.6	11586.6		
	Hardness (mg/L)	3	811.0	3380.0	3250.0	2480.3	1447.1		
	Alkalinity (mg/L)	8	12.4	104.0	80.1	72.7	30.1		
	Color (CU)	8	5	25	10	12	7		
	Chemical								
	Dissolved Oxygen (mg/L)	8	5.4	9.0	6.8	7.0	1.4		
	pH (SU)	8	7.9	8.3	8.1	8.1	0.1		
	J Ammonia Nitrogen (mg/L)	8	< 0.029	< 0.090	0.045	0.034	0.016		
	J Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.020	0.041	0.015	0.020	0.013		
	J Total Kjeldahl Nitrogen (mg/L)	8	0.560	1.400	0.780	0.862	0.262		
	J Total Nitrogen (mg/L)	8	< 0.601	< 1.410	0.805	0.882	0.253		
	Dis Reactive Phosphorus (mg/L)	8	< 0.005	0.063	0.002	0.013	0.021		
	J Total Phosphorus (mg/L)	8	0.034	0.064	0.046	0.046	0.010		
	J Dissolved Organic Carbon (mg/L)	8	< 0.7	< 45.8	16.1	13.6	10.3		
	J CBOD-5 (mg/L)	8	< 2.0	3.1	1.0	1.3	0.7		
	Chlorides (mg/L)	8	2900.0	21000.0	12000.0	11000.0	5684.8		
	Total Metals								
	Aluminum (T) (mg/L)	3	0.234	0.780	0.752	0.589	0.307		
	Iron (T) (mg/L)	3	0.215	0.706	0.570	0.497	0.254		
	J Manganese (T) (mg/L)	3	< 0.001	0.038	0.031	0.023	0.020		
	Dissolved Metals								
	J Aluminum (mg/L)	3	0.039	0.190	0.101	0.110	0.076		
	Antimony (µg/L)	3	< 2.770	< 5.540	1.385	1.847	0.800		
	Arsenic (µg/L)	3	< 7.380	9.340	8.640	7.223	3.080		
	J Cadmium (µg/L)	3	< 3.430	< 6.870	1.715	2.288	0.993		
	J Chromium (µg/L)	3	< 4.070	< 8.150	2.035	2.715	1.178		
	J Copper (µg/L)	3	13.000	62.700	50.500	42.067	25.901		
	Iron (mg/L)	3	< 0.056	< 0.056	0.028	0.028	0.000		
	Lead (µg/L)	3	< 3.260	< 6.530	1.630	2.175	0.944		
	J Manganese (mg/L)	3	< 0.001	< 0.005	0.002	0.002	0.001		
	J Nickel (µg/L)	3	< 3.160	< 6.330	3.165	3.132	1.535		
	Selenium (µg/L)	3	8.600	50.500 A	49.100	36.067	23.797	3	
	Silver (µg/L)	3	< 3.330	< 6.660	1.665	2.220	0.961		
	Thallium (µg/L)	3	< 3.120	< 6.230	1.560	2.078	0.898		
	J Zinc (µg/L)	3	< 42.400	< 84.700	21.200	28.250	12.211		
	Biological								
	Chlorophyll a (mg/m³)	8	< 1.00	13.00	2.70	3.71	4.03		
	L Enterococci (MPN/DL)	8	10	10	5	5	0		

A=*SH,S,F&W* aquatic life use criterion exceeded; C= *SH,S,F&W* criterion violated; E=# samples that exceeded criteria; H= *SH,S,F&W* human health criterion exceeded; J= estimate; L= estimate; N=# samples; Q=number of samples that have uncertain exceedances; S= *SH,S,F&W* aquatic life use criterion exceeded.

	PEIM-1	N	Min	Max	Med	Avg	SD	E	Q
PEIM-1	**Physical**								
	Temperature (°C)	8	17.5	30.6	26.4	25.0	4.4		
	Turbidity (NTU)	7	0.4	23.3	2.3	5.5	8.0		
	Total Dissolved Solids (mg/L)	8	11400.0	35100.0	32950.0	29737.5	8002.3		
	Total Suspended Solids (mg/L)	8	5.0	18.0	6.5	8.0	4.3		
	Specific Conductance	8	32762.1	49868.8	43555.8	42139.6	6024.3		
	Hardness (mg/L)	3	4270.0	4940.0	4460.0	4556.7	345.3		
	Alkalinity (mg/L)	8	58.2	118.0	96.6	95.8	19.3		
	Color (CU)	8 <	5	20	5	6	6		
	Chemical								
	Dissolved Oxygen (mg/L)	8	5.6	7.9	6.7	6.8	0.8		
	pH (SU)	8	7.7	8.2	8.1	8.0	0.1		
	J Ammonia Nitrogen (mg/L)	8 <	0.029	< 0.090	0.045	0.034	0.016		
	J Nitrate+Nitrite Nitrogen (mg/L)	8 <	0.020	0.134	0.044	0.048	0.041		
	J Total Kjeldahl Nitrogen (mg/L)	8 <	0.120	2.400	0.865	0.984	0.698		
	J Total Nitrogen (mg/L)	8 <	0.127	< 2.410	0.898	1.032	0.675		
	Dis Reactive Phosphorus (mg/L)	8 <	0.005	0.025	0.002	0.005	0.008		
	J Total Phosphorus (mg/L)	8 <	0.017	0.102	0.055	0.057	0.027		
	J Dissolved Organic Carbon (mg/L)	8 <	0.4	< 45.8	12.1	11.8	11.8		
	J CBOD-5 (mg/L)	8 <	2.0	< 2.0	1.0	1.0	0.0		
	Chlorides (mg/L)	8	7400.0	19000.0	18000.0	16550.0	4045.1		
	Total Metals								
	Aluminum (T) (mg/L)	3 <	0.003	0.230	0.110	0.114	0.114		
	J Iron (T) (mg/L)	3 <	0.056	0.058	0.028	0.038	0.017		
	J Manganese (T) (mg/L)	3 <	0.001	0.018	0.006	0.008	0.009		
	Dissolved Metals								
	J Aluminum (mg/L)	3	0.017	0.050	0.049	0.039	0.019		
	Antimony (µg/L)	3 <	2.770	< 11.100	1.385	2.773	2.405		
	Arsenic (µg/L)	3 <	12.900	< 14.800	12.900	11.200	3.297		
	J Cadmium (µg/L)	3 <	3.430	< 13.700	1.715	3.427	2.965		
	J Chromium (µg/L)	3 <	4.070	< 16.300	2.035	4.073	3.530		
	J Copper (µg/L)	3	73.800	115.000	91.000	93.267	20.693		
	Iron (mg/L)	3 <	0.056	< 0.056	0.028	0.028	0.000		
	Lead (µg/L)	3 <	3.260	< 13.100	1.630	3.270	2.840		
	J Manganese (mg/L)	3 <	0.001	< 0.005	0.002	0.002	0.001		
	J Nickel (µg/L)	3 <	4.290	< 12.700	4.950	5.197	1.052		
	Selenium (µg/L)	3	64.000	77.300 A	74.800	72.033	7.068	3	
	Silver (µg/L)	3 <	3.330	< 13.300	1.665	3.327	2.878		
	Thallium (µg/L)	3 <	3.120	< 12.500	1.560	3.123	2.708		
	J Zinc (µg/L)	3 <	42.400	<169.000	21.200	42.300	36.546		
	Biological								
	Chlorophyll a (mg/m³)	8 <	1.00	3.80	0.80	1.78	1.61		
	J,L Enterococci (MPN/DL)	8	10	10	5	6	2		

A=*SH,S,F&W* aquatic life use criterion exceeded; C=*SH,S,F&W* criterion violated; E=# samples that exceeded criteria; H= *SH,S,F&W* human health criterion exceeded; J= estimate; L= estimate; N=# samples; Q=number of samples that have uncertain exceedances; S= *SH,S,F&W* aquatic life use criterion exceeded.

		N	Min	Max	Med	Avg	SD	E	Q
PRBM-3	**Physical**								
	Temperature (°C)	8	16.3	30.9	29.7	26.7	5.3		
	Turbidity (NTU)	8	8.4	27.0	14.6	15.2	6.6		
	Total Dissolved Solids (mg/L)	8	5100.0	27800.0	23450.0	19047.5	9077.6		
	Total Suspended Solids (mg/L)	8	11.0	32.0	18.0	20.5	8.4		
	Specific Conductance	8	8481.8	39180.4	33366.1	27700.9	12350.4		
	Hardness (mg/L)	3	816.0	3620.0	3220.0	2552.0	1516.7		
	Alkalinity (mg/L)	8 <	0.6	99.5	75.4	68.0	30.7		
	Color (CU)	8	5	25	10	11	6		
	Chemical								
	Dissolved Oxygen (mg/L)	8	5.5	8.6	6.0	6.5	1.3		
	pH (SU)	8	7.6	8.4	8.0	8.0	0.2		
	[J] Ammonia Nitrogen (mg/L)	8 <	0.029	< 0.090	0.045	0.034	0.016		
	[J] Nitrate+Nitrite Nitrogen (mg/L)	8 <	0.020	< 0.039	0.015	0.017	0.010		
	[J] Total Kjeldahl Nitrogen (mg/L)	8	0.460	1.200	0.980	0.891	0.277		
	[J] Total Nitrogen (mg/L)	8 <	0.480	1.238	0.990	0.908	0.278		
	Dis Reactive Phosphorus (mg/L)	8 <	0.005	0.045	0.006	0.011	0.014		
	[J] Total Phosphorus (mg/L)	8	0.032	0.079	0.058	0.057	0.014		
	[J] Dissolved Organic Carbon (mg/L)	8 <	0.7	< 45.8	16.6	13.7	10.3		
	[J] CBOD-5 (mg/L)	8 <	2.0	4.5	1.0	1.4	1.2		
	Chlorides (mg/L)	8	3200.0	21000.0	12000.0	10962.5	5940.2		
	Total Metals								
	Aluminum (T) (mg/L)	3	0.408	0.706	0.580	0.565	0.150		
	Iron (T) (mg/L)	3	0.310	0.765	0.409	0.495	0.239		
	[J] Manganese (T) (mg/L)	3 <	0.001	0.052	0.032	0.028	0.026		
	Dissolved Metals								
	[J] Aluminum (mg/L)	3	0.036	0.170	0.046	0.084	0.075		
	Antimony (µg/L)	3 <	2.770	< 5.540	2.770	2.308	0.800		
	Arsenic (µg/L)	3 <	7.380	11.100	8.170	7.653	3.732		
	[J] Cadmium (µg/L)	3 <	3.430	< 6.870	3.435	2.862	0.993		
	[J] Chromium (µg/L)	3 <	4.070	< 8.150	4.075	3.395	1.178		
	[J] Copper (µg/L)	3	19.000	59.300	48.500	42.267	20.860		
	Iron (mg/L)	3 <	0.056	< 0.056	0.028	0.028	0.000		
	Lead (µg/L)	3 <	3.260	< 6.530	3.265	2.720	0.944		
	[J] Manganese (mg/L)	3 <	0.001	< 0.005	0.002	0.002	0.001		
	[J] Nickel (µg/L)	3 <	3.160	< 6.330	3.165	2.637	0.915		
	Selenium (µg/L)	3 <	6.070	62.000 [A]	46.800	37.278	30.614	2	
	Silver (µg/L)	3 <	3.330	< 6.660	3.330	2.775	0.961		
	Thallium (µg/L)	3 <	3.120	< 6.230	3.115	2.597	0.898		
	[J] Zinc (µg/L)	3 <	42.400	< 84.700	42.350	35.300	12.211		
	Biological								
	Chlorophyll a (mg/m³)	8 <	1.00	4.50	2.85	2.59	1.64		
	[J,L] Enterococci (MPN/DL)	8	10	10	5	6	2		

A= *SH,S,F&W* aquatic life use criterion exceeded; C= *SH,S,F&W* criterion violated; E=# samples that exceeded criteria; H= *SH,S,F&W* human health criterion exceeded; J= estimate; L= estimate; N=# samples; Q=number of samples that have uncertain exceedances; S= *SH,S,F&W* aquatic life use criterion exceeded.

		N	Min		Max	Med	Avg	SD	E	Q
WFRM-2	**Physical**									
	Temperature (°C)	8	15.8		30.7	29.1	26.5	5.3		
	Turbidity (NTU)	8	7.7		18.1	12.8	12.9	3.0		
	Total Dissolved Solids (mg/L)	8	933.0		18500.0	6630.0	7750.4	6477.5		
	Total Suspended Solids (mg/L)	8	12.0		16.0	15.0	14.5	1.2		
	Specific Conductance	8	1716.4		27399.8	10790.6	12387.3	9615.4		
	Hardness (mg/L)	3	206.0		2010.0	1330.0	1182.0	911.1		
	[J] Alkalinity (mg/L)	8	2.0		95.4	43.9	48.2	31.0		
	Color (CU)	8	30		140	58	66	39		
	Chemical									
	Dissolved Oxygen (mg/L)	8	2.3 [C]		8.5	4.5	4.7	2.0	5	
	pH (SU)	8	6.6		7.4	6.9	6.9	0.2		
	[J] Ammonia Nitrogen (mg/L)	8	< 0.029	<	0.090	0.045	0.034	0.016		
	[J] Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.020		0.107	0.015	0.026	0.033		
	[J] Total Kjeldahl Nitrogen (mg/L)	8	0.480		1.400	1.045	0.918	0.331		
	[J] Total Nitrogen (mg/L)	8	< 0.500	<	1.410	1.055	0.944	0.313		
	[J] Dis Reactive Phosphorus (mg/L)	8	< 0.005		0.012	0.003	0.005	0.004		
	[J] Total Phosphorus (mg/L)	8	0.039		0.073	0.050	0.052	0.010		
	[J] Dissolved Organic Carbon (mg/L)	8	< 2.2	<	45.8	5.4	9.4	7.9		
	[J] CBOD-5 (mg/L)	8	< 2.0		3.1	1.0	1.3	0.7		
	Chlorides (mg/L)	8	590.0		9800.0	3700.0	4271.2	3492.3		
	Total Metals									
	Aluminum (T) (mg/L)	3	0.384		0.850	0.663	0.632	0.234		
	Iron (T) (mg/L)	3	0.410		0.639	0.550	0.533	0.115		
	[J] Manganese (T) (mg/L)	3	0.040		0.139	0.097	0.092	0.050		
	Dissolved Metals									
	Aluminum (mg/L)	3	0.159		0.240	0.182	0.194	0.042		
	Antimony (µg/L)	3	< 0.554	<	2.770	1.385	1.016	0.640		
	[J] Arsenic (µg/L)	3	1.100		6.030	4.210	3.780	2.493		
	[J] Cadmium (µg/L)	3	< 0.687	<	3.430	1.715	1.258	0.792		
	[J] Chromium (µg/L)	3	< 0.970	<	4.070	2.035	1.680	0.615		
	[J] Copper (µg/L)	3	3.600		26.700	21.900	17.400	12.190		
	[J] Iron (mg/L)	3	0.070		0.109	0.072	0.084	0.022		
	Lead (µg/L)	3	< 0.653	<	3.260	1.630	1.196	0.752		
	[J] Manganese (mg/L)	3	0.030		0.090	0.089	0.070	0.034		
	Nickel (µg/L)	3	< 0.633	<	3.160	1.580	1.159	0.729		
	[J] Selenium (µg/L)	3	2.100		32.300 [A]	23.800	19.400	15.573	2	
	Silver (µg/L)	3	< 0.666	<	3.330	1.665	1.221	0.769		
	Thallium (µg/L)	3	< 0.623	<	3.120	1.560	1.144	0.721		
	[J] Zinc (µg/L)	3	< 8.470	<	42.400	21.200	15.545	9.795		
	Biological									
	Chlorophyll a (mg/m³)	8	< 1.00		5.60	1.15	2.28	2.23		
	[J,L] Enterococci (MPN/DL)	8	10		100	20	31	35		

A=*S,F&W* aquatic life use criterion exceeded; C= *S,F&W* criterion violated; E=# samples that exceeded criteria; H= *S,F&W* human health criterion exceeded; J= estimate; L= estimate; N=# samples; Q=number of samples that have uncertain exceedances; S= *S,F&W* aquatic life use criterion exceeded.