ADEM Coastal Waters Monitoring Program 2018 Report

Perdido and Wolf Bay Sub-estuaries

Alabama Department of Environmental Management

Field Operations Division
Mobile Office
Environmental Assessment Section
Water Unit
June 2025

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LIST OF ACRONYMS

A&I	Agricultural and Industrial Water Supply
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 Waters
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 Corps of Engineers
USEPA	United States Environmental Protection Agency

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INTRODUCTION

The Alabama Department of Environmental Management (ADEM) monitored stations within the Perdido and Wolf Bay watersheds and their vicinities as part of the 2018 assessment under the Coastal Waters Monitoring Program (CWMP). The Perdido Bay watershed forms the southeastern boundary of coastal Alabama and encompasses 50 mi^2 of coastal and inland portions of Alabama and Florida. Perdido Bay discharges into the Gulf of Mexico at Perdido Pass in Orange Beach, Alabama. Major tributaries to Perdido Bay include Perdido River, Styx River, Blackwater River, the Intracoastal Waterway, and Wolf Bay. Wolf Bay, an estuary classified as an Outstanding Alabama Water (OAW), has a 69.8 mi^2 watershed with tributaries such as Miflin Creek, Sandy Creek, and Wolf Creek. Wolf Bay flows into the Intracoastal Waterway and, subsequently, Perdido Bay. Both watersheds provide valuable resources to the area including agriculture, spawning habitats for commercial fish and shellfish, and recreational activities such as boating, fishing, and swimming.

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. 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 2017 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 includes waterbodies in the Perdido and Wolf Bay watersheds and their vicinities that are on the 2018 CWA 303(d) list.

The purpose of this report is to summarize data collected at nineteen stations as part of the 2018 Coastal Waters Monitoring Program 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 Perdido and Wolf Bay watersheds and their vicinity.

Assessment Unit ID	Waterbody Name	County	Uses	Causes	Sources	Size	Unit Type	Year Listed
AL03160205-0300-202	Bon Secour Bay	Baldwin	Shellfish Harvesting Swimming Fish & Wildlife	Pathogens (Enterococcus)	On-site wastewater systems Urban runoff/storm sewers	102.96	square miles	1998
AL03160205-0206-101	Bon Secour River	Baldwin	Swimming Fish & Wildlife	Metals (Mercury)	Atmospheric deposition	9.12	miles	2006
AL03160205-0206-102	Bon Secour River	Baldwin	Swimming Fish & Wildlife	Metals (Mercury)	Atmospheric deposition	4.38	miles	2006
AL03160205-0206-102	Bon Secour River	Baldwin	Swimming Fish & Wildlife	Pathogens (E. coli)	Pasture grazing	4.38	miles	2018
AL03160205-0208-100	Oyster Bay	Baldwin	Shellfish Harvesting Fish & Wildlife	Pathogens (Enterococcus)	Unknown source	0.95	square miles	2006
AL03140106-0203-100	Dyas Creek	Baldwin	Swimming Fish & Wildlife	Pathogens (E. coli)	Pasture grazing	18.34	miles	2018
AL03140106-0507-100	Styx River	Baldwin	Fish & Wildlife	Metals (Mercury)	Atmospheric deposition	18.52	miles	2002
AL03140106-0603-101	Blackwater River	Baldwin	Fish & Wildlife	Metals (Mercury)	Atmospheric deposition	3.11	miles	2004
AL03140106-0703-100	Perdido River	Baldwin	Fish & Wildlife	Metals (Mercury)	Atmospheric deposition	21.93	miles	2006
AL03140107-0204-302	Perdido Bay	Baldwin	Shellfish Harvesting Swimming Fish & Wildlife	Pathogens (Enterococcus)	Collection system failure On-site wastewater systems	1.29	square miles	2012
AL03140107-0103-100	Perdido Bay	Baldwin	Shellfish Harvesting Swimming Fish & Wildlife	Metals (Mercury)	Atmospheric deposition	4.21	square miles	2016
AL-Gulf-of-Mexico-1	Gulf of Mexico	Baldwin Mobile	Shellfish Harvesting Swimming Fish & Wildlife	Metals (Mercury)	Atmospheric deposition	205.77	square miles	1998

METHODS

Sampling stations were selected using historical data and previous assessments (Fig. 1). Specific location information can be found in Table 2. Waterbodies sampled included Arnica Bay, Old River, Terry Cove, Bay La Launch, Gulf of Mexico, Intracoastal Waterway, Perdido Bay, Oyster Bay, Bon Secour River, Little Lagoon, Lake Shelby, and Wolf Bay.

Water quality assessments were conducted monthly, bi-monthly, or quarterly March or April-October. All samples were collected, preserved, stored, and transported according to procedures in the ADEM Field Operations Division Standard Operation Procedures (ADEM 2018), Surface Water Quality Assurance Project Plan (2018), and Quality Management Plan (ADEM 2012). Flow was measured at several sample locations and calculated discharge values are depicted on respective charts.

Mean growing season, March-October, TN, TP, chl *a*, and TSS were calculated to evaluate water quality conditions at each site using data from 2008 through 2018. Monthly concentrations of these parameters were graphed with ADEM's previously collected data for all stations within the focus watersheds. 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 possible surface water quality monitoring data to the EPA.

Figure 1. 2018 Coastal Water Monitoring Program sample locations and impaired waterbodies.

Table 2. Descriptions of the monitoring stations in the Perdido and Wolf Bay watersheds and their vicinity, 2018.

HUC8	County	Station	Use Classification	Waterbody Name	Station Description	Latitude	Longitude
3140107	Baldwin	PDBB-3	S/F&W/SH	Perdido Bay	Perdido Bay at mid-channel south of Chambers Point.	30.4501	-87.382
3140107	Baldwin	PDBB-1	S/F&W/SH	Perdido Bay	Perdido Bay at mid-bay west of DuPont Point.	30.366	-87.4517
3140107	Escambia	IC-4	F&W	Intracoastal Waterway	Intracoastal Waterway in no-wake zone between Holiday Harbor Marina and Florida SR 292 bridge crossing. FL waters.	30.313525	-87.436402
3140107	Baldwin	IC-3	S/F&W/SH	Bay La Launch	Intracoastal Waterway 1/2 mile from Hatchet Point at marker 69.	30.304167	-87.541667
3140107	Baldwin	TECB-1	S/F&W/SH	Terry Cove	Terry Cove about 1/4 mile Northeast of Boggy Point boat ramp.	30.28778	-87.55715
3140107	Baldwin	PDBB-0	S/F&W/SH	Perdido Bay	Perdido Bay at approximately 0.25 miles upstream of State Highway 182 bridge.	30.27968	-87.54948
3140107	Baldwin	OLRB-1	S/F&W/SH	Old River	Old River between Ono Island and Flora-Bama Yacht Club.	30.28396	-87.51833
	Baldwin	GMEX-8	S/F&W/SH	Gulf Of Mexico	Gulf of Mexico, 1.5 miles offshore at extent of state waters (AL/FL state line).	30.257645	-87.518428
3140107	Baldwin	WLFB-11	S/F&W/SH	Wolf Bay	Wolf Bay at mid-bay, south of Moccasin Bayou.	30.35308	-87.60319
3140107	Baldwin	WLFB-12	S/F&W/SH	Wolf Bay	Wolf Bay upper reach of Hammock Creek embayment.	30.34441	-87.58037
3140107	Baldwin	WLFB-2	S/F&W/SH	Wolf Bay	Wolf Bay at mid-bay off Mulberry Point.	30.32124	-87.58962
3140107	Baldwin	IC-3A	F&W	Intracoastal Waterway	Intracoastal Waterway just west of Wolf Bay at designated coordinates.	30.30136	-87.61257
3140107	Baldwin	IC-1A	F&W	Intracoastal Waterway	Intracoastal Waterway in Gulf Shores at Hwy 59.	30.2793	-87.687
3160205	Baldwin	OYBB-2	S/F&W/SH	Oyster Bay	Oyster Bay middle.	30.271102	-87.731941
3160205	Baldwin	BSBB-5	S/F&W	Bon Secour R	Bon Secour River approximately 4 miles upstream of mouth.	30.31726	-87.71258
3160205	Baldwin	BS-1	S/F&W	Bon Secour R	Bon Secour River at Oyster Bay Canal.	30.30221	-87.73575
3140107	Baldwin	SHLB-1	S/F&W	L Shelby	Lake Shelby in Gulf State Park.	30.25933	-87.66223
3140107	Baldwin	LLEB-1	S/F&W/SH	Little Lagoon	East Little Lagoon.	30.2549	-87.69918
3140107	Baldwin	LLWB-1	S/F&W/SH	Little Lagoon	West Little Lagoon.	30.23891	-87.77928

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 Fig. 11. Summary statistics of all data collected during 2018 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 stations that may be potential candidates for reference waterbodies and watersheds.

In 2018 the highest mean growing season TN within the Perdido watershed was in Little Lagoon at LLEB-1 (Fig. 2). However, the highest mean TN value among all monitored locations was in the Gulf of Mexico station GMEX-8. Mean growing season TN values in stations in the Intracoastal Waterway (IC-4), Perdido Bay (PDBB-0), Wolf Bay (WLFB-2), and the Gulf of Mexico (GMEX-8) have increased overall in the years sampled. Monthly TN concentrations are graphed in Figure 6.

While mean growing season TP values have declined in the Bon Secour River at BS-1 between 2008 and 2018 the highest value among monitored stations still occurred at this site in 2018 (Fig. 3). Mean TP values in IC-1A increased overall from 2008 until 2015 and declined in 2018 (Fig. 7). Monthly TP concentrations are graphed in Figure 7.

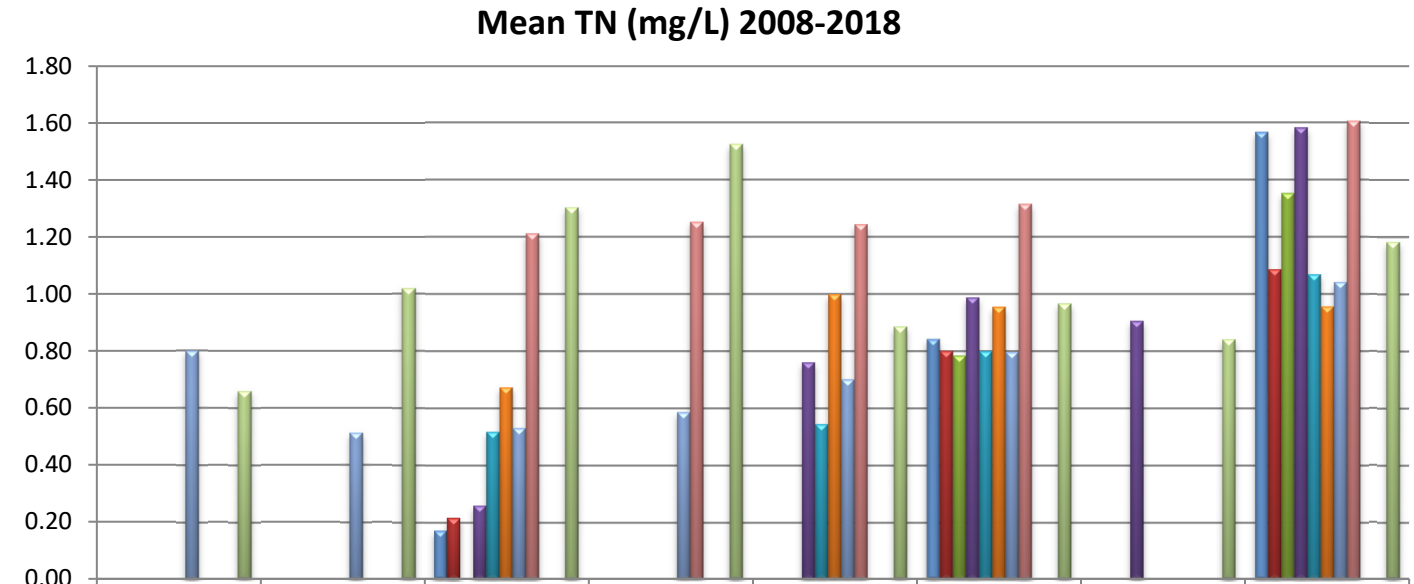
Mean growing season chl *a* concentrations declined or remained steady in monitored Perdido Bay stations, 2008 through 2015. However, concentrations in PDBB-3, WLFB-2, IC-1a,

and BS-1 increased in 2018 (Fig. 4). The highest mean growing season chl *a* value was at Bon Secour River (BSBB-5). Monthly chl *a* concentrations are graphed in Figure 8.

The highest 2018 mean growing season TSS value was in Perdido Bay's Terry Cove at TECB-1 (Fig. 5). Monthly TSS concentrations are graphed in Figure 9.

Dissolved oxygen concentrations were below the ADEM criteria limit of 5.0 mg/L in the Intracoastal Waterway (IC-1A) and Bon Secour River (BSBB-5 and BS-1) from June through October (ADEM Admin. Code R. 335-6-10-09) (Fig. 10). Dissolved oxygen concentrations were also below ADEM criteria in Perdido Bay (PDBB-1) in July and September and in the Intracoastal Waterway (IC-3A) during July and August. The Little Lagoon at LLEB-1 and LLWB-1 were below criteria during August, and Perdido Bay (PDBB-3), Bay La Launch (IC-3), Intracoastal Waterway (IC-4), and Perdido Bay's Terry Cove (TECB-1) were below the criteria value in September.

Figure 2. Growing season mean TN concentrations measured in stations within the Perdido and Wolf Bay watersheds and their vicinity, 2008-2018.



	PDBB-3	IC-4	PDBB-0	GMEX-8	WLFB-2	IC-1A	OYBB-2	BS-1
2008			0.172			0.842		1.567
2009			0.216			0.800		1.086
2010						0.784		1.352
2011			0.260		0.761	0.987	0.905	1.582
2012			0.517		0.545	0.800		1.068
2013			0.673		0.999	0.954		0.956
2014	0.799	0.511	0.530	0.586	0.700	0.797		1.041
2015			1.211	1.251	1.244	1.315		1.606
2016								
2017								
2018	0.658	1.018	1.302	1.524	0.885	0.966	0.841	1.183

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

Figure 2. (Continued)

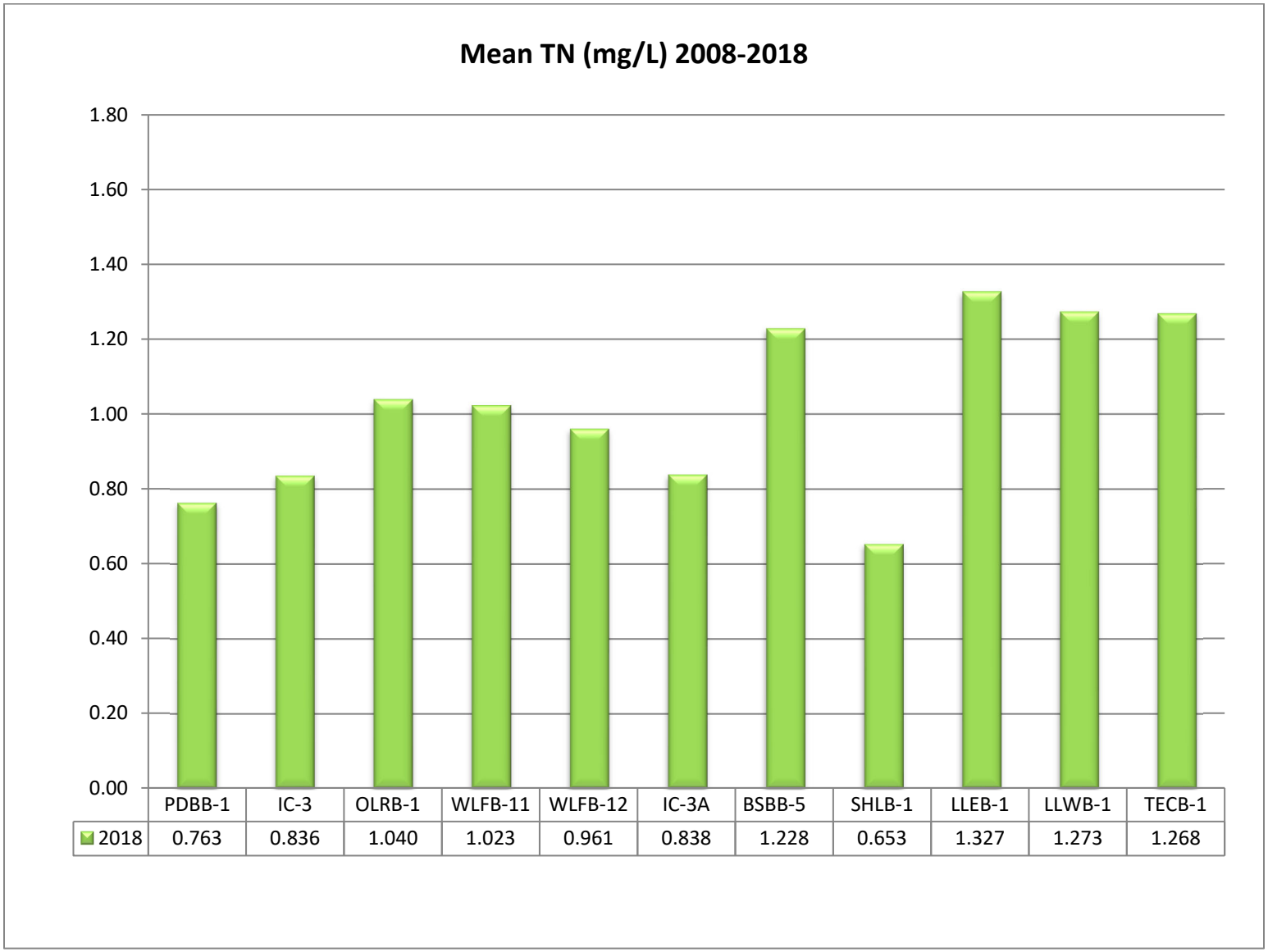
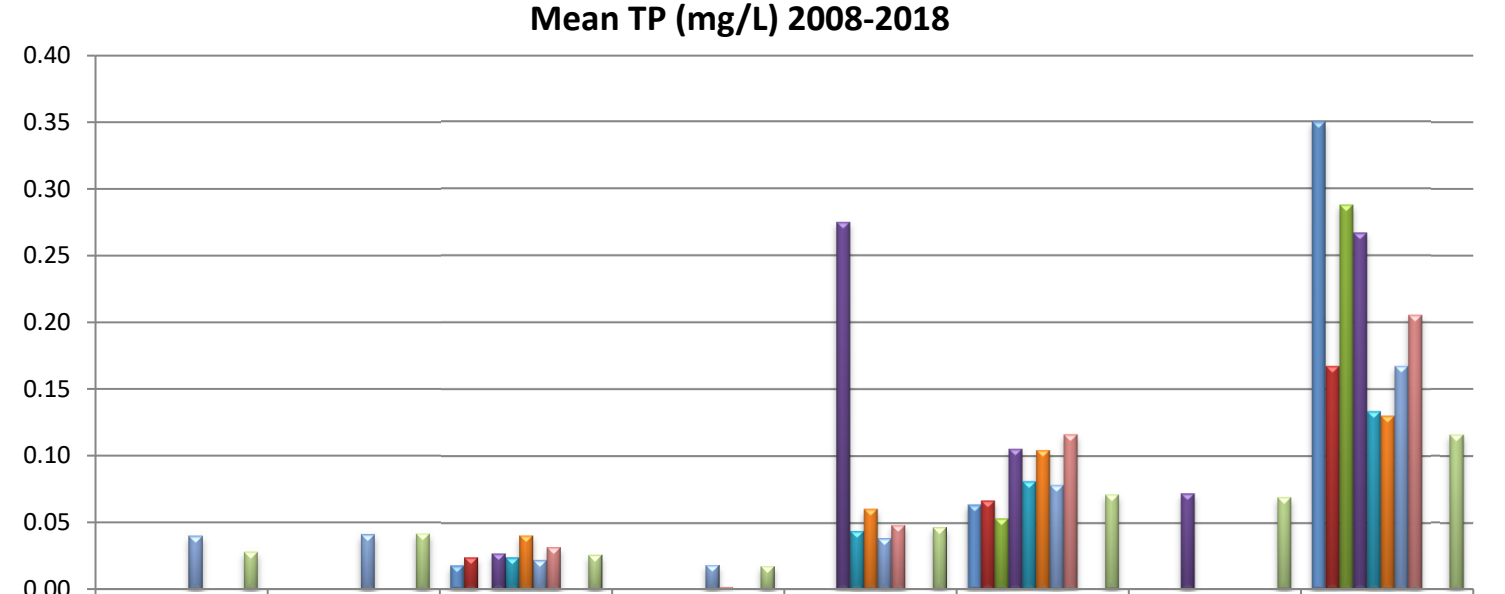


Figure 3. Growing season mean TP concentrations measured in stations within the Perdido and Wolf Bay watersheds and their vicinity, 2008-2018.



	PDBB-3	IC-4	PDBB-0	GMEX-8	WLFB-2	IC-1A	OYBB-2	BS-1
2008			0.018			0.064		0.350
2009			0.024			0.067		0.167
2010						0.053		0.288
2011			0.027		0.275	0.105	0.072	0.267
2012			0.024		0.044	0.081		0.133
2013			0.041		0.061	0.104		0.130
2014	0.040	0.041	0.022	0.019	0.039	0.078		0.167
2015			0.032	0.002	0.049	0.116		0.205
2016								
2017								
2018	0.028	0.042	0.026	0.018	0.047	0.071	0.069	0.116

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

Figure 3. (Continued)

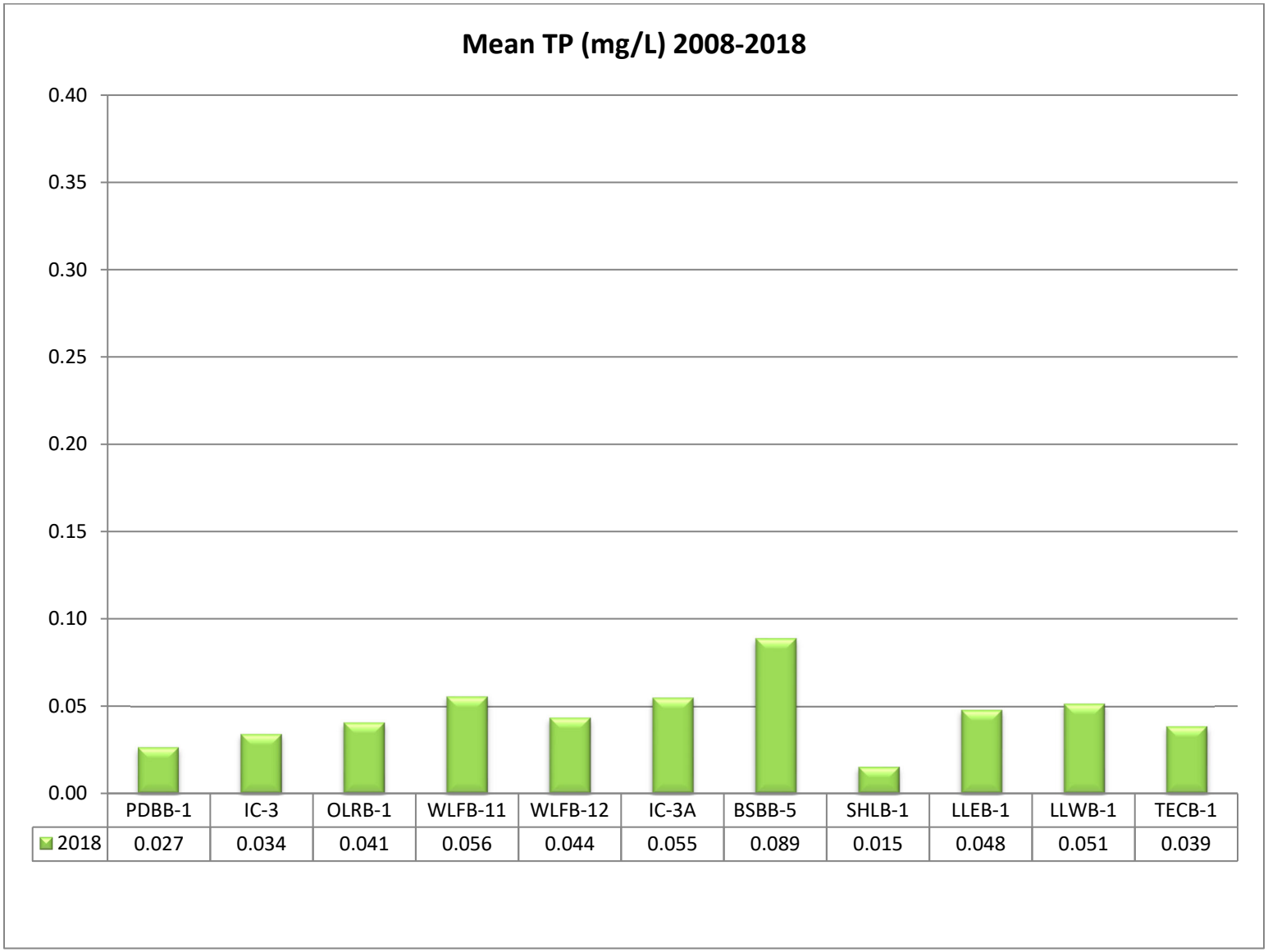
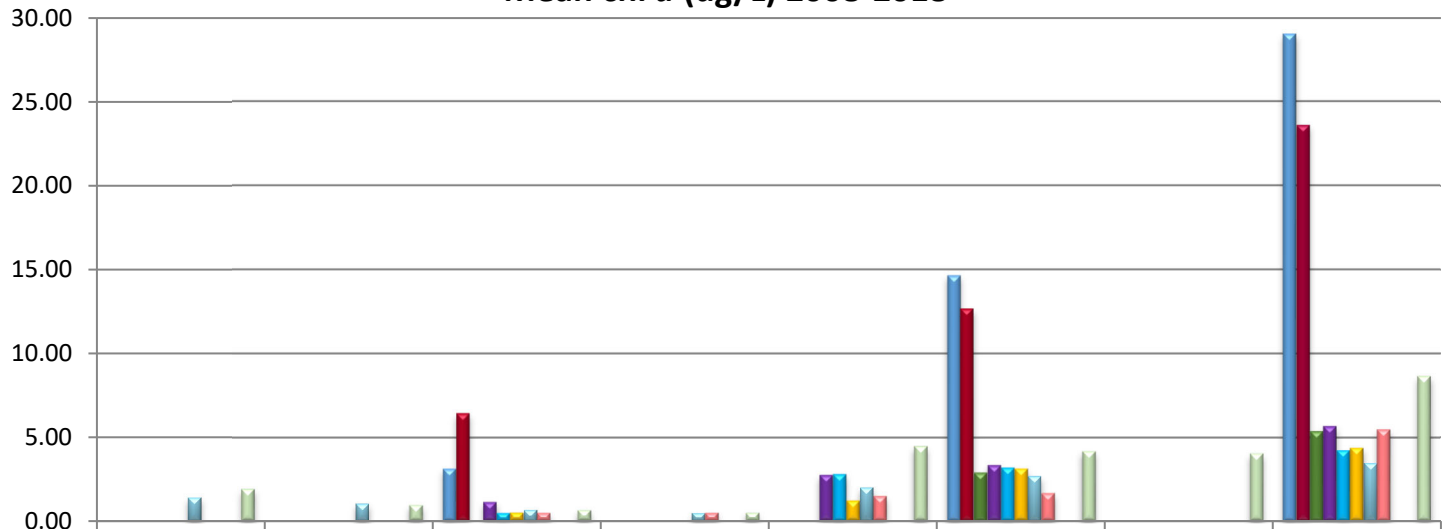


Figure 4. Growing season mean chl *a* concentrations measured in stations within the Perdido and Wolf Bay watersheds and their vicinity, 2008-2018.



	PDBB-3	IC-4	PDBB-0	GMEX-8	WLFB-2	IC-1A	OYBB-2	BS-1
2008			3.13			14.63		29.00
2009			6.43			12.65		23.56
2010						2.90		5.37
2011			1.13		2.75	3.33	-	5.67
2012			0.50		2.80	3.20		4.23
2013			0.50		1.23	3.13		4.37
2014	1.43	1.06	0.69	0.50	2.03	2.70		3.48
2015			0.50	0.50	1.50	1.67		5.47
2016								
2017								
2018	1.91	0.95	0.66	0.50	4.46	4.16	4.04	8.64

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

Chl *a* was not sampled at OYBB-2 in 2011.

Figure 4. (Continued)

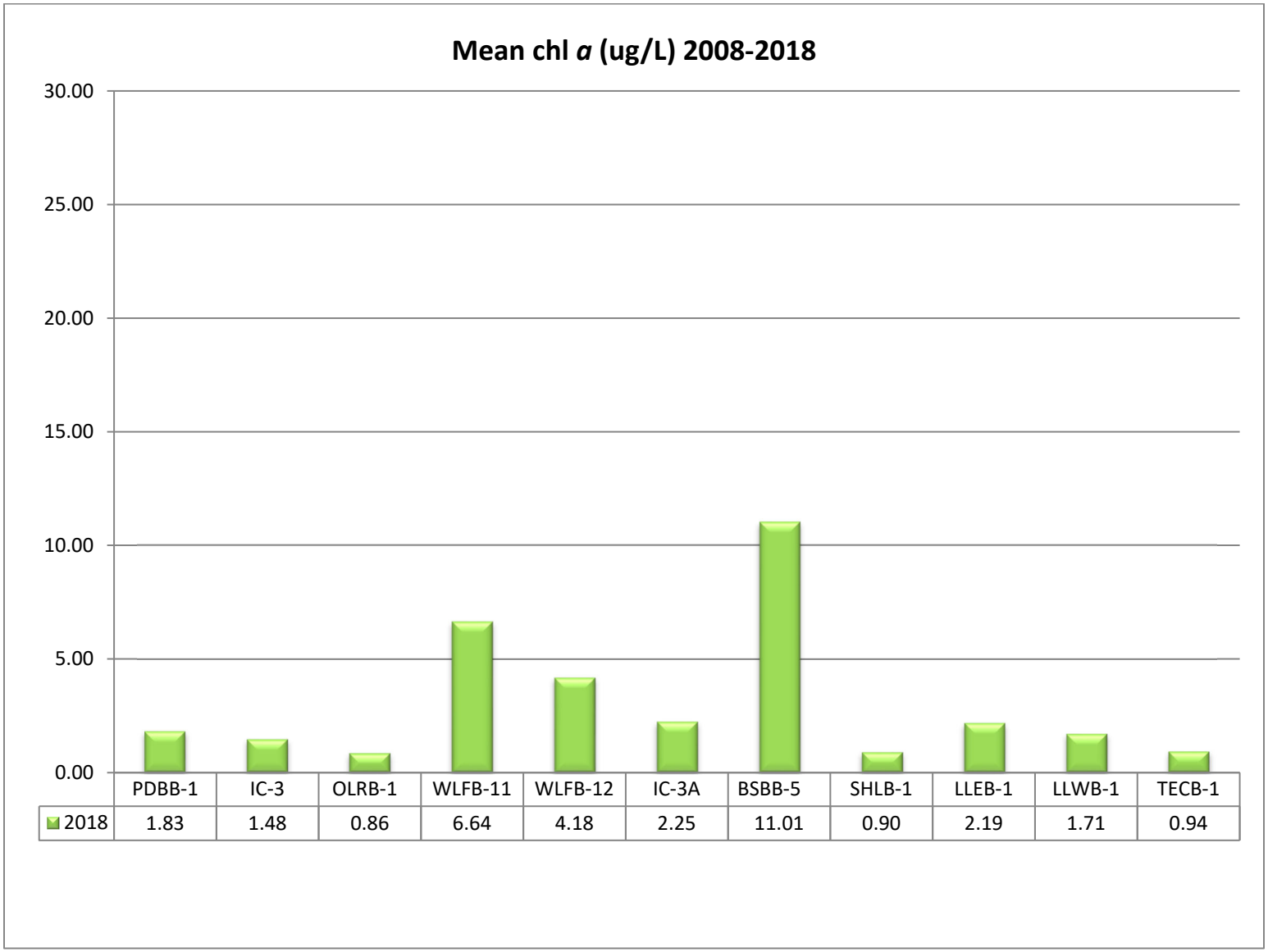
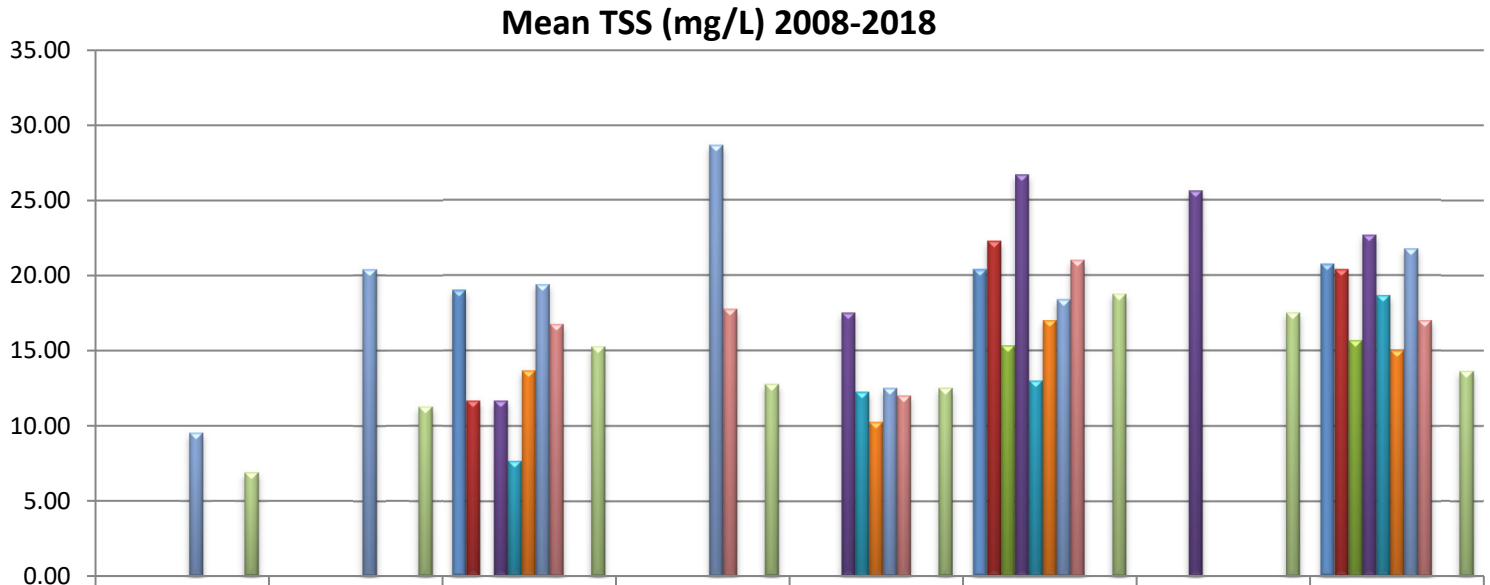


Figure 5. Growing season mean TSS concentrations measured in stations within the Perdido and Wolf Bay watersheds and their vicinity, 2008-2018.



	PDBB-3	IC-4	PDBB-0	GMEX-8	WLFB-2	IC-1A	OYBB-2	BS-1
2008			19.0			20.4		20.8
2009			11.7			22.3		20.4
2010						15.3		15.7
2011			11.7		17.5	26.7	25.6	22.7
2012			7.7		12.3	13.0		18.7
2013			13.7		10.3	17.0		15.0
2014	9.5	20.4	19.4	28.6	12.5	18.4		21.8
2015			16.8	17.8	12.0	21.0		17.0
2016								
2017								
2018	6.9	11.3	15.3	12.8	12.5	18.8	17.5	13.6

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

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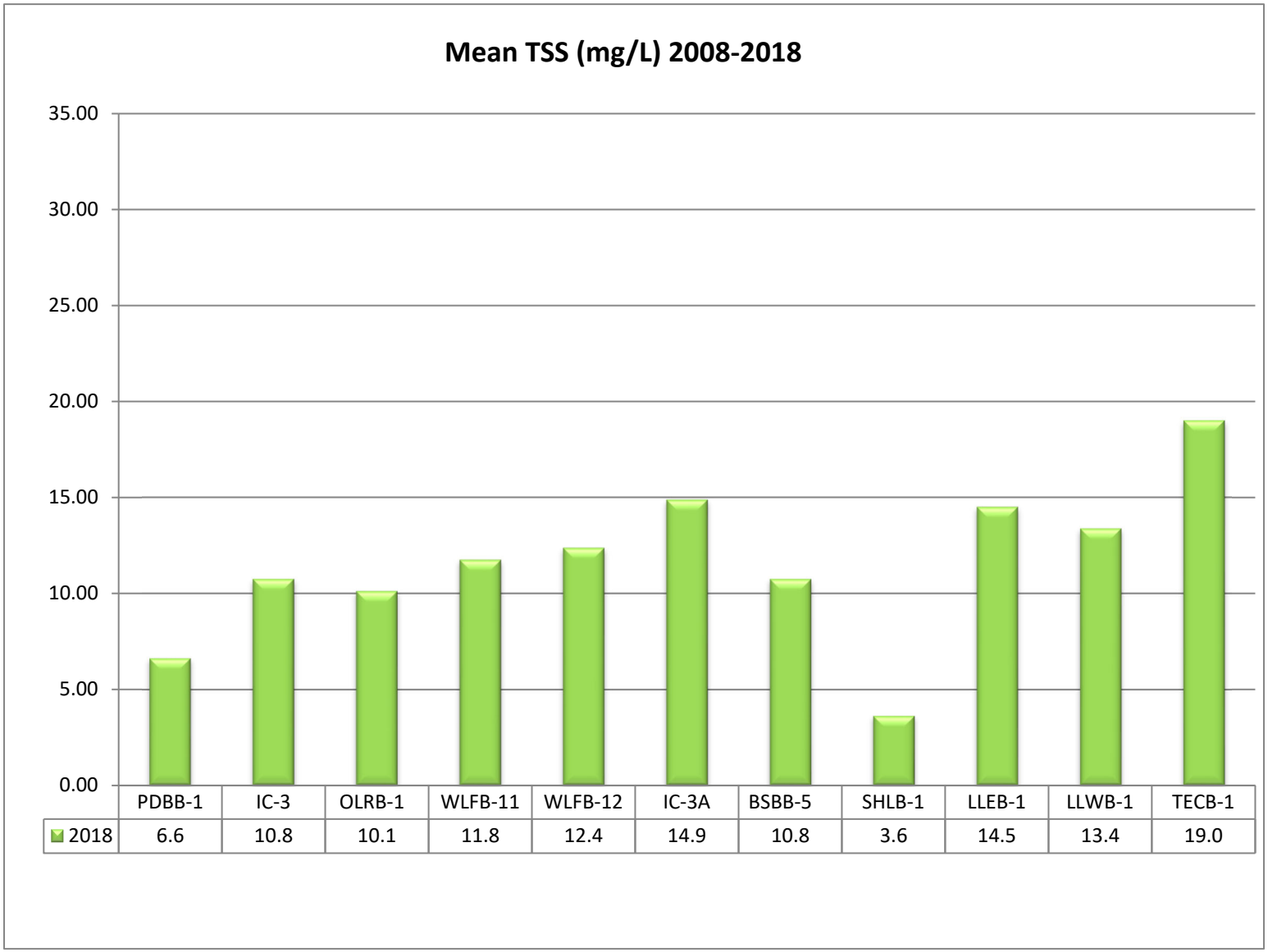
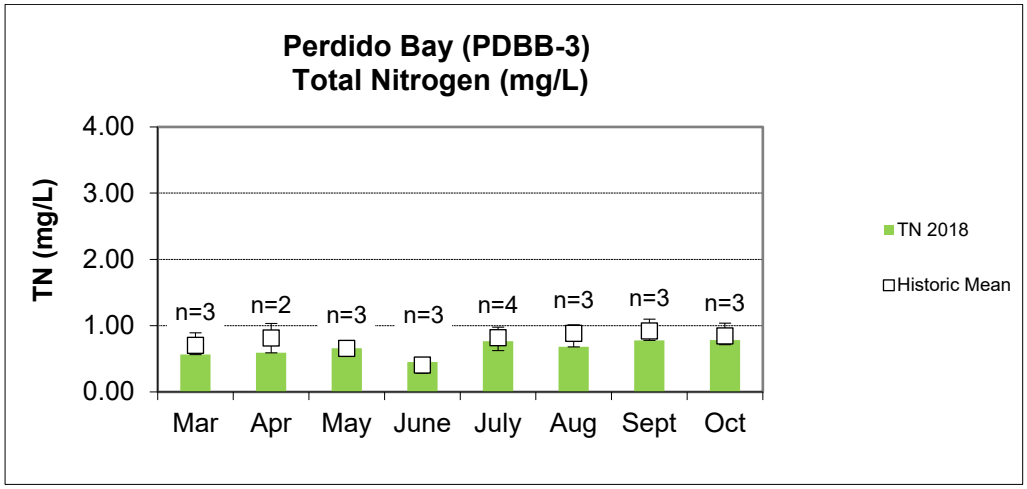
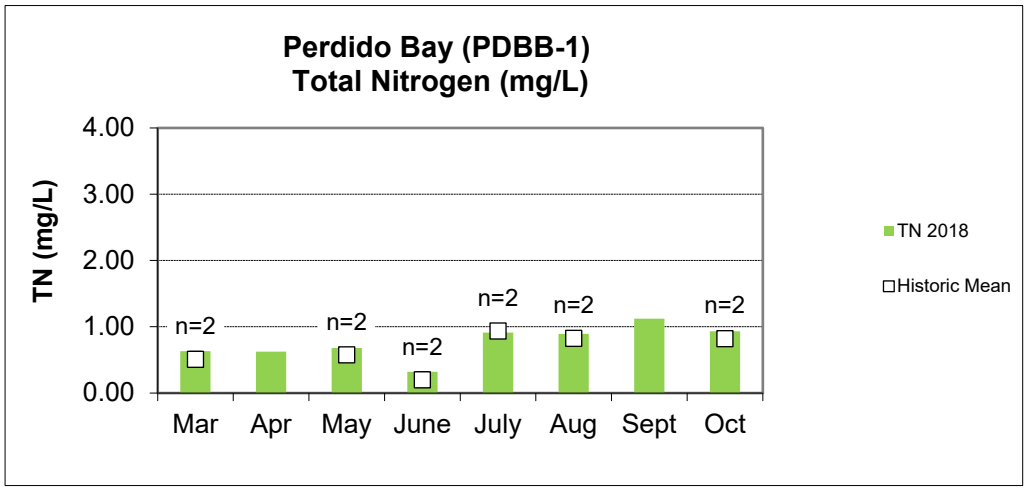
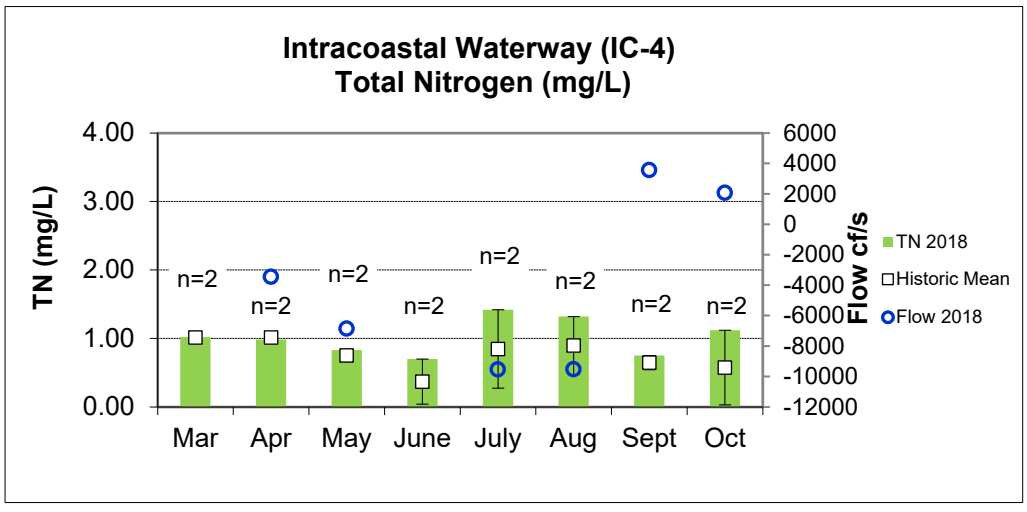


Figure 6. Monthly TN concentrations measured in stations within the Perdido and Wolf Bay watersheds and their vicinity, March-October 2018. The historic mean (1990-2018) and min/max ranges are displayed for comparison. The "n" value equals the number of data points included in the monthly historic calculations. Instantaneous flows were measured during sample collection by ADEM at several stations and are depicted on respective graphs.







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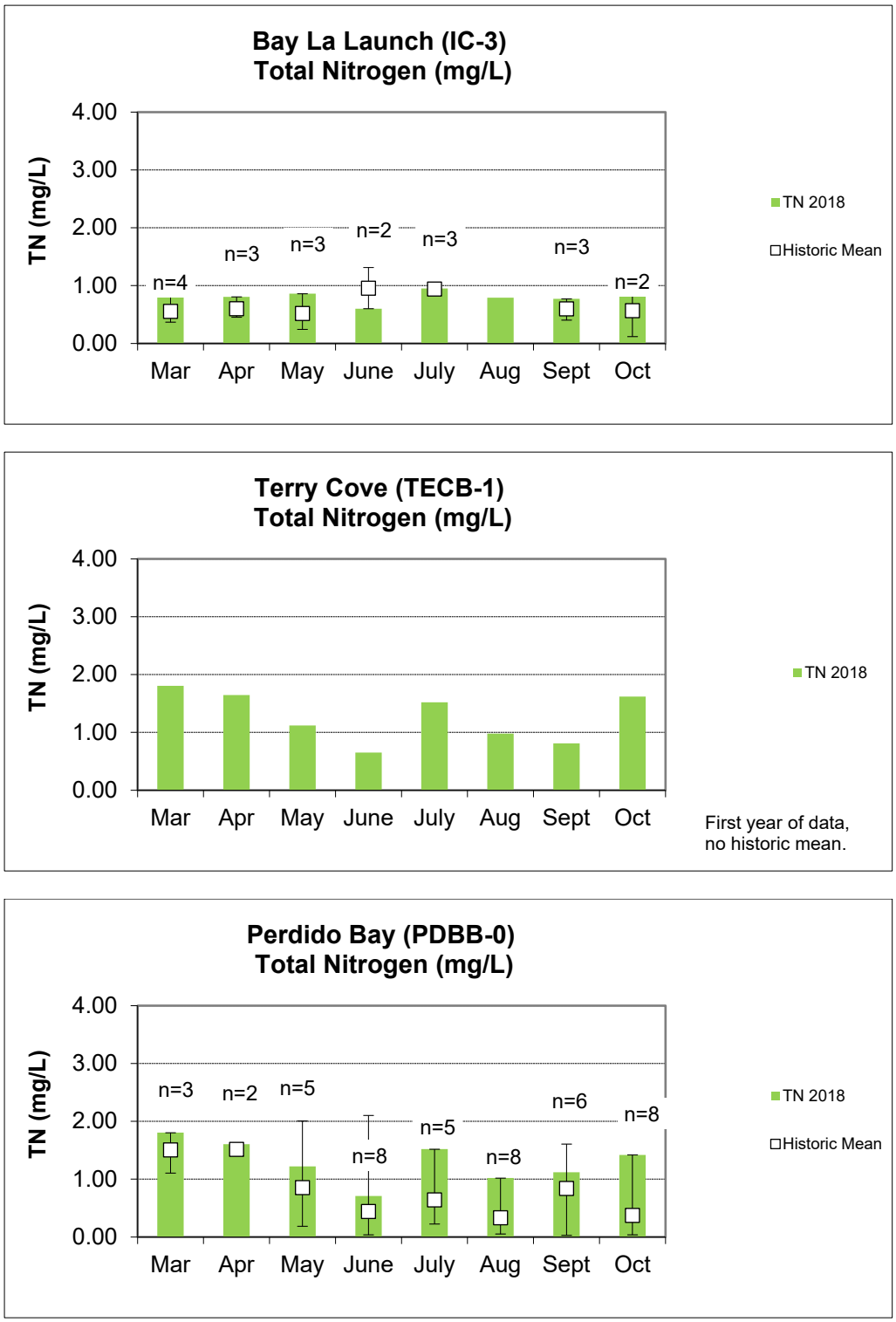

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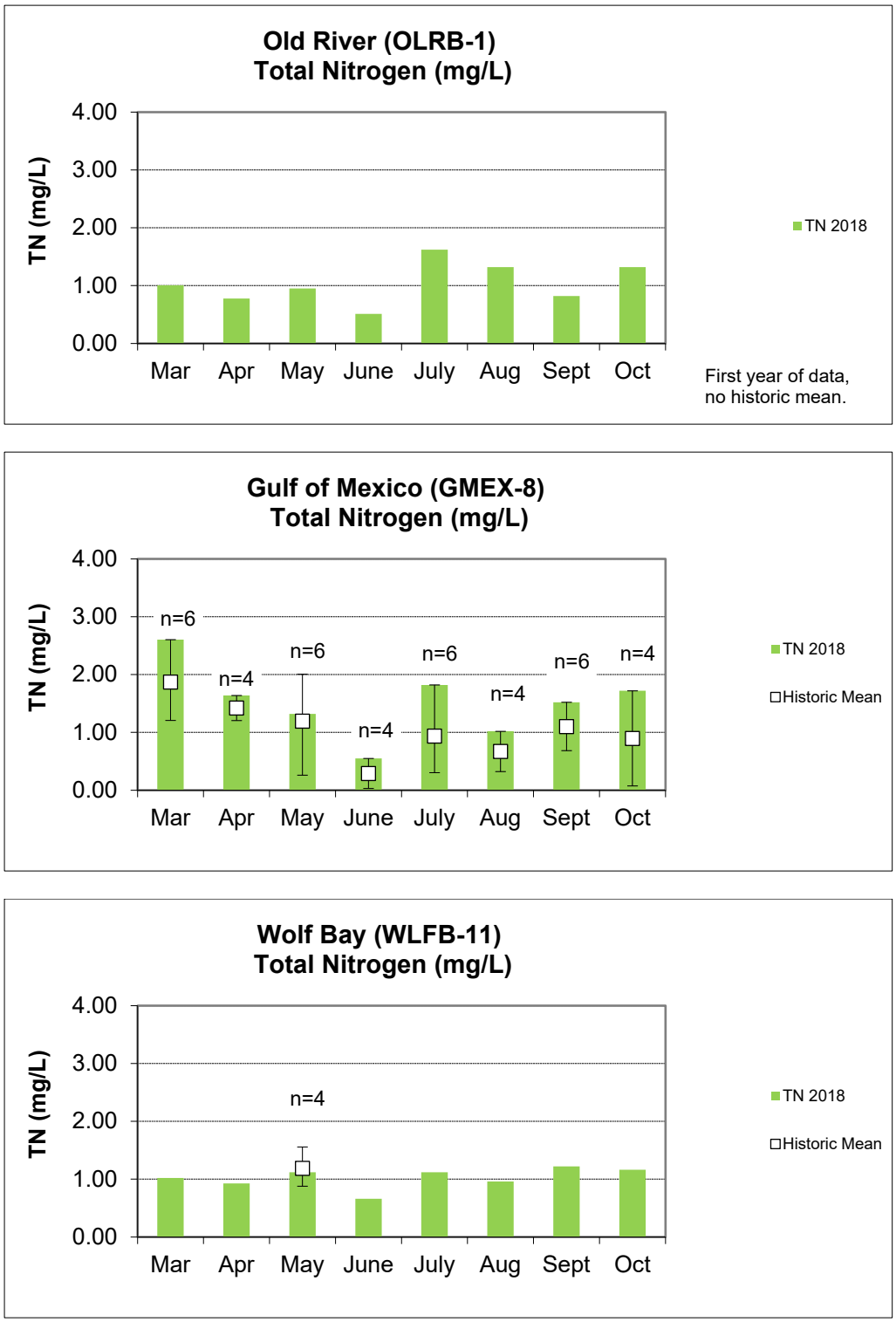

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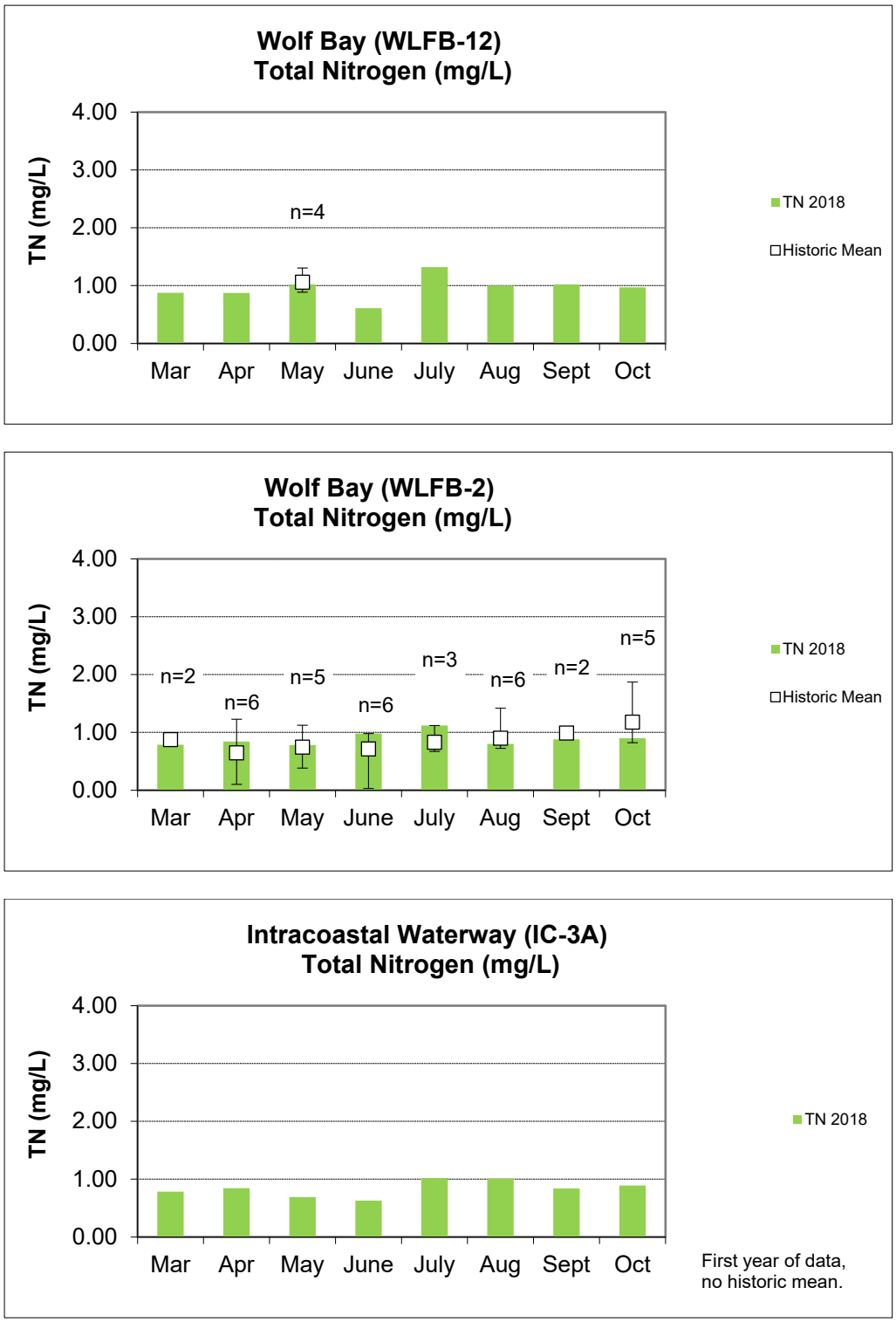

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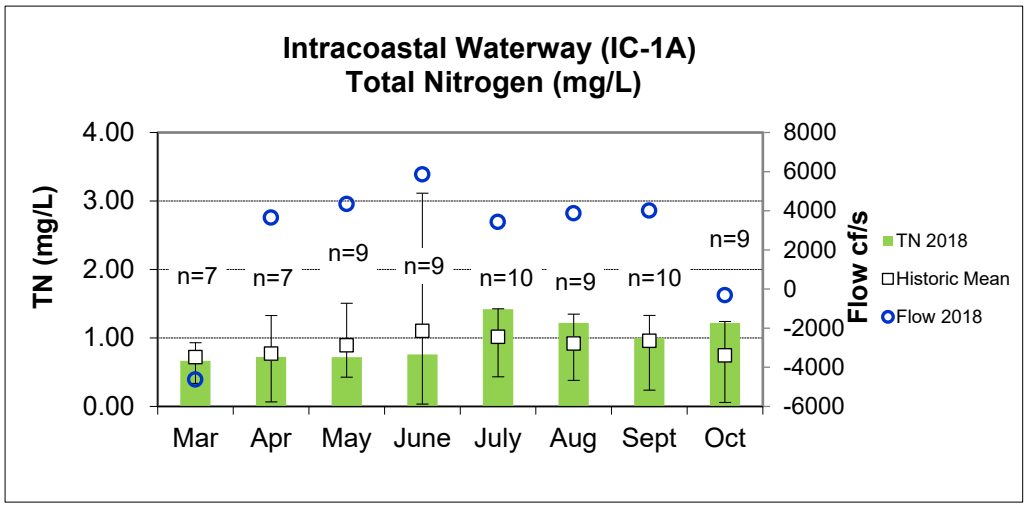

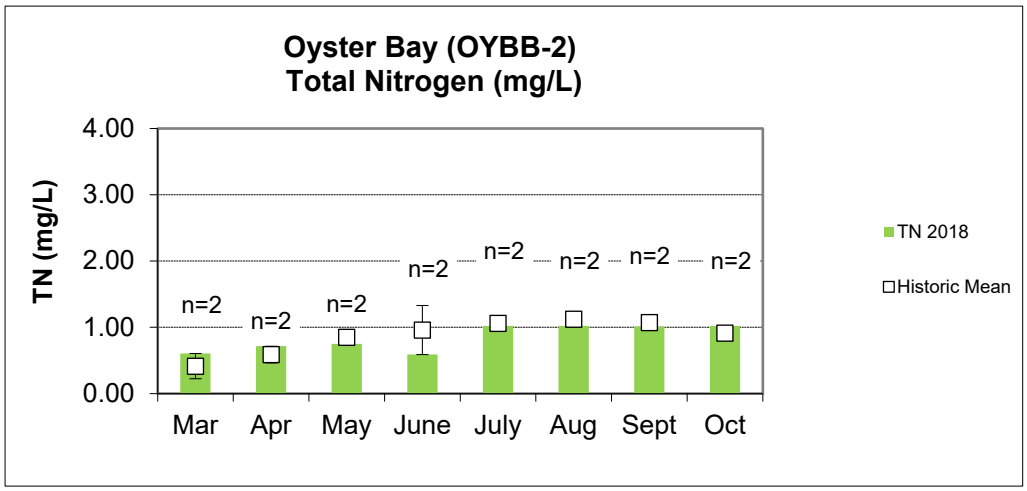

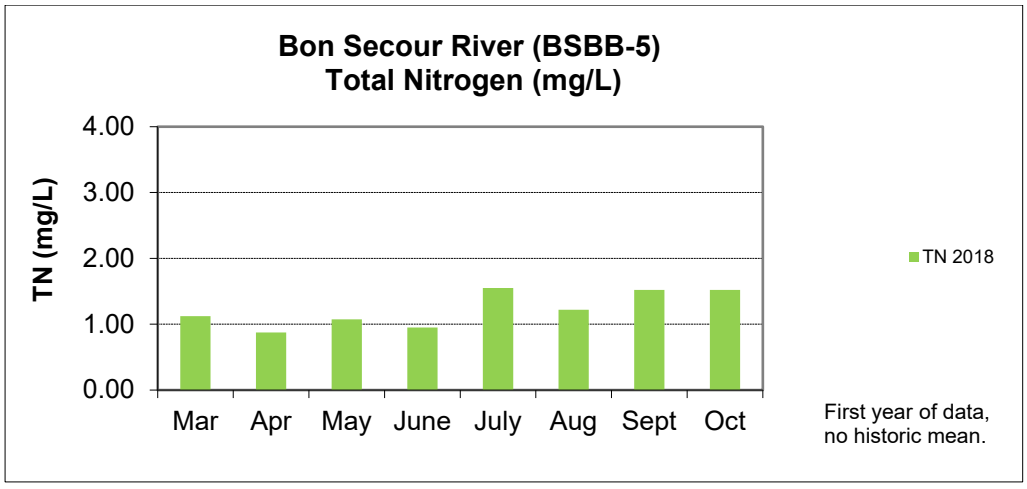

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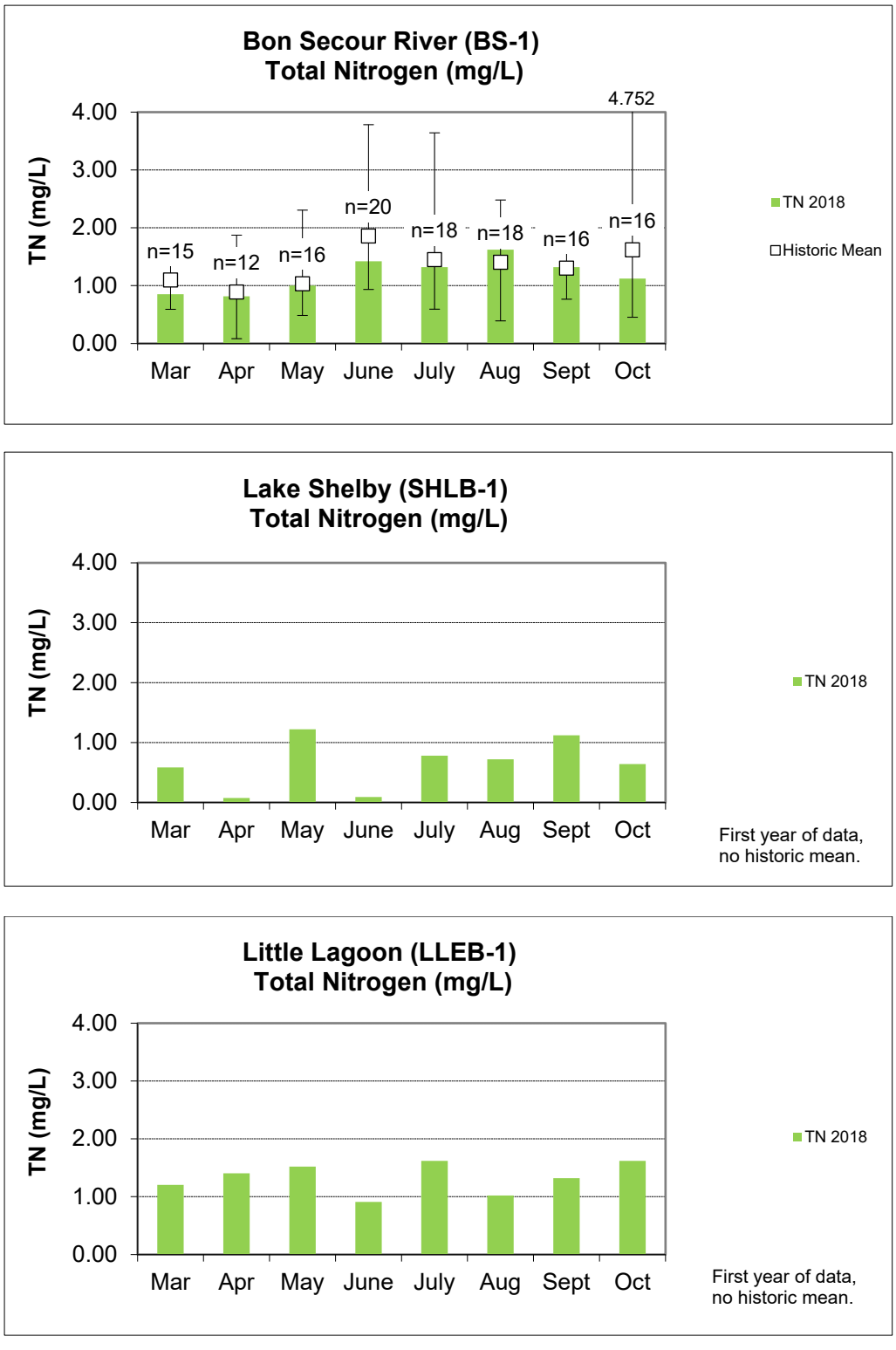

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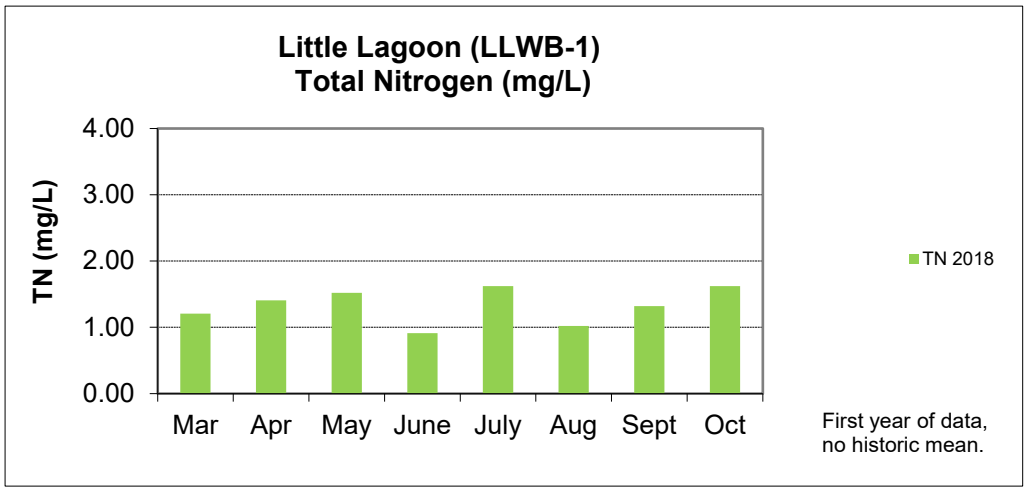
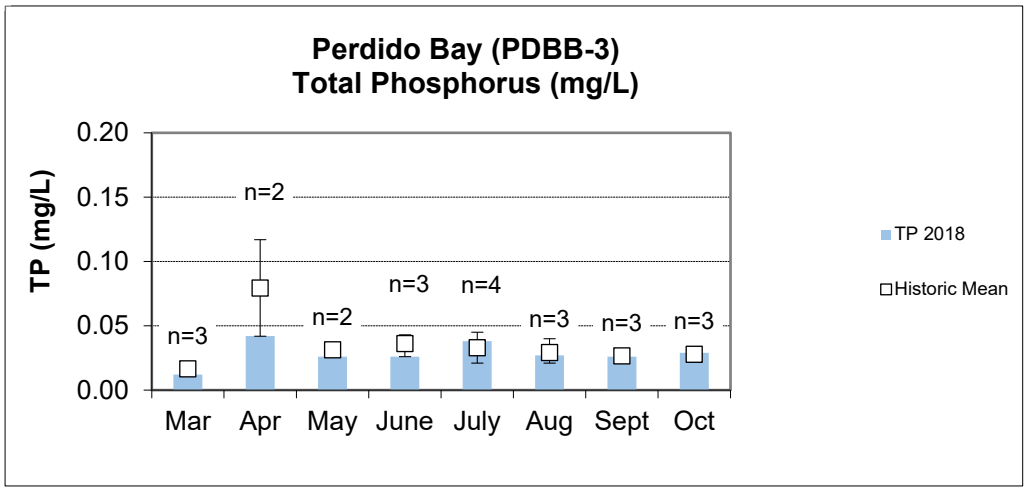
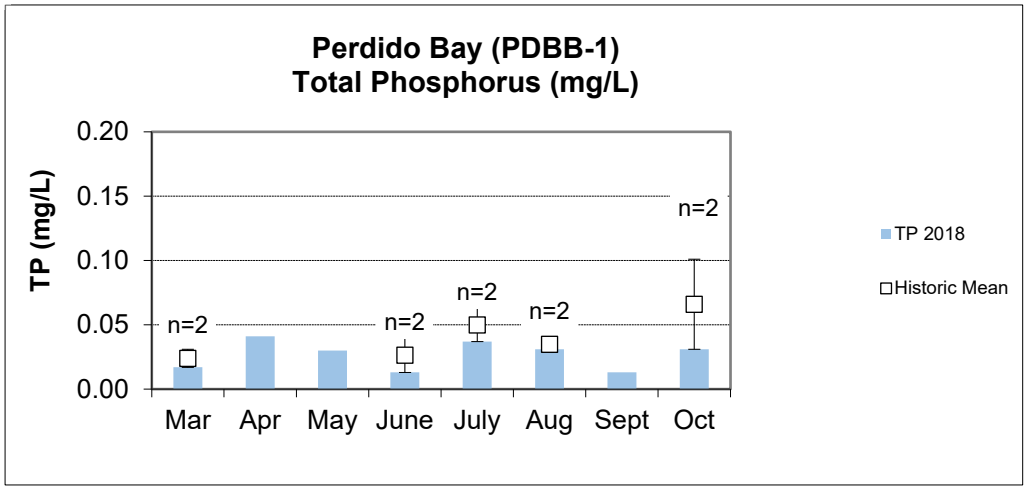
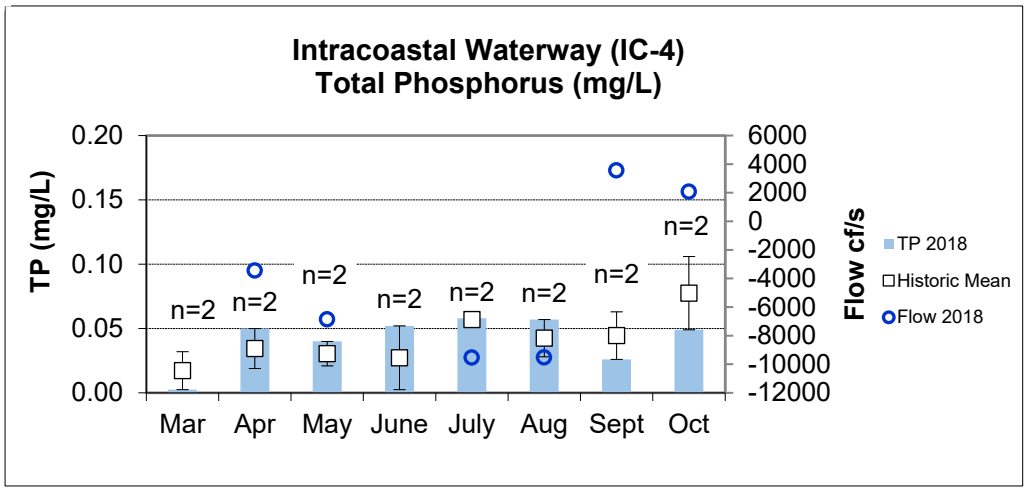


Figure 7. Monthly TP concentrations measured in stations within the Perdido and Wolf Bay watersheds and their vicinity, March-October 2018. The historic mean (1990-2018) and min/max ranges are displayed for comparison. The "n" value equals the number of data points included in the monthly historic calculations**.** Instantaneous flows were measured during sample collection by ADEM at several stations and are depicted on respective graphs.







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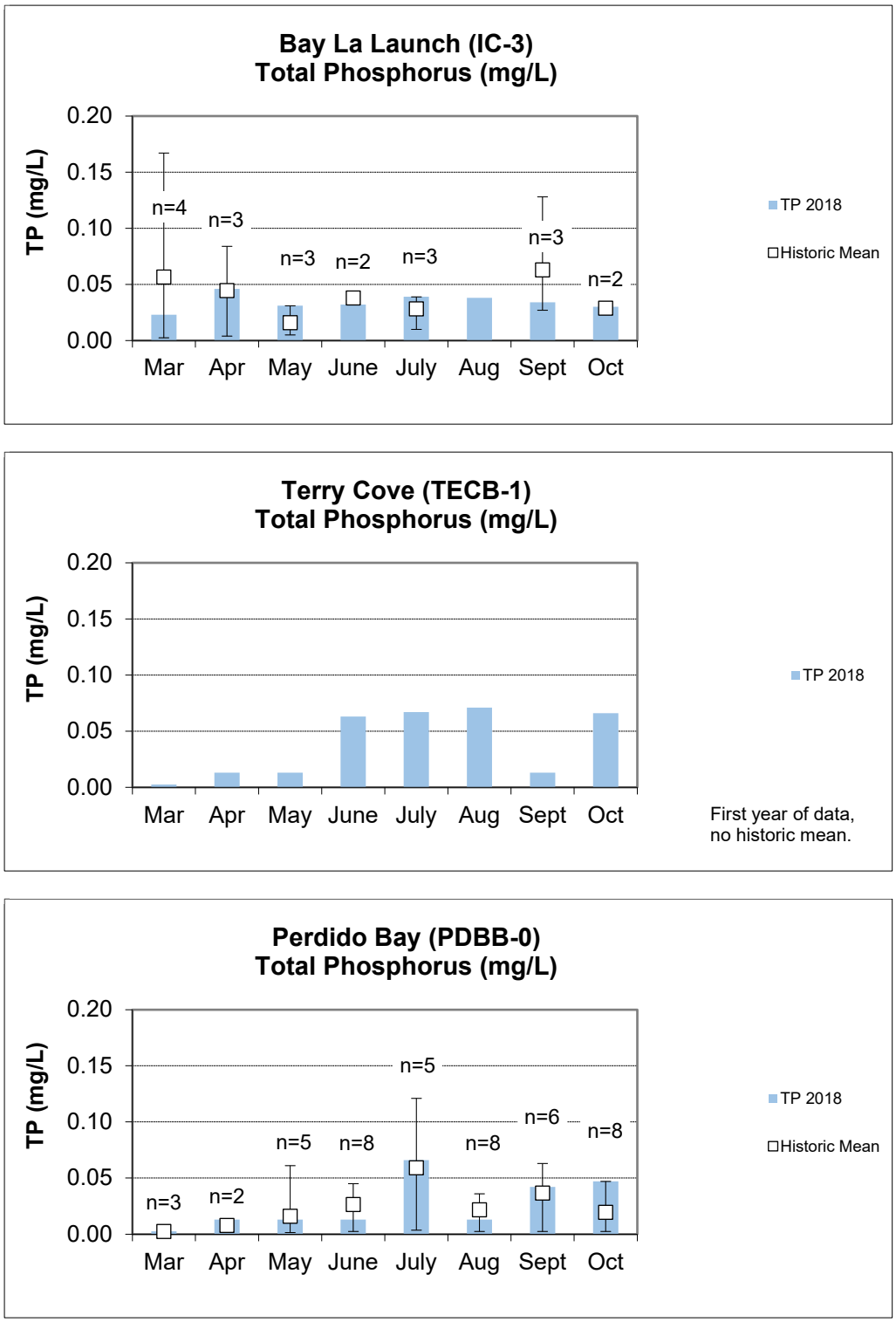

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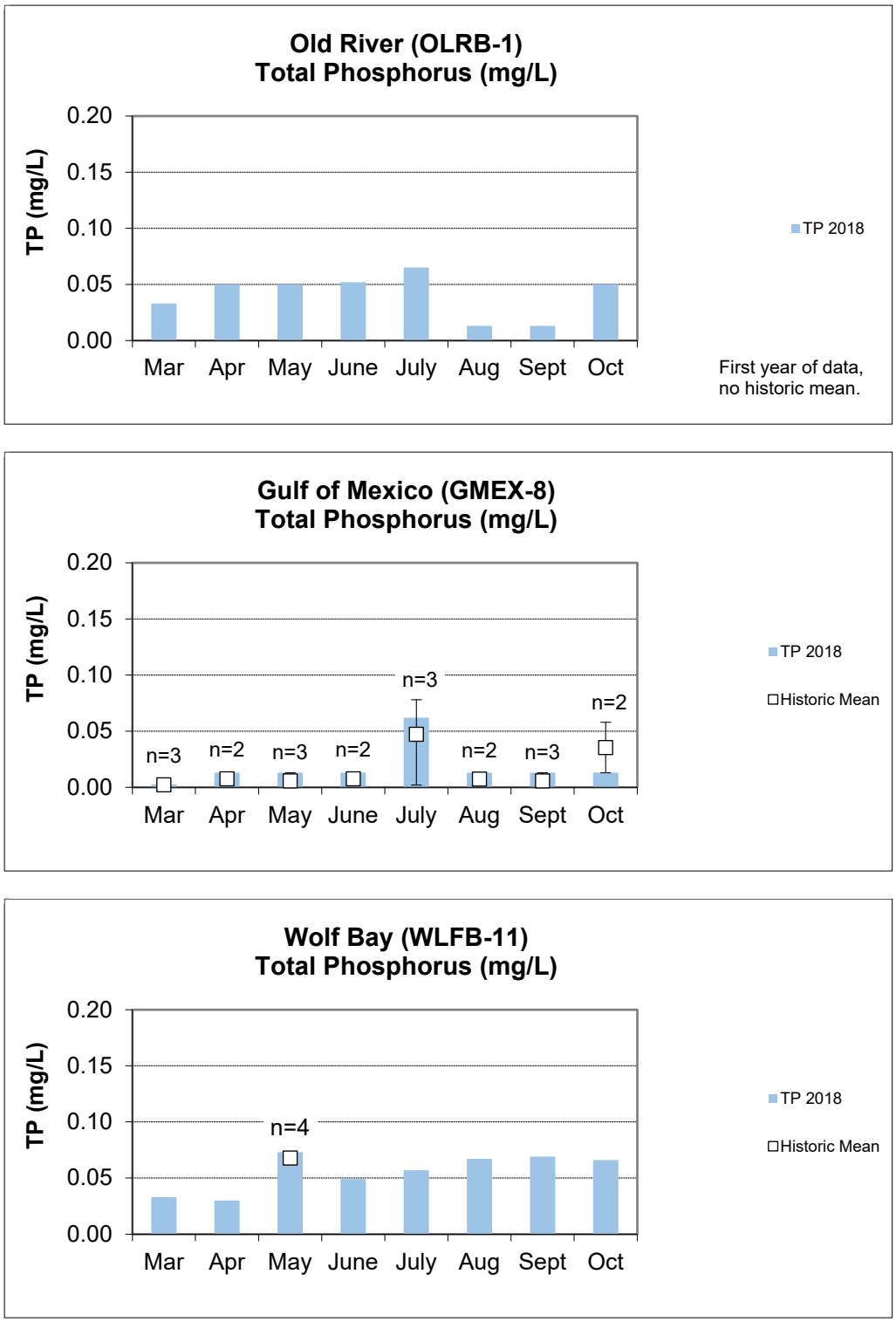

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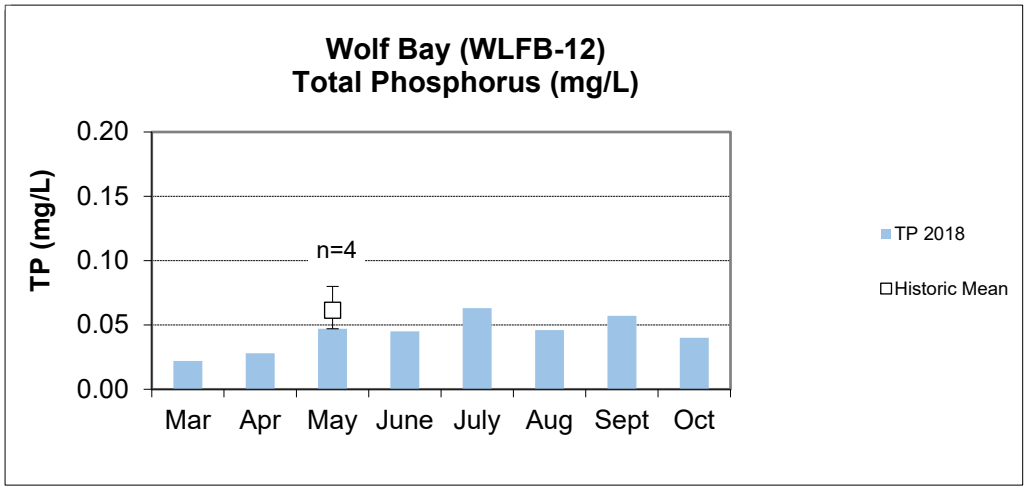

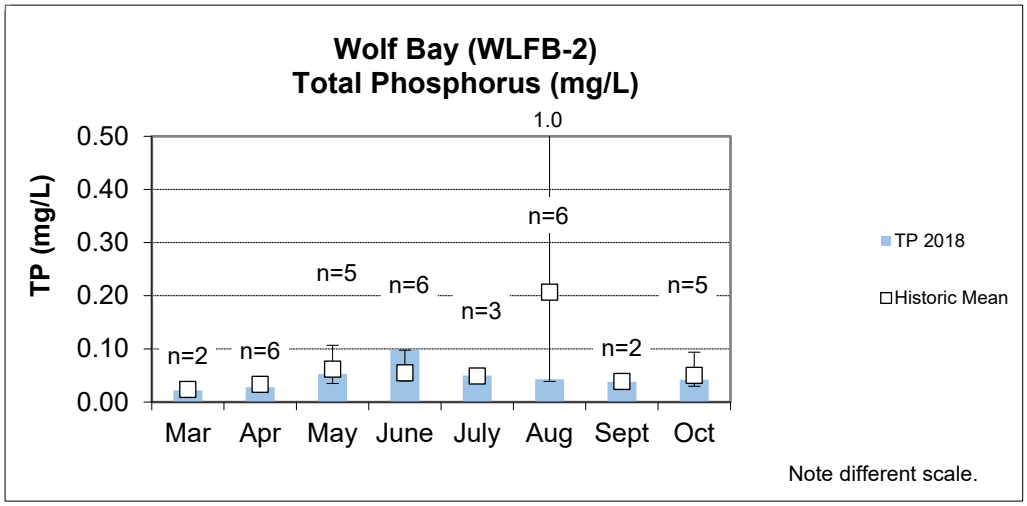

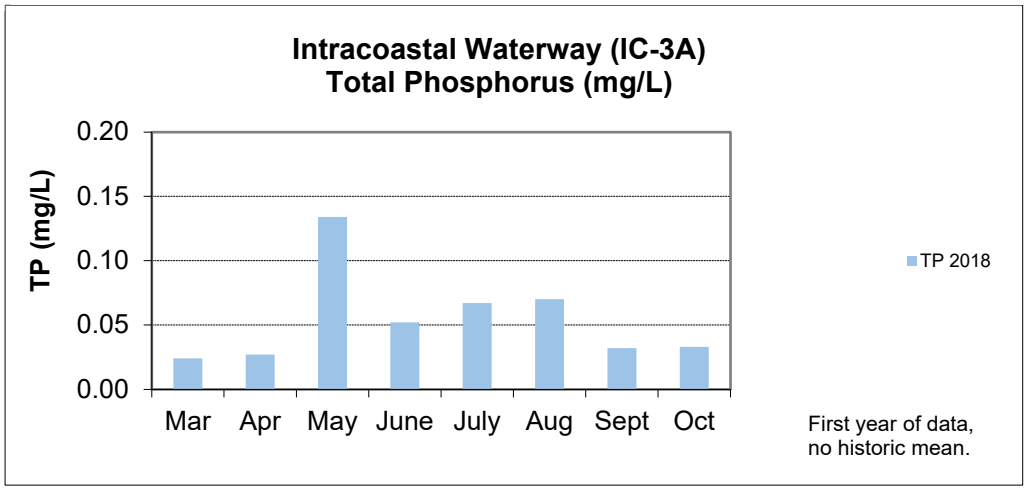

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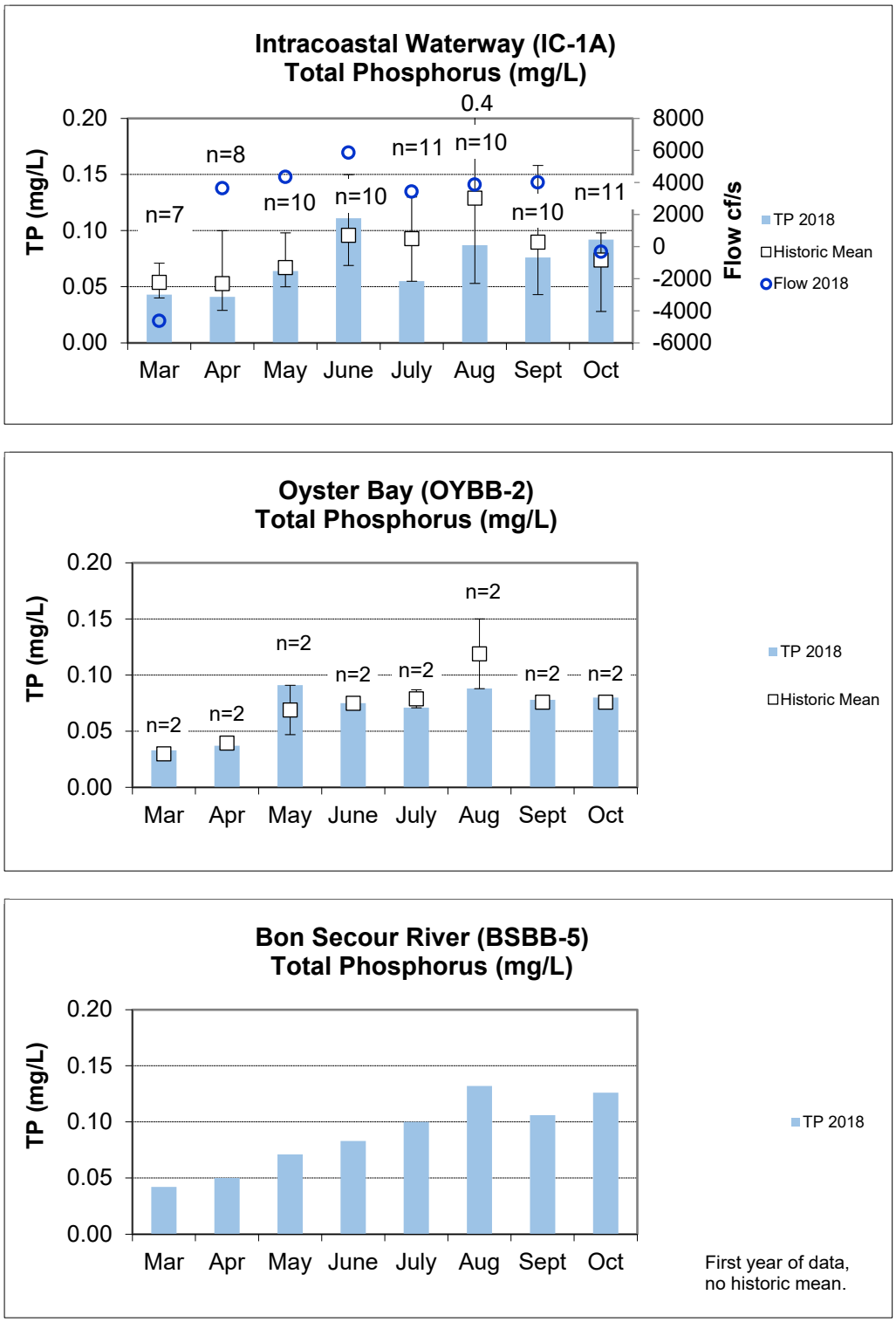

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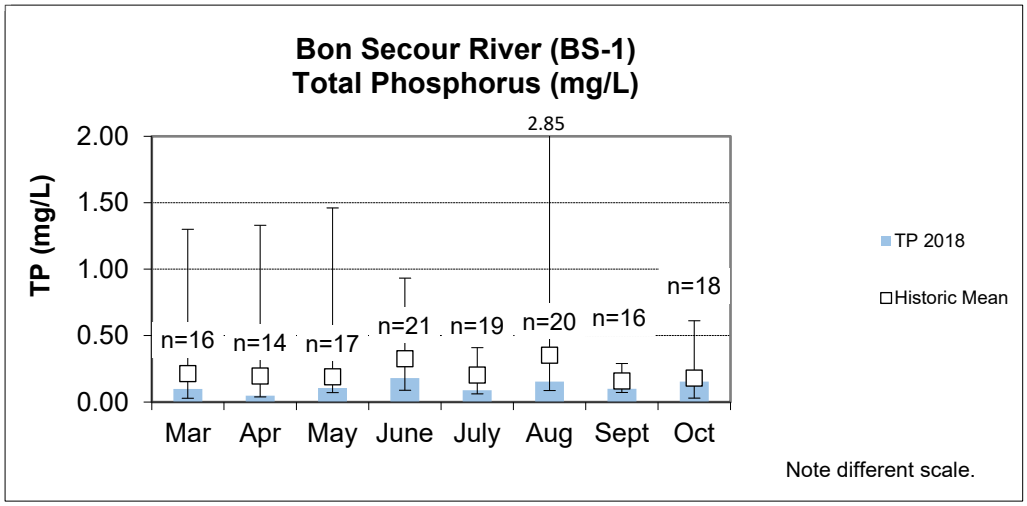

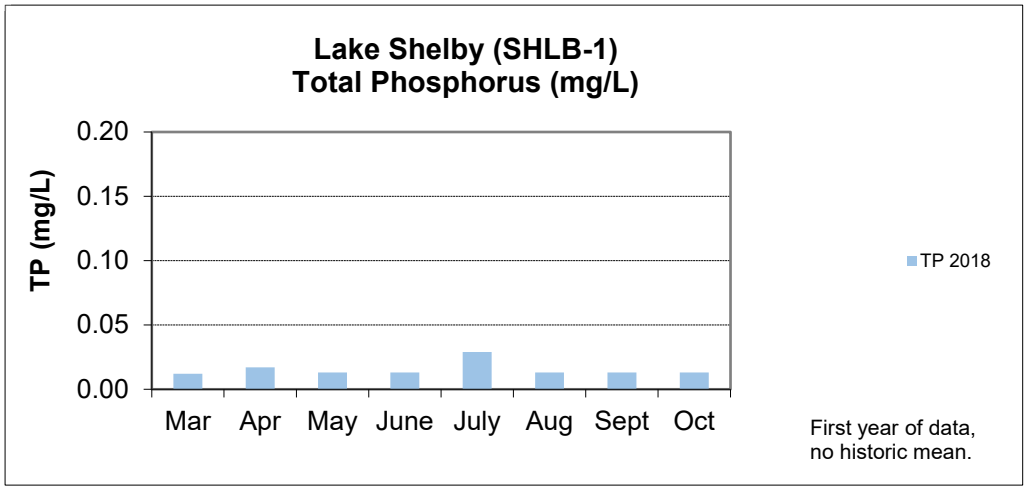

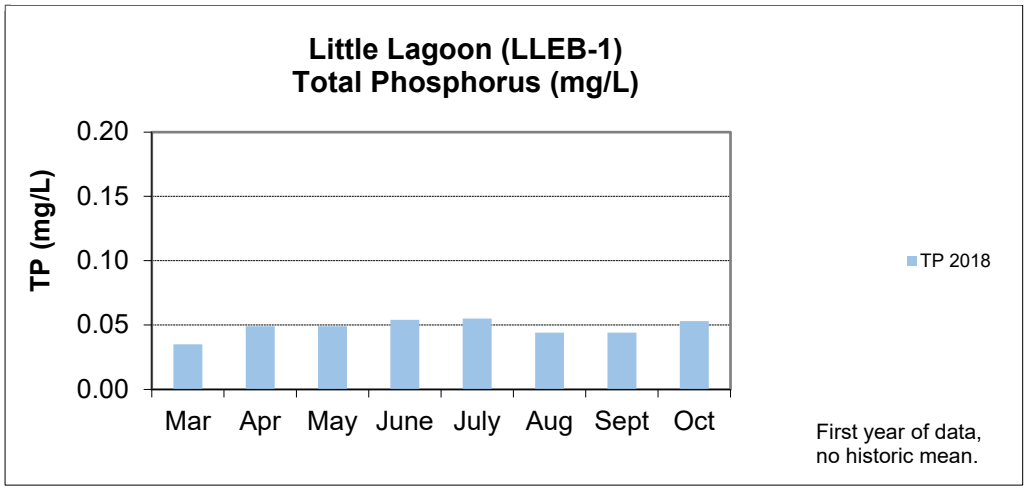

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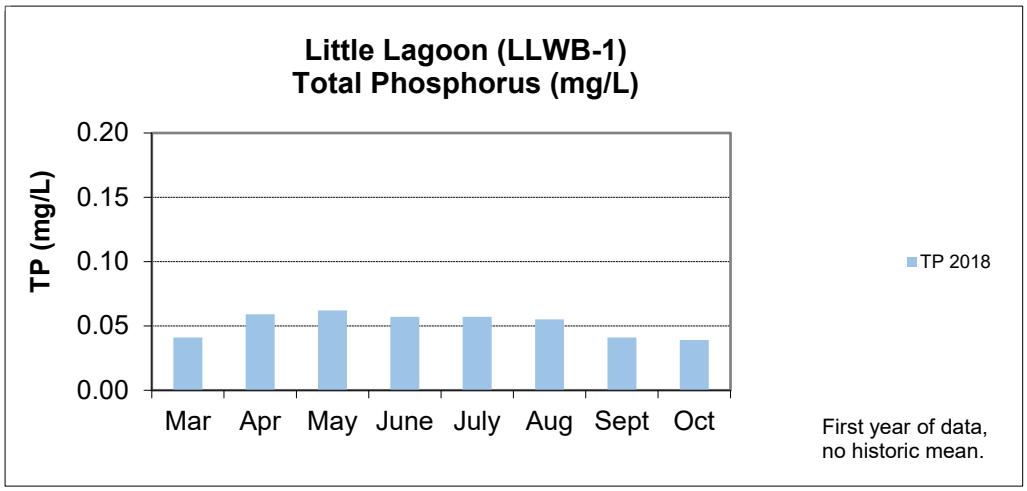
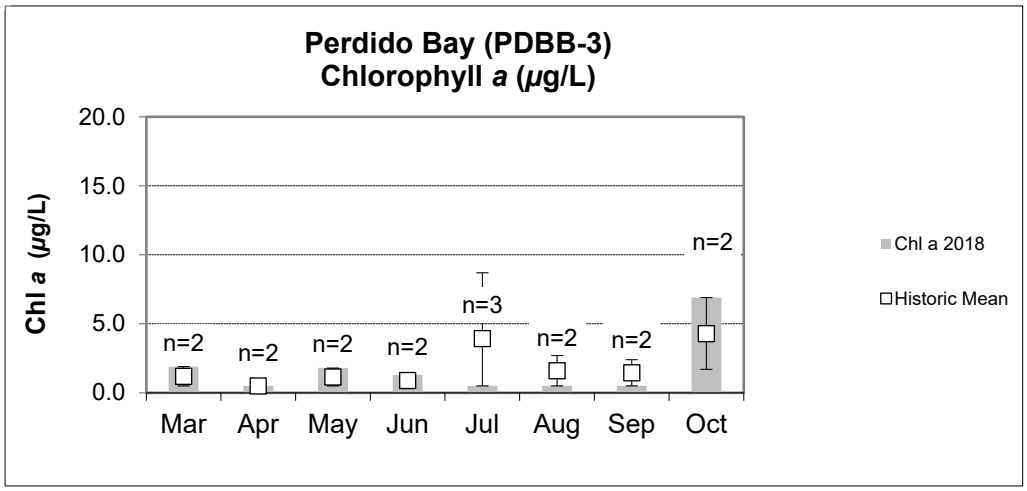
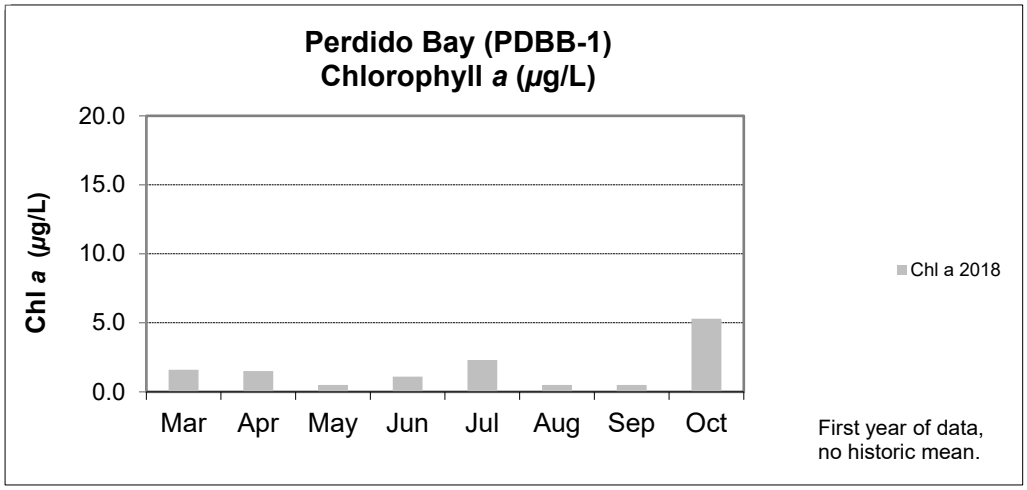
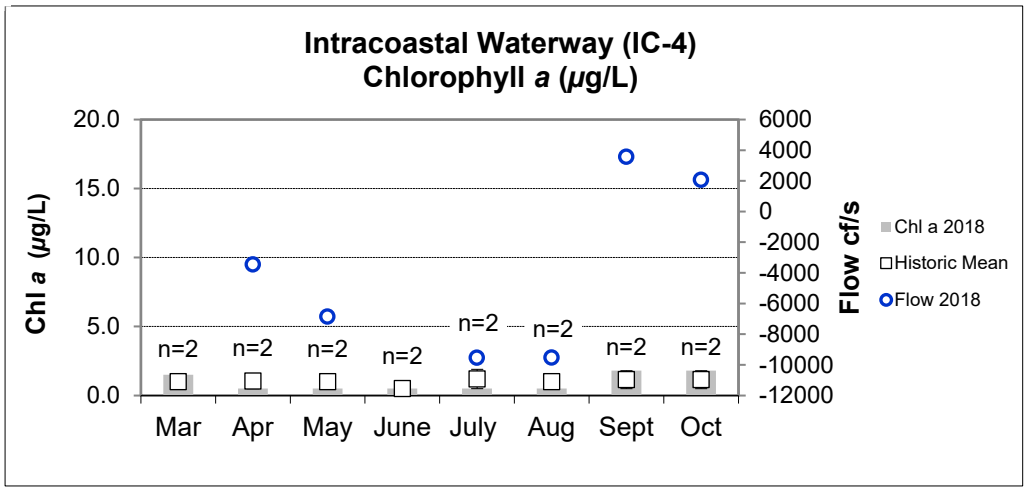


Figure 8. Monthly chl *a* concentrations measured in stations within the Perdido and Wolf Bay watersheds and their vicinity, March-October 2018. The historic mean (1990-2018) and min/max ranges are displayed for comparison. The "n" value equals the number of data points included in the monthly historic calculations. Instantaneous flows were measured during sample collection by ADEM at several stations and are depicted on respective graphs.







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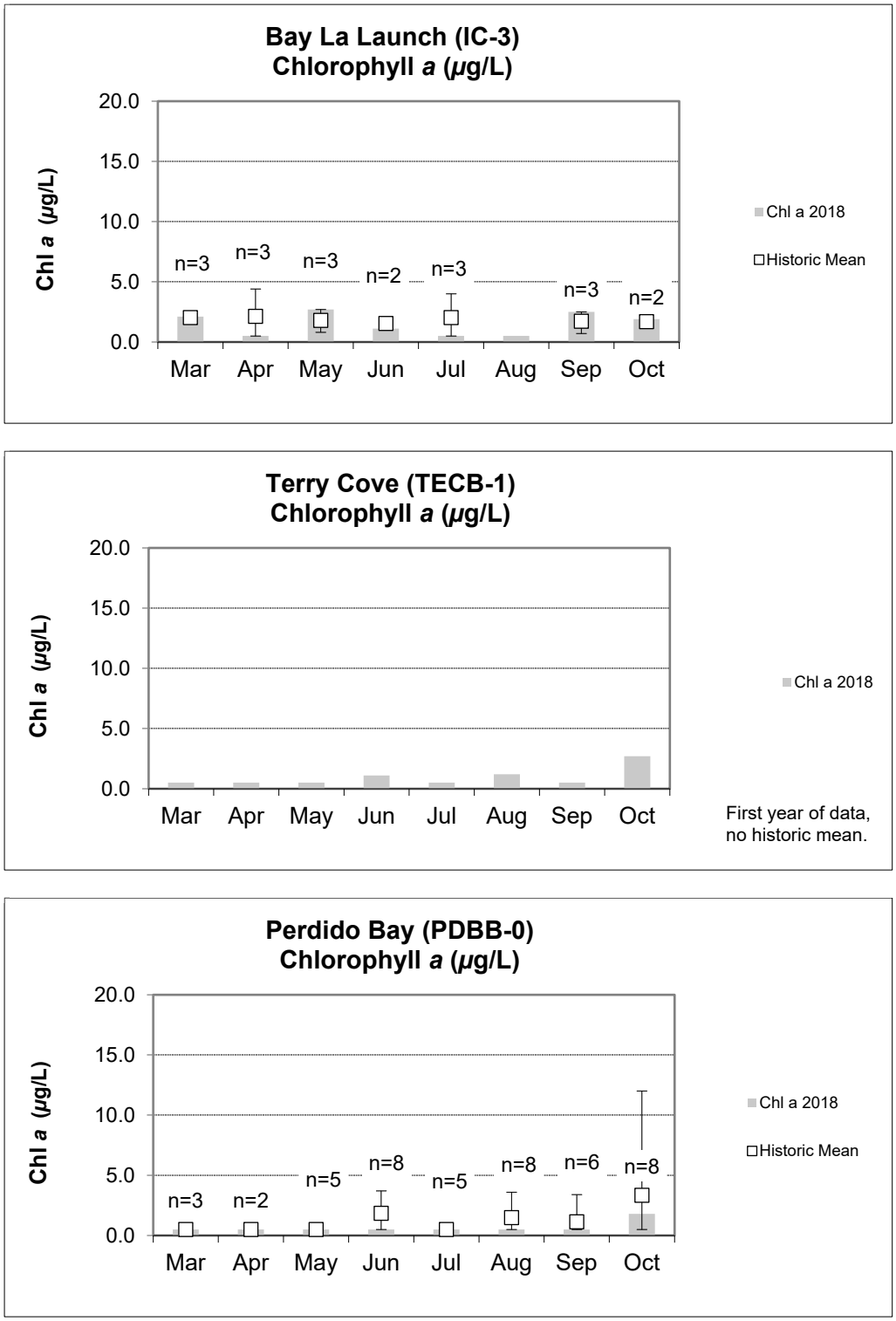
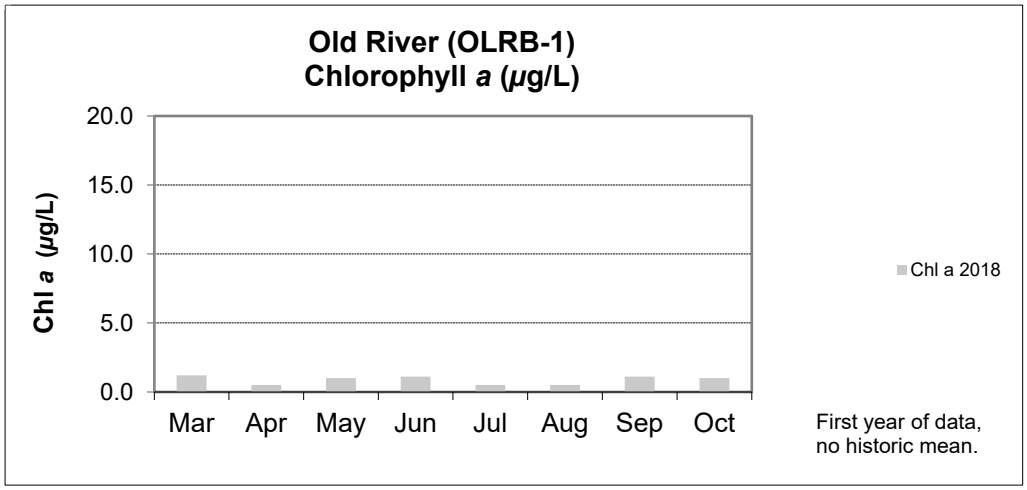
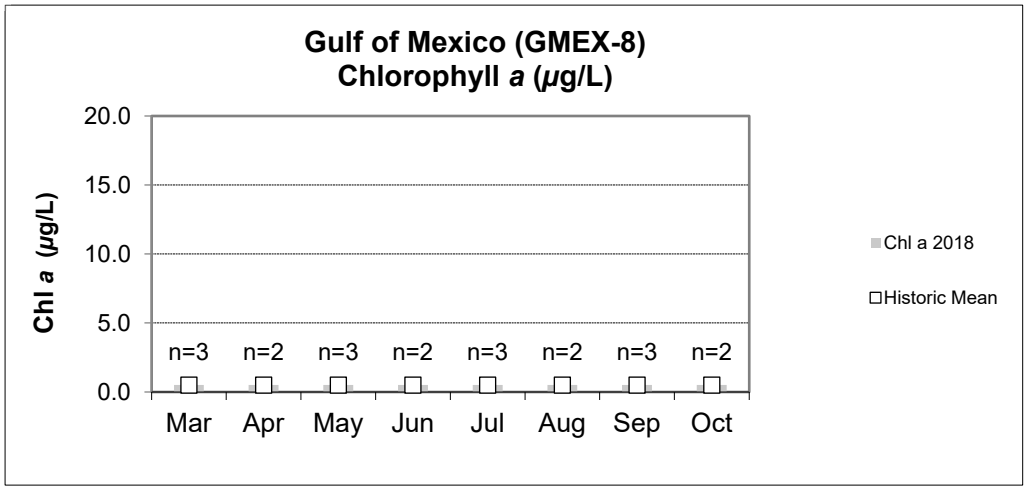
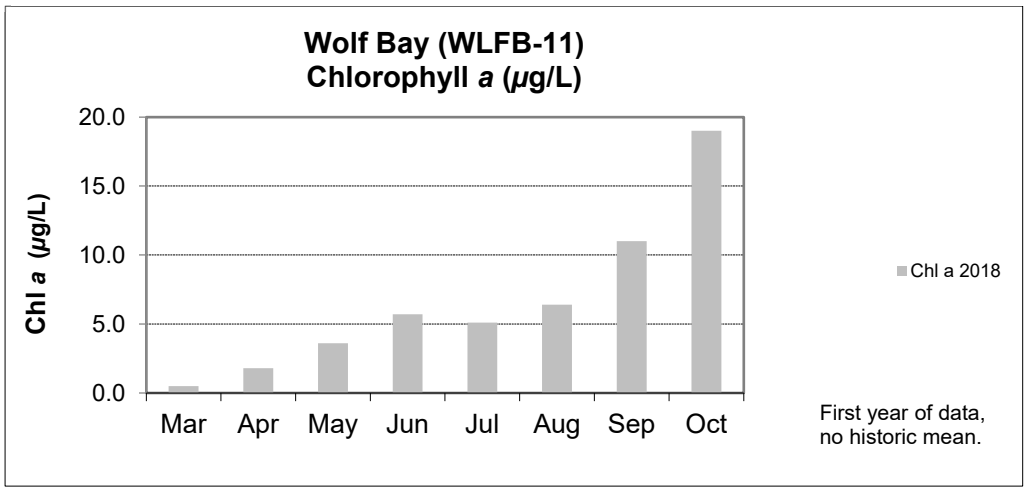


Figure 8. (continued)







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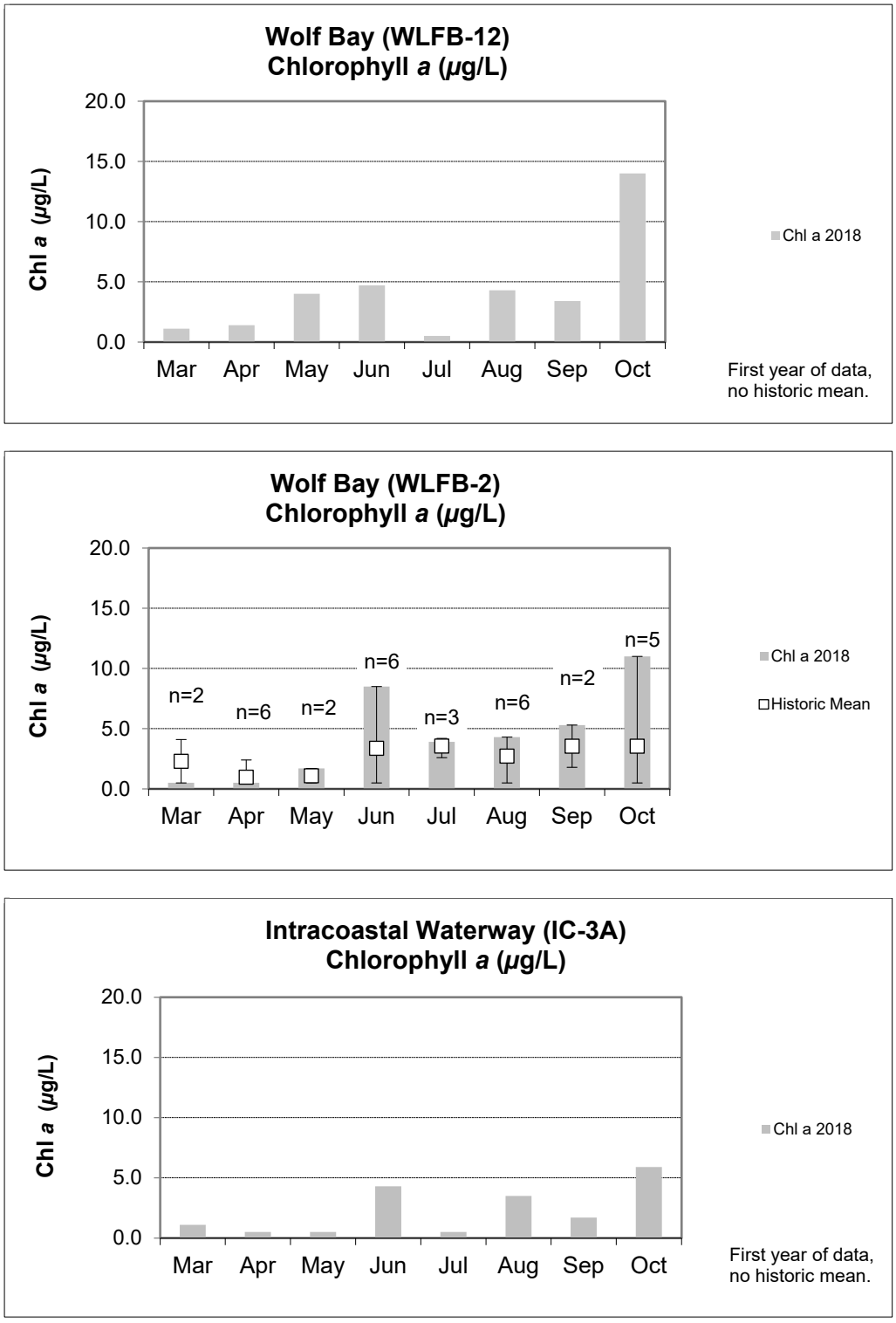

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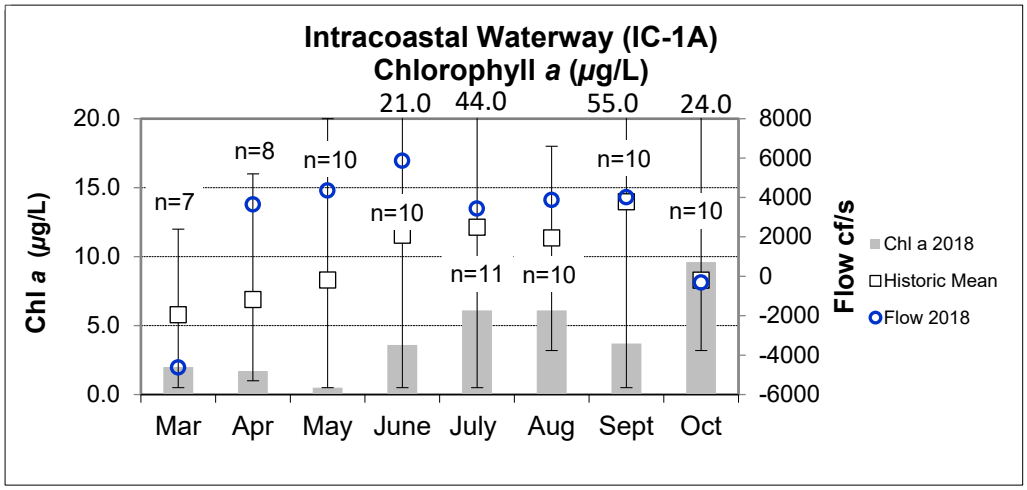

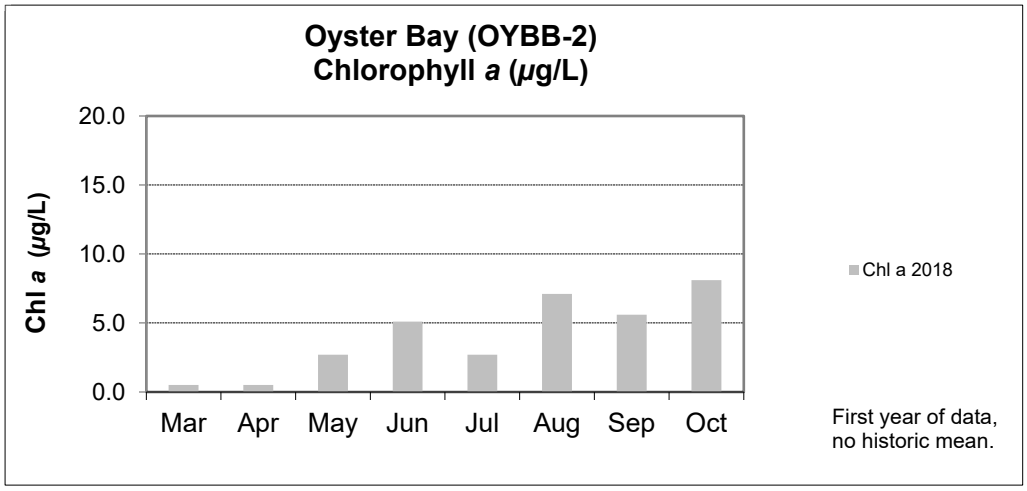

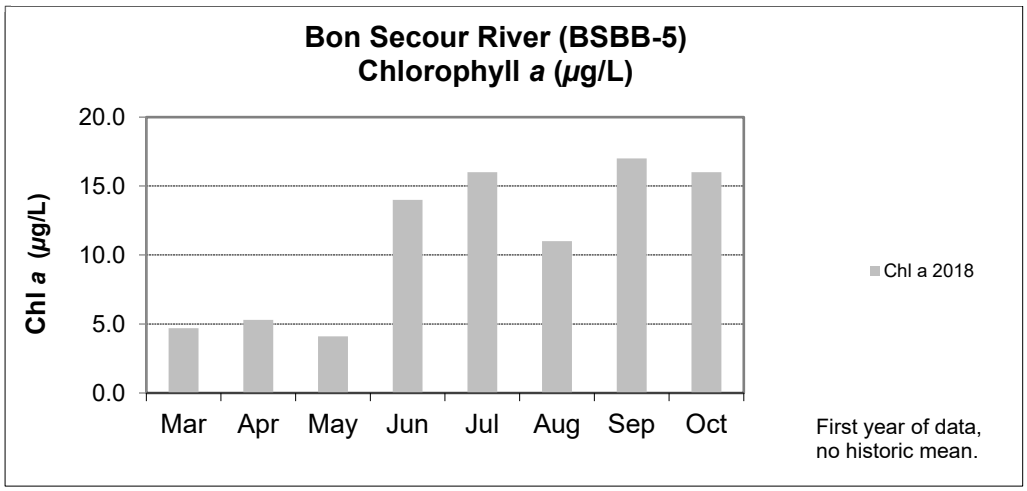

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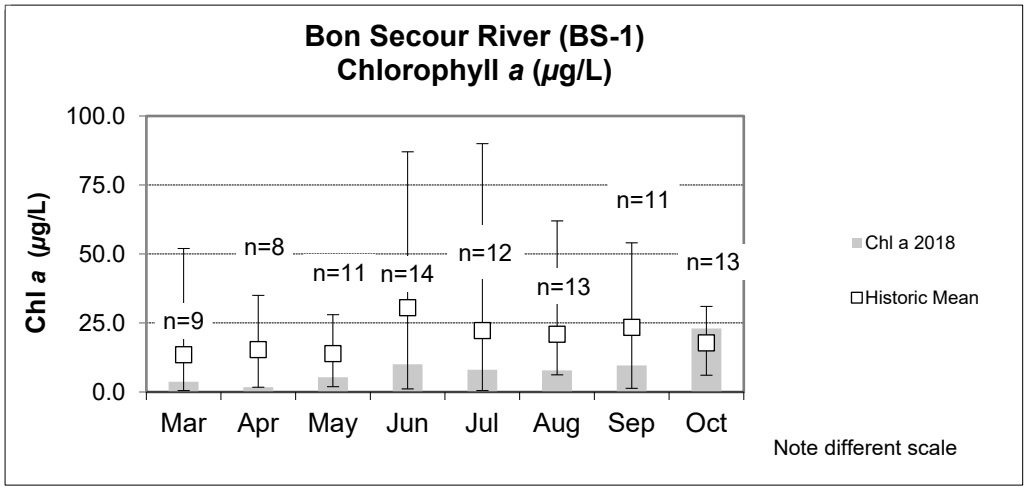

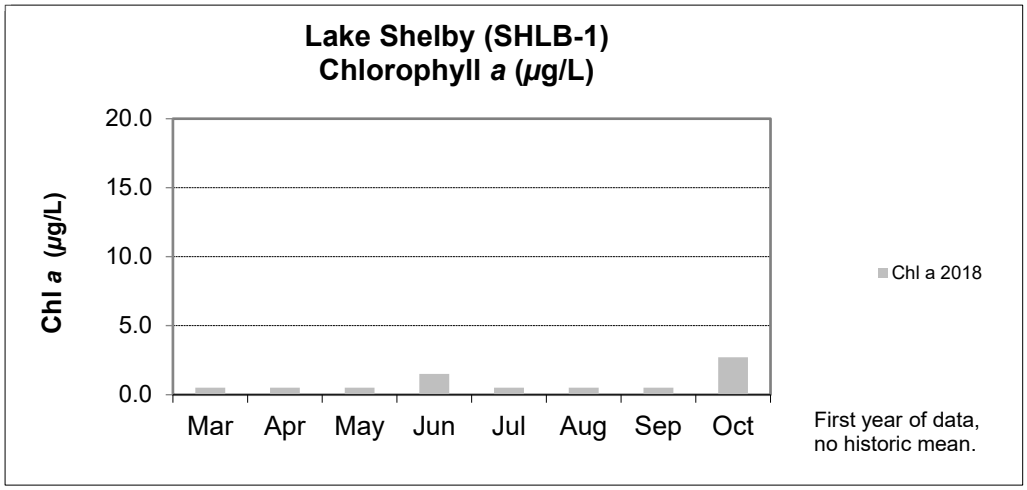

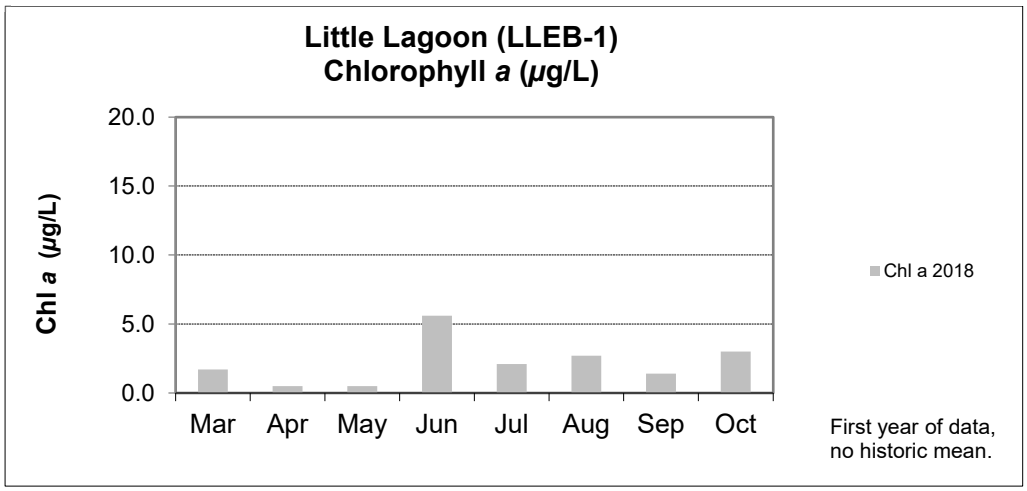

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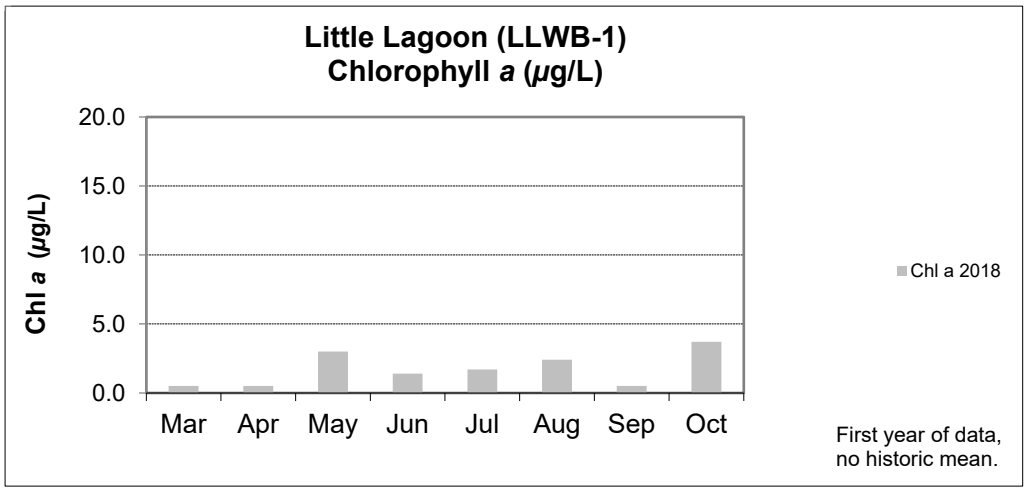
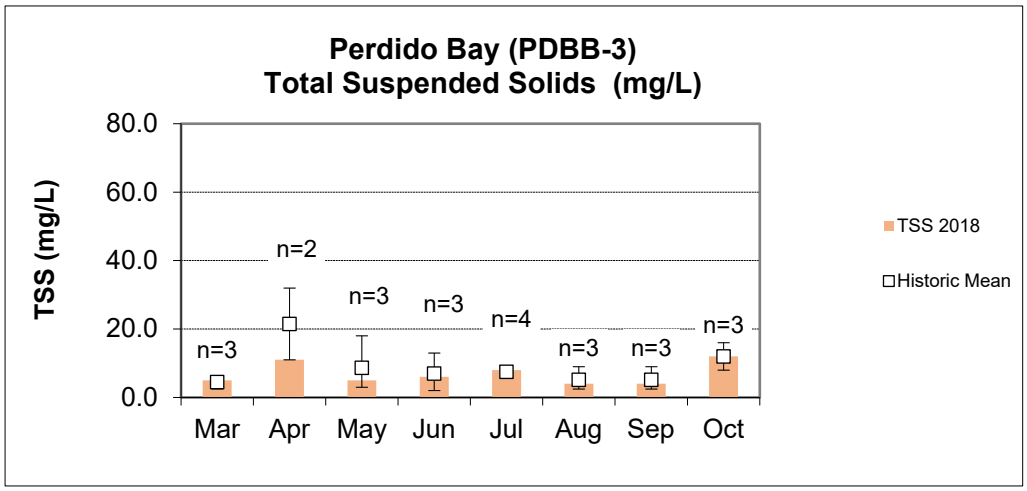
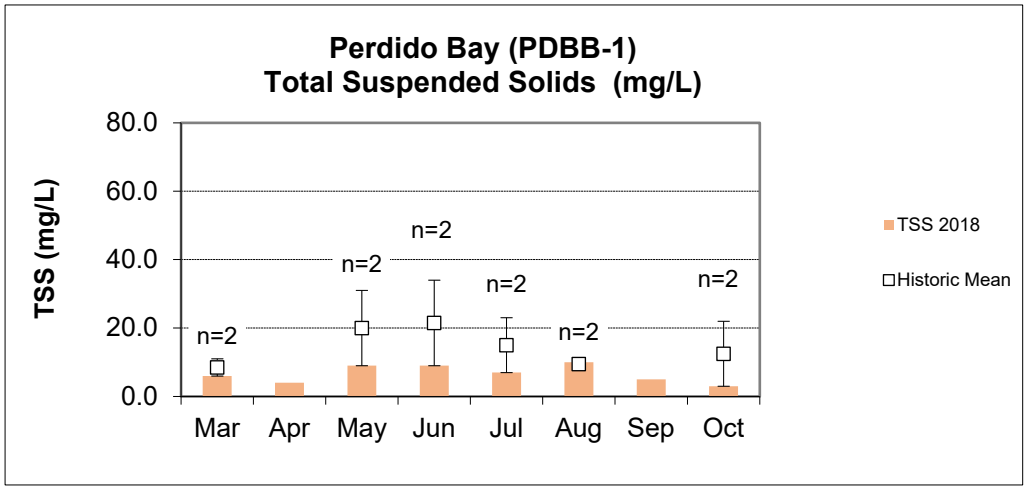


Figure 9. Monthly TSS concentrations measured in stations within the Perdido and Wolf Bay watersheds and their vicinity, March-October 2018. The historic mean (1990-2018) and min/max ranges are displayed for comparison. The "n" value equals the number of data points included in the monthly historic calculations. Instantaneous flows were measured during sample collection by ADEM at several stations and are depicted on respective graphs.





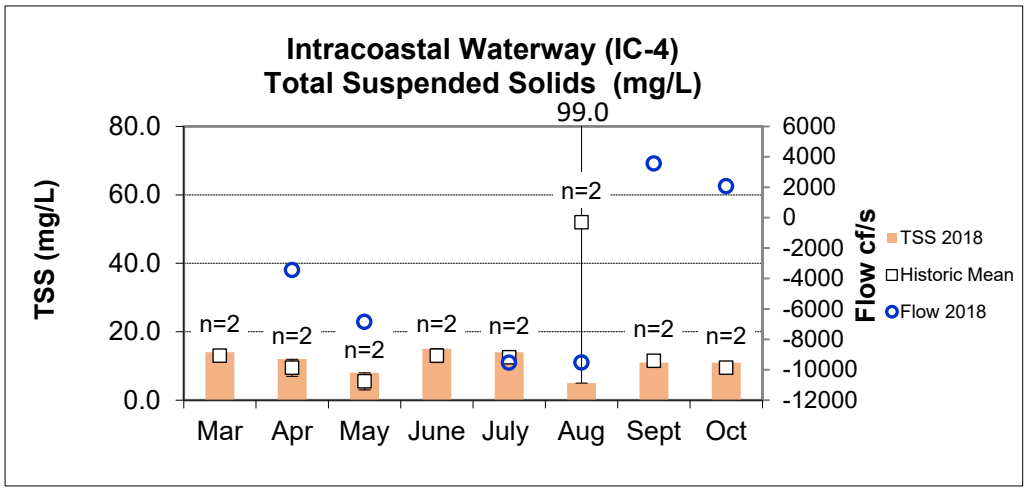
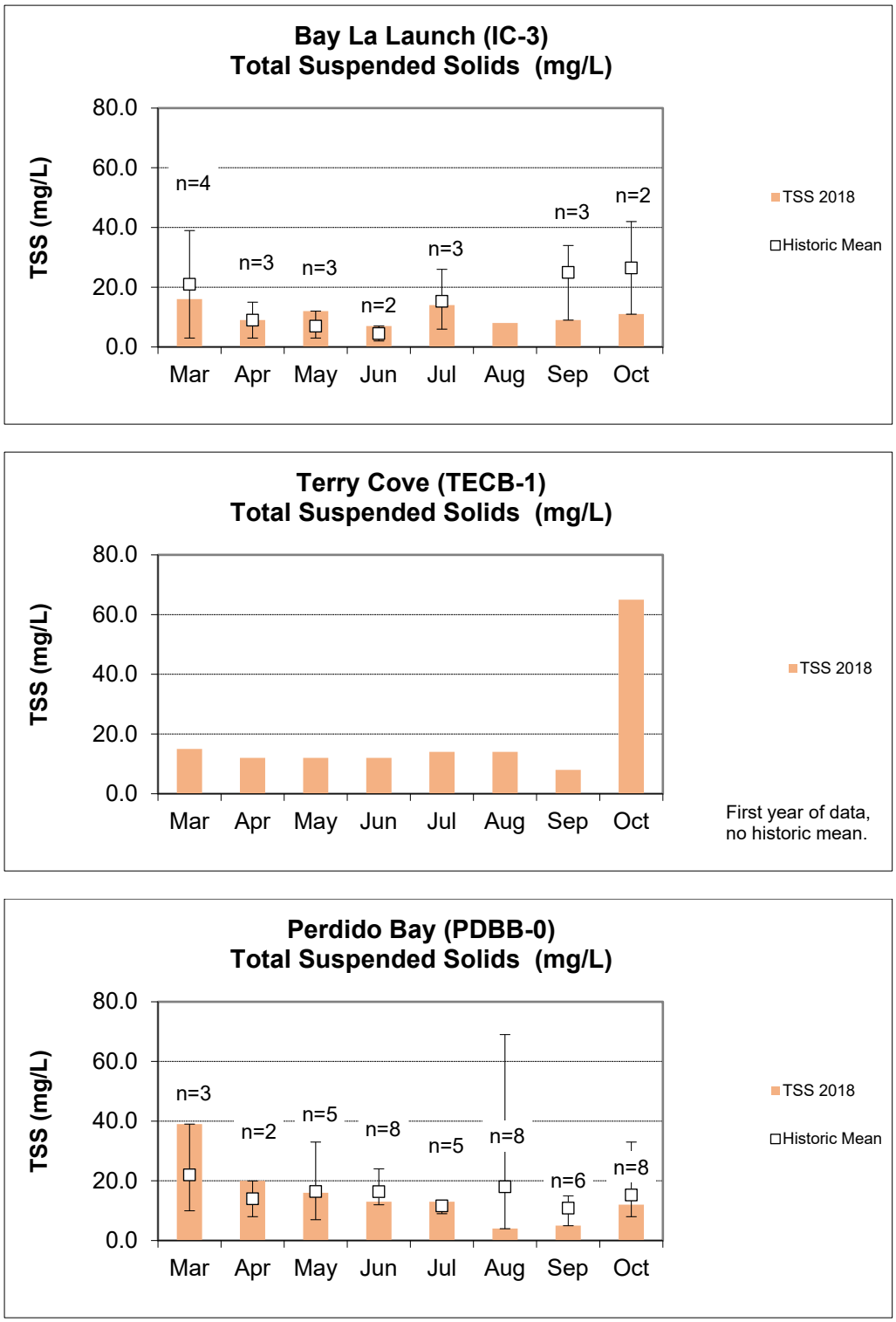


Figure 9. (continued)



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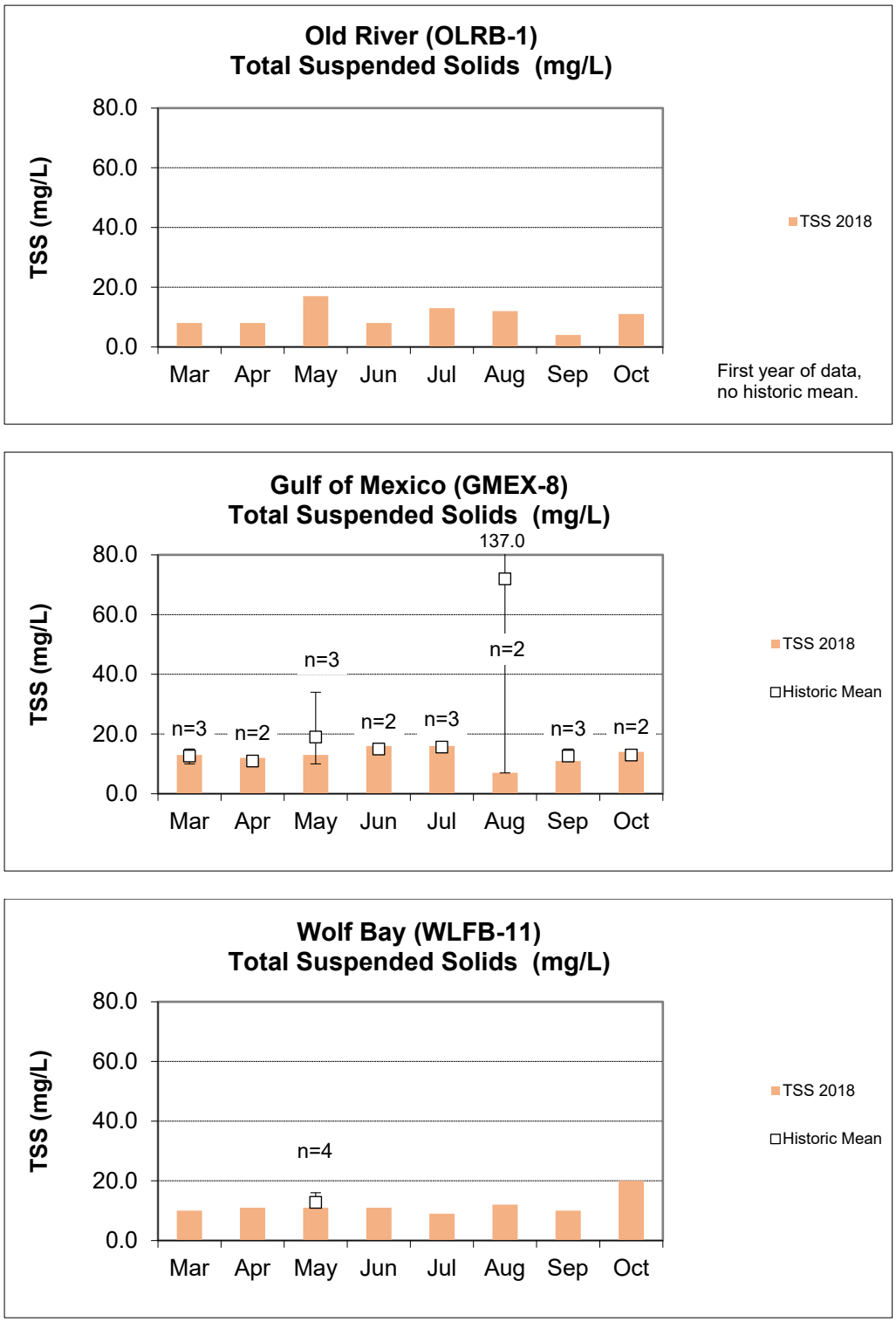

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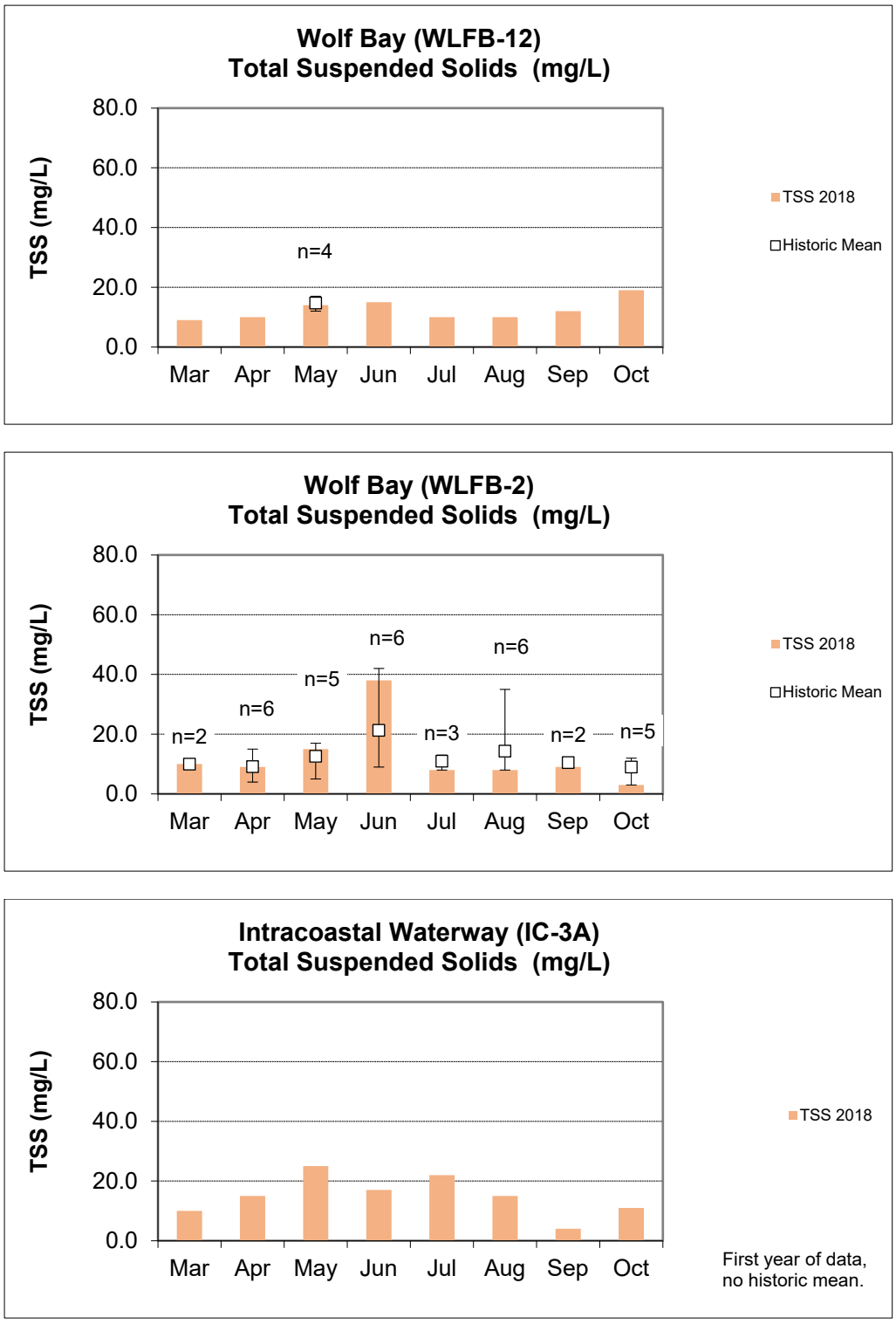

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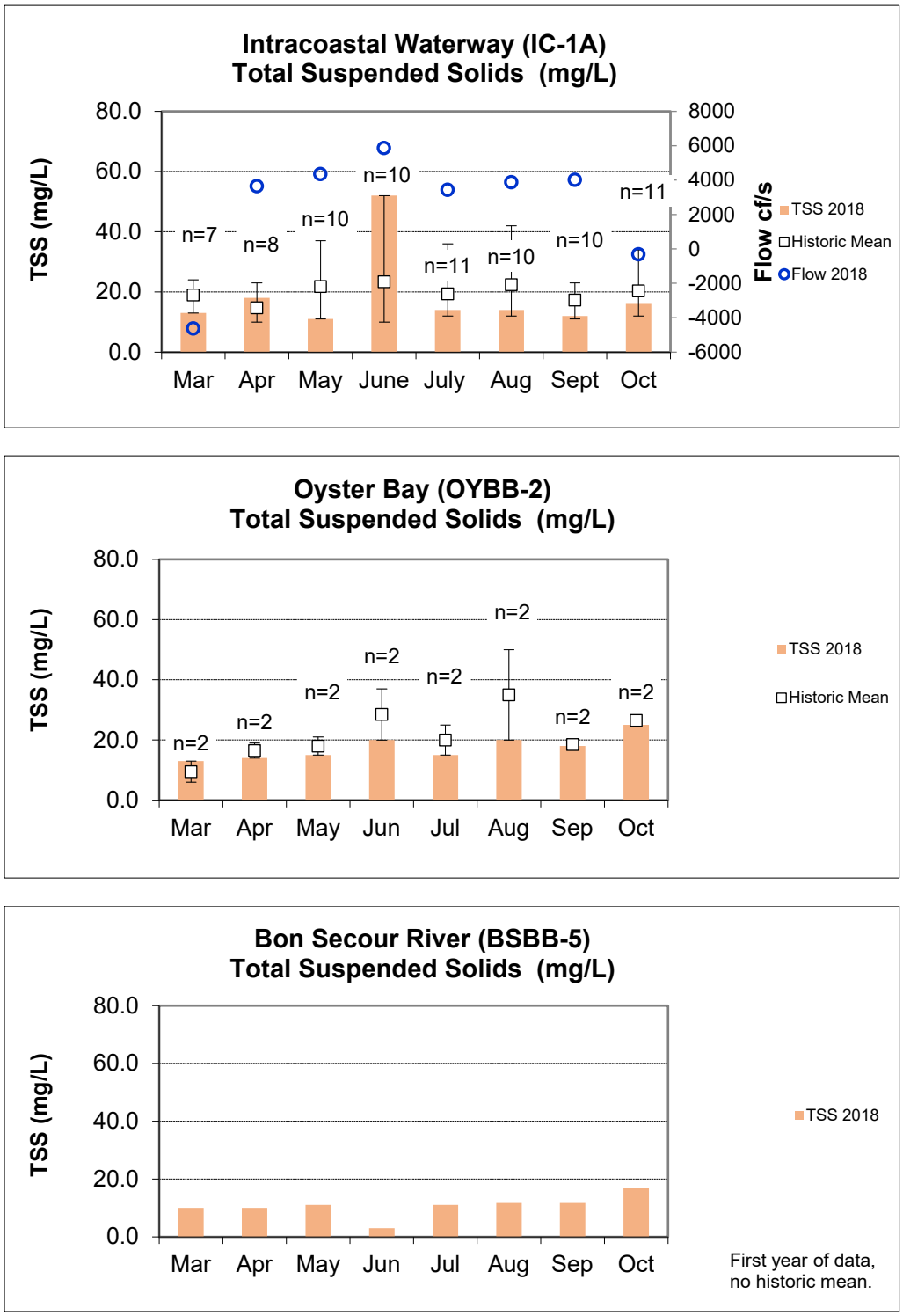

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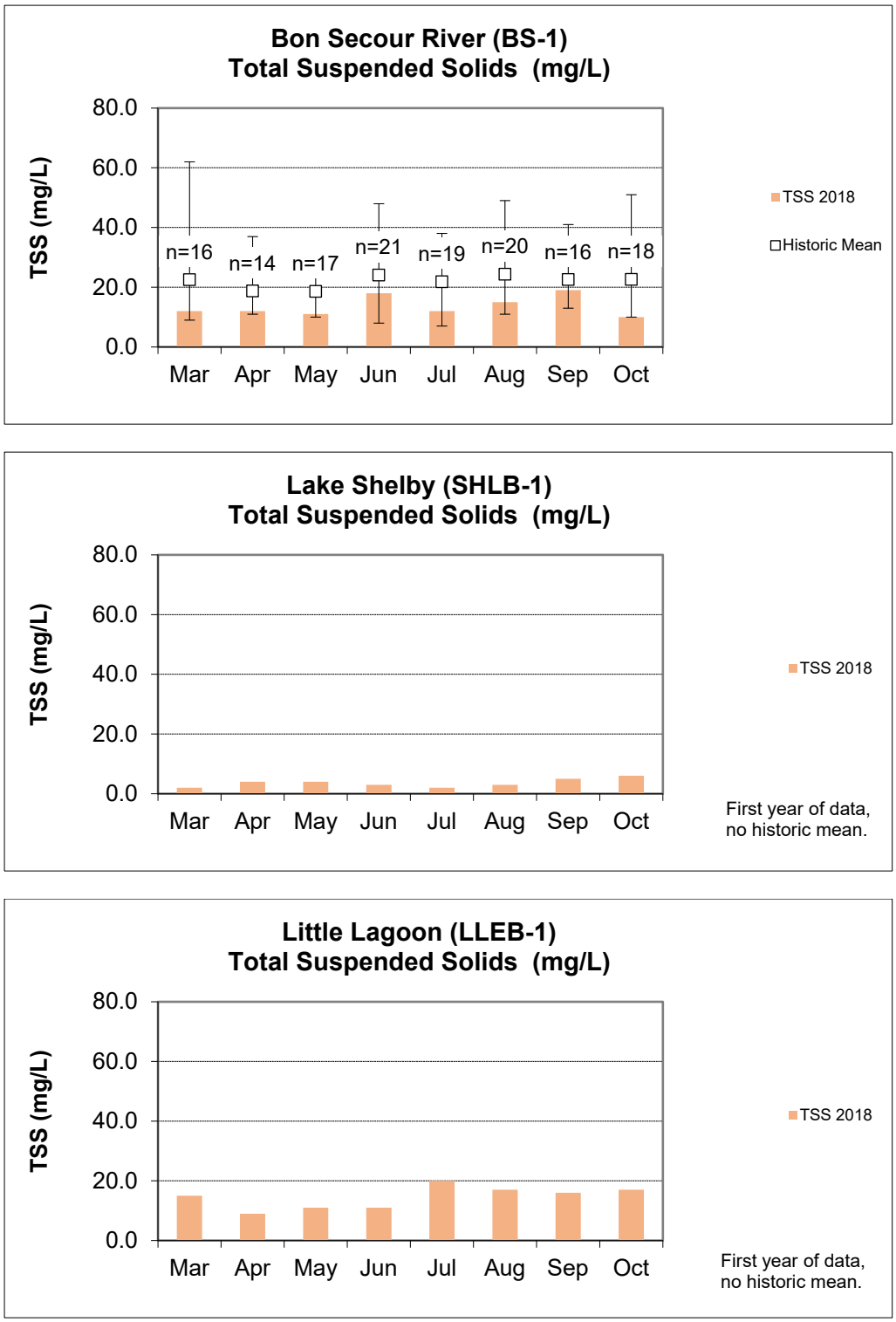

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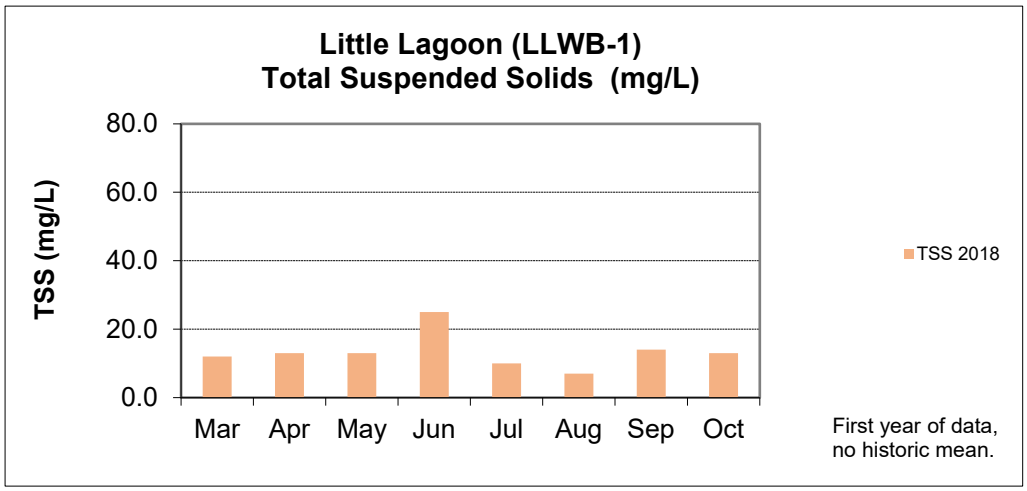
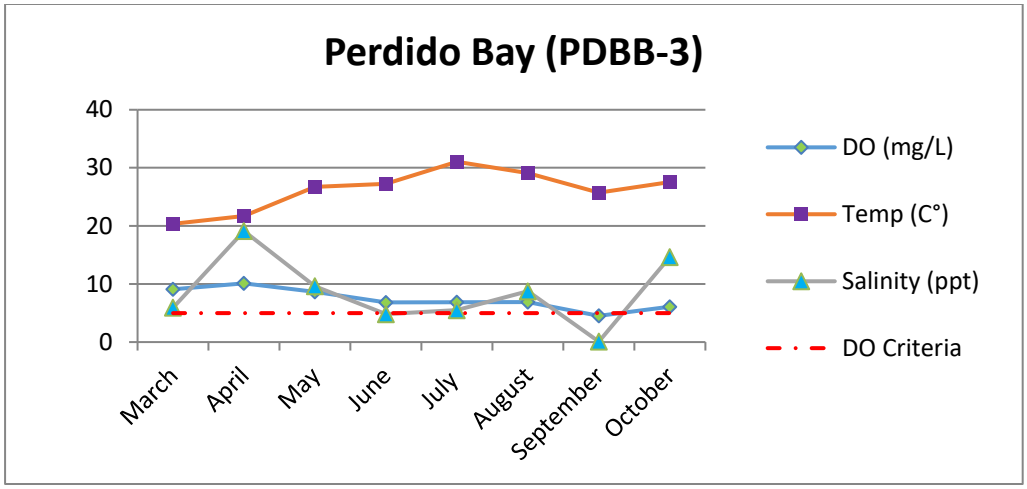
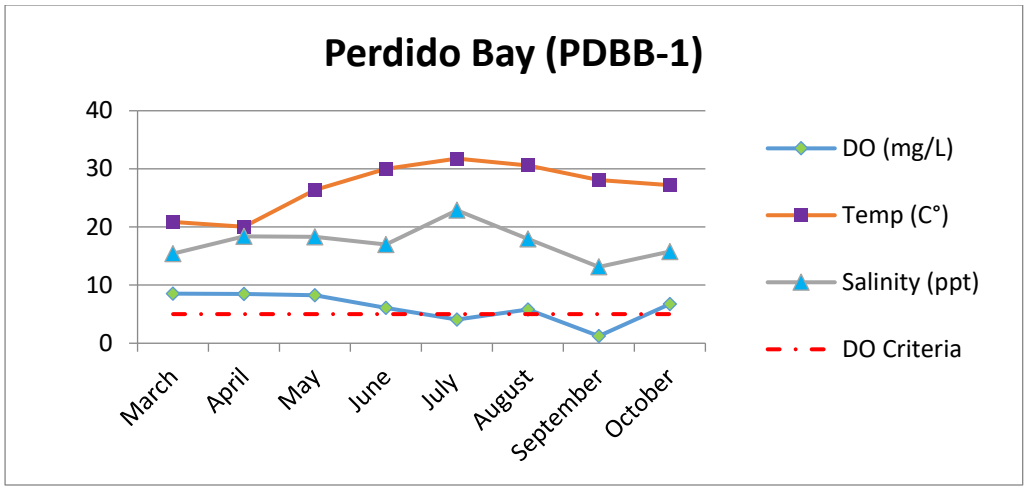


Figure 10. Monthly DO, temperature, and salinity concentrations at 1.5 m (5 ft), or mid-depth, for stations within the Perdido and Wolf Bay watersheds and their vicinity, March-October 2018. ADEM Water Quality Criteria requires a DO concentration of 5.0 mg/L at this depth (ADEM 2012). Instantaneous flows were measured during sample collection by ADEM at several stations and are depicted on respective graphs.





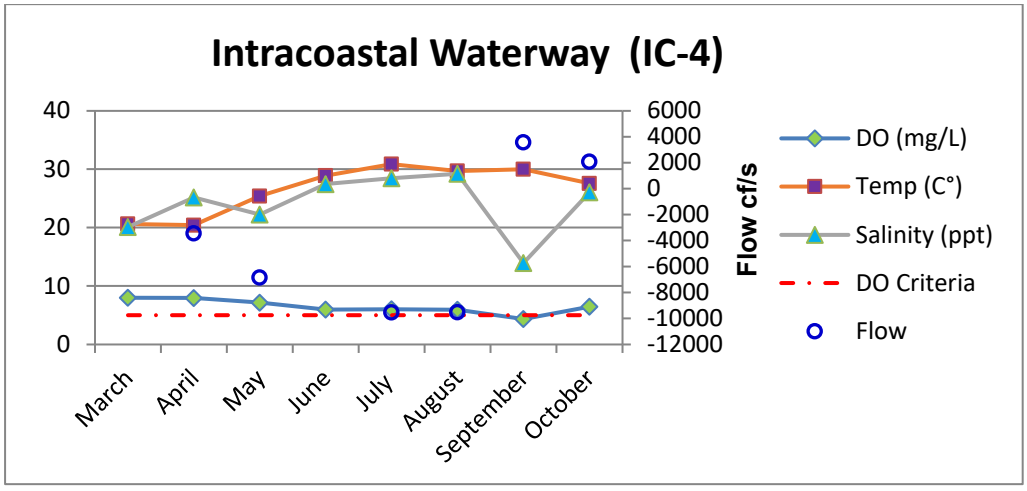


Figure 10. (continued)

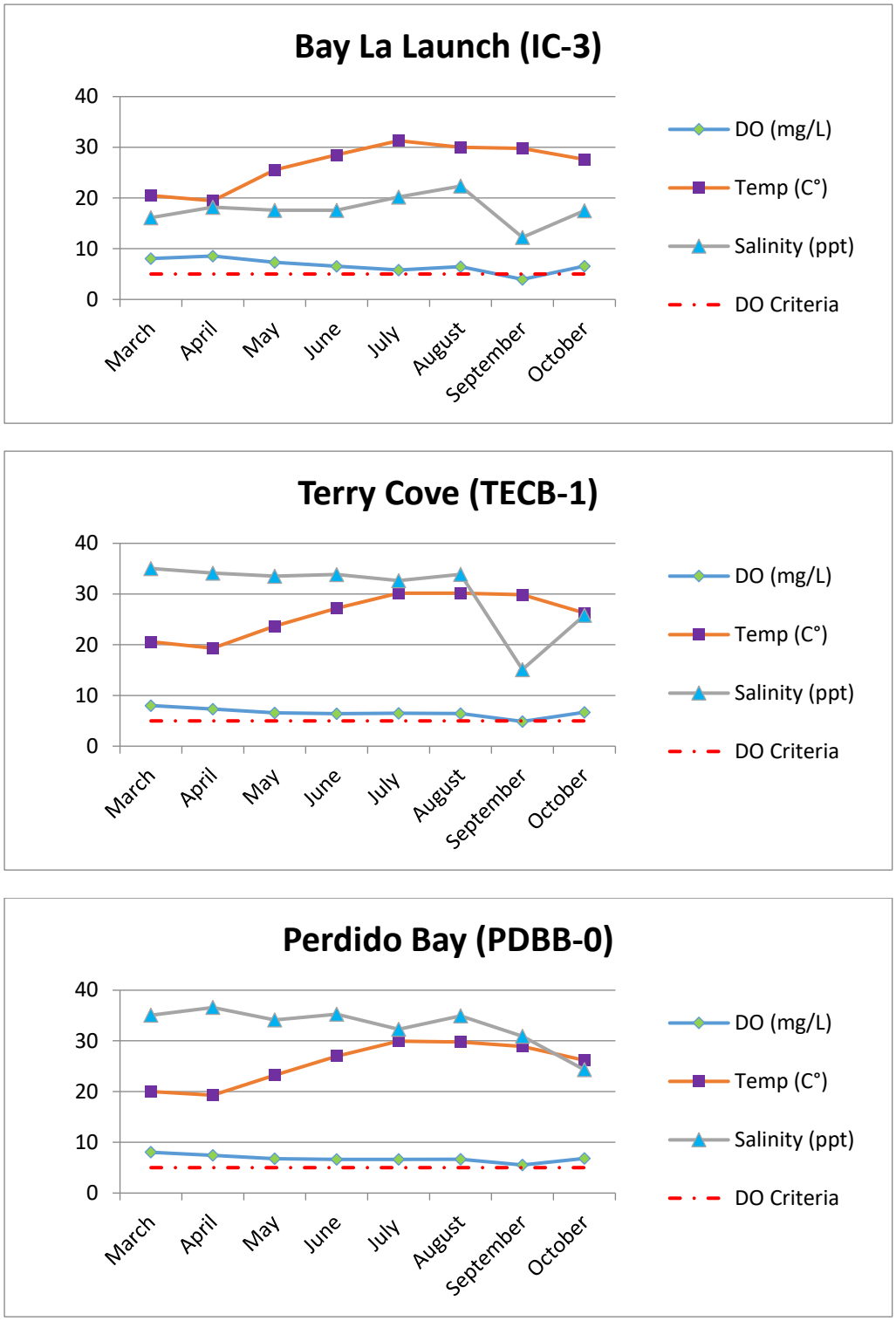


Figure 10. (continued)

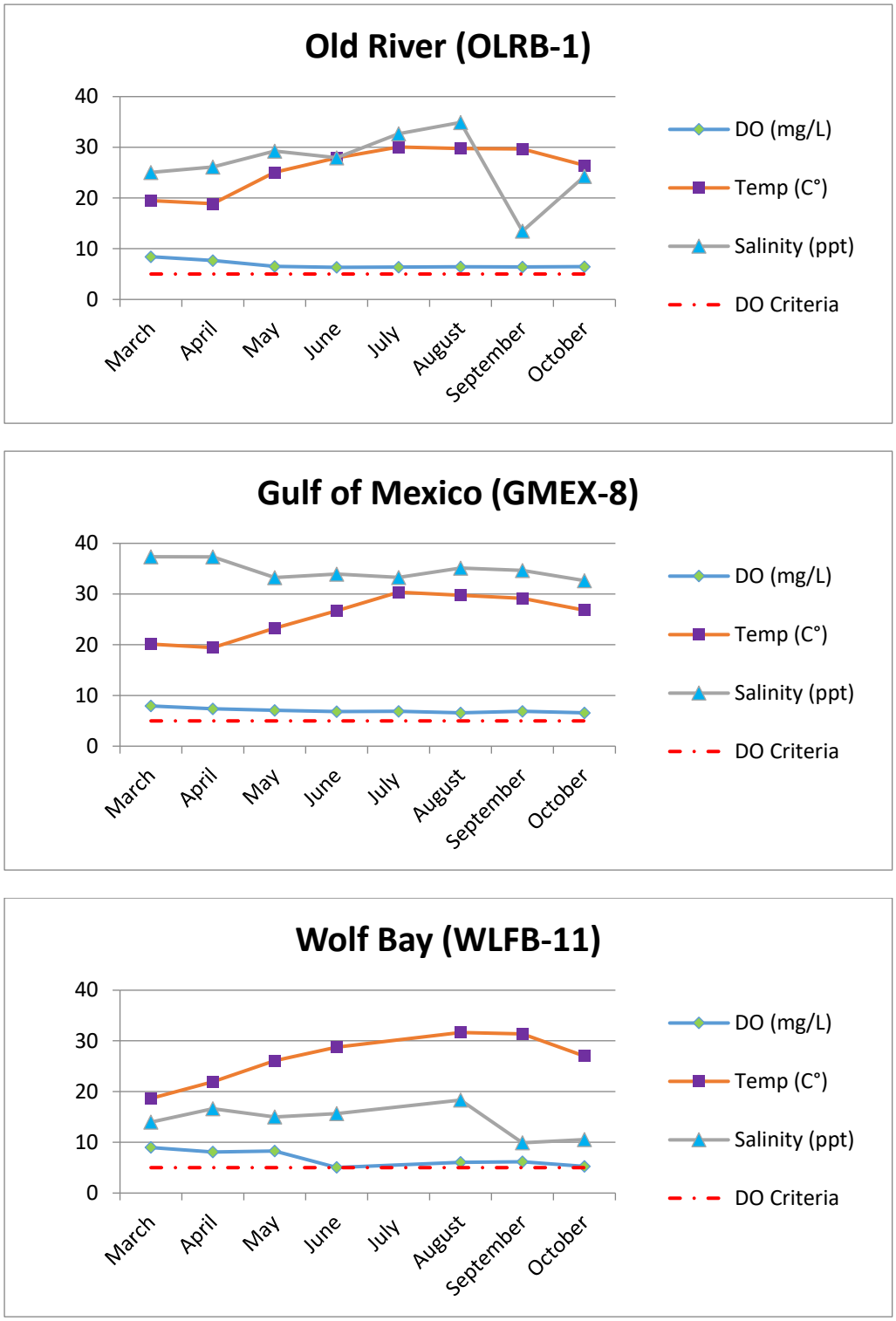


Figure 10. (continued)

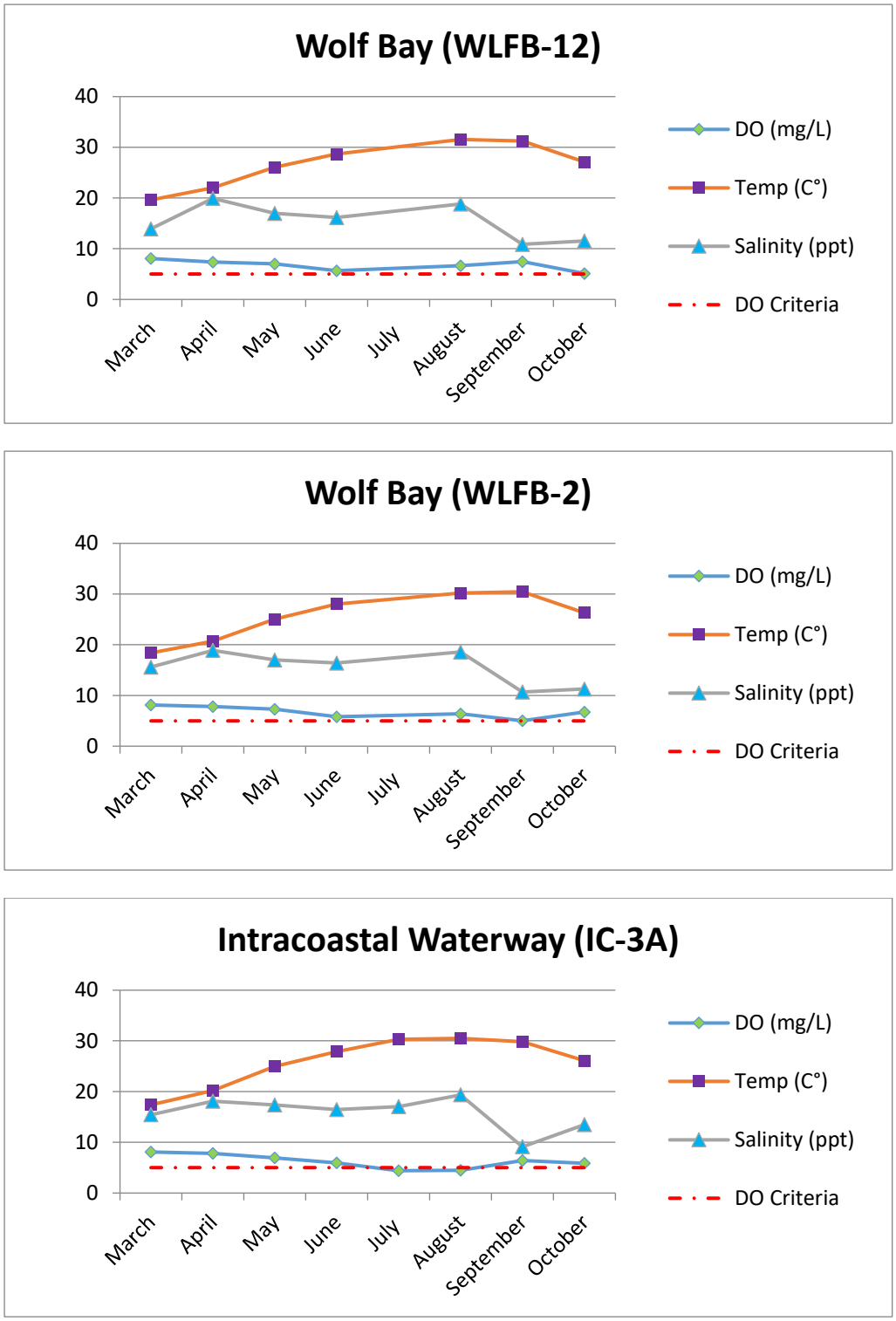


Figure 10. (continued)

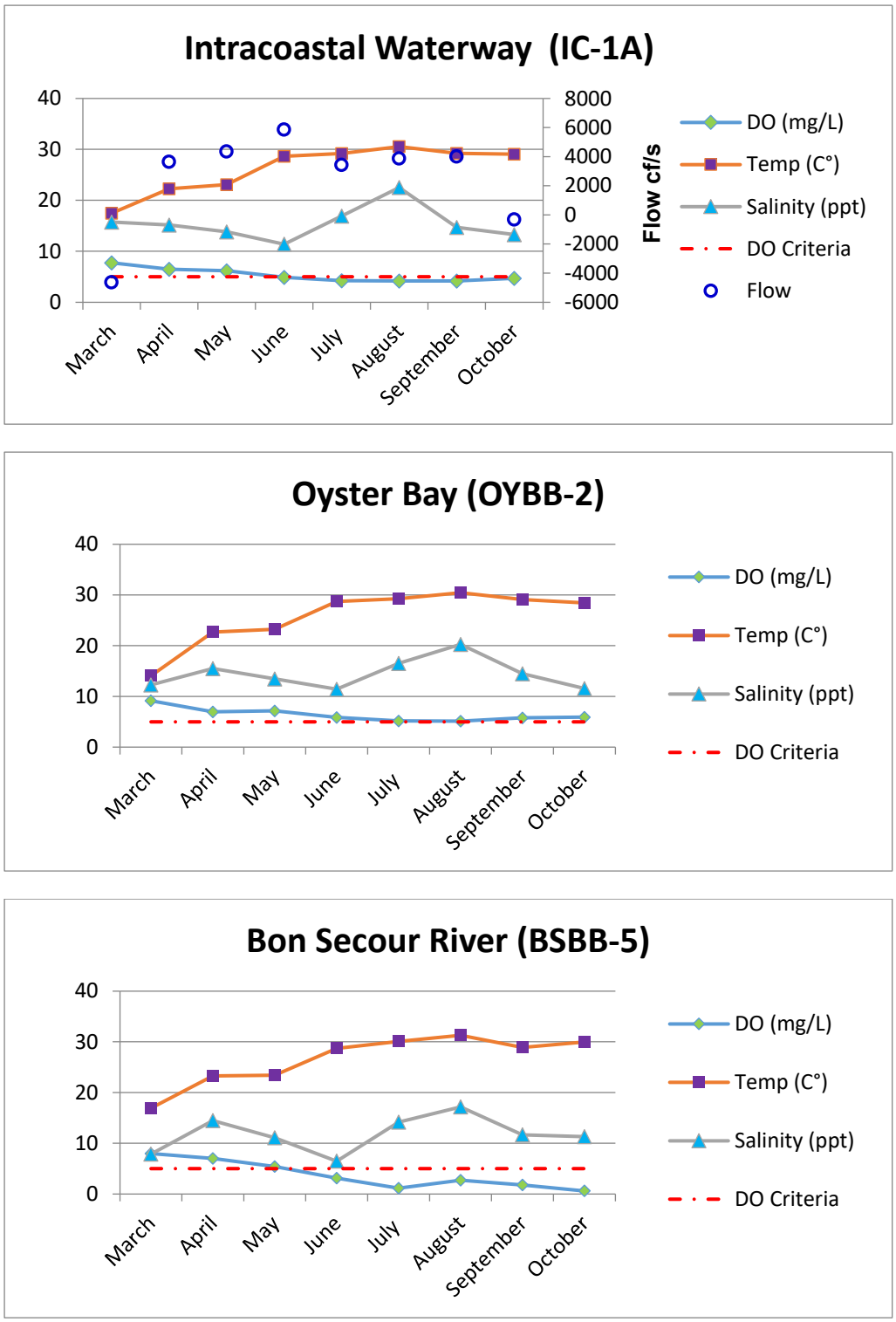


Figure 10. (continued)

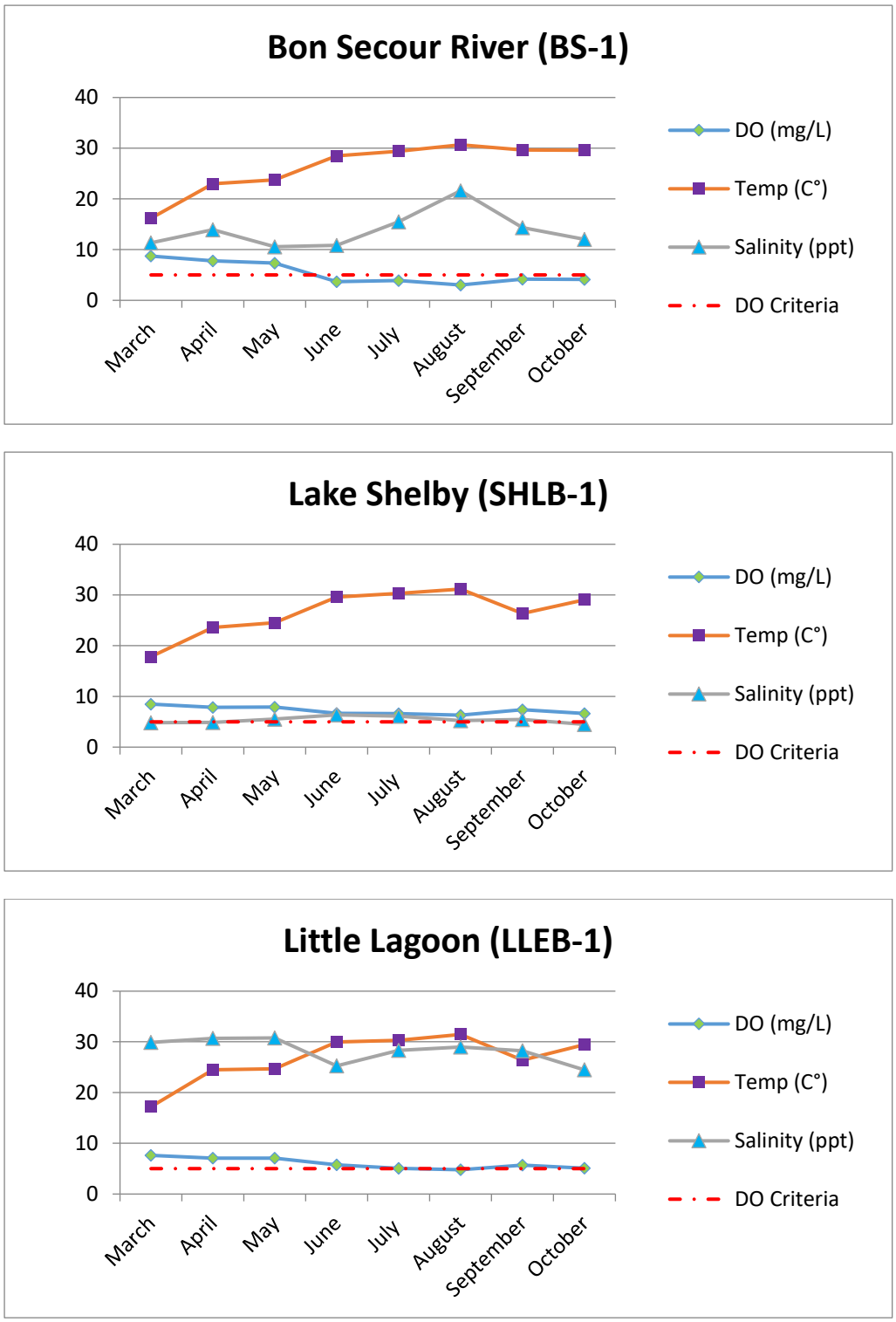


Figure 10. (continued)

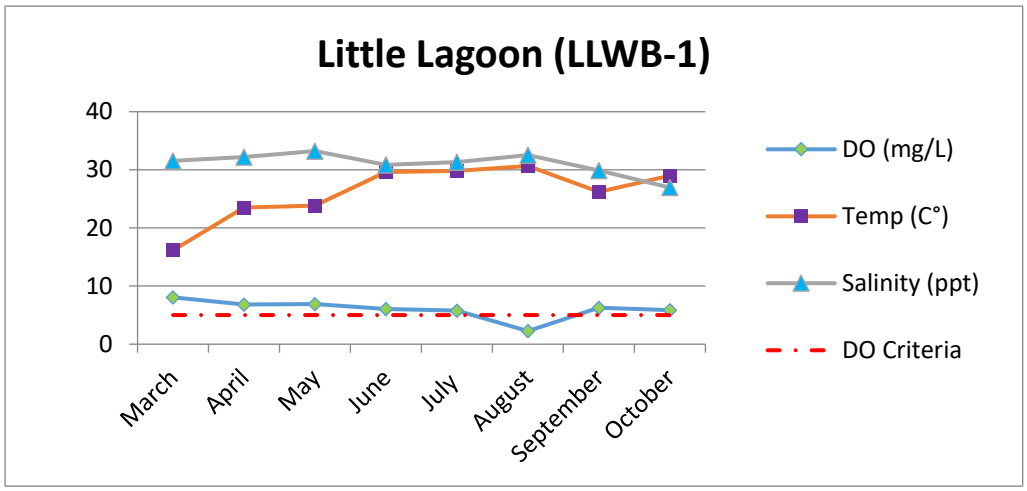


Figure 11. Monthly depth profiles of dissolved oxygen, temperature, and salinity for stations within the Perdido and Wolf Bay watersheds and their vicinity, March-October 2018.

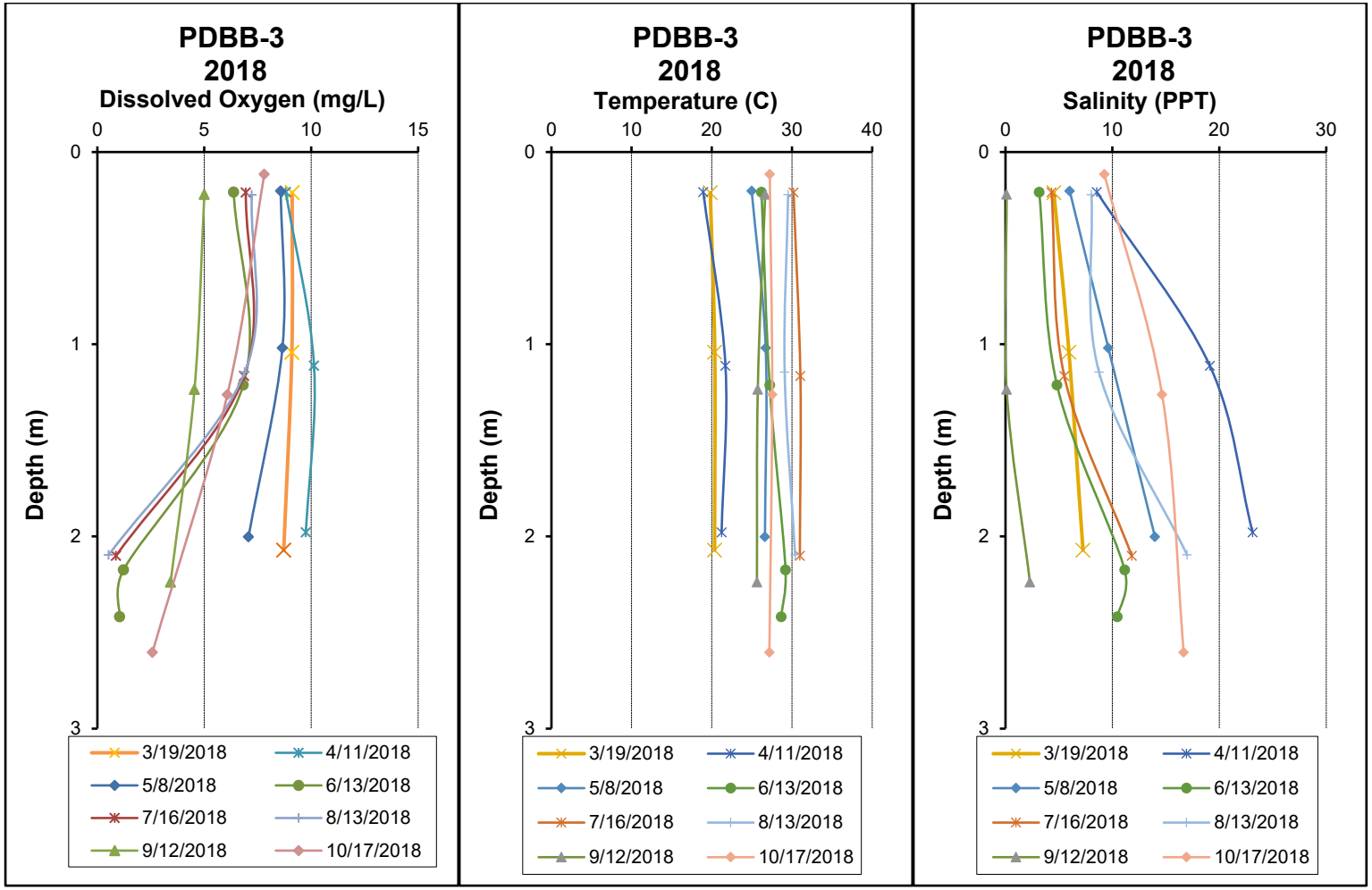


Figure 11. (continued)

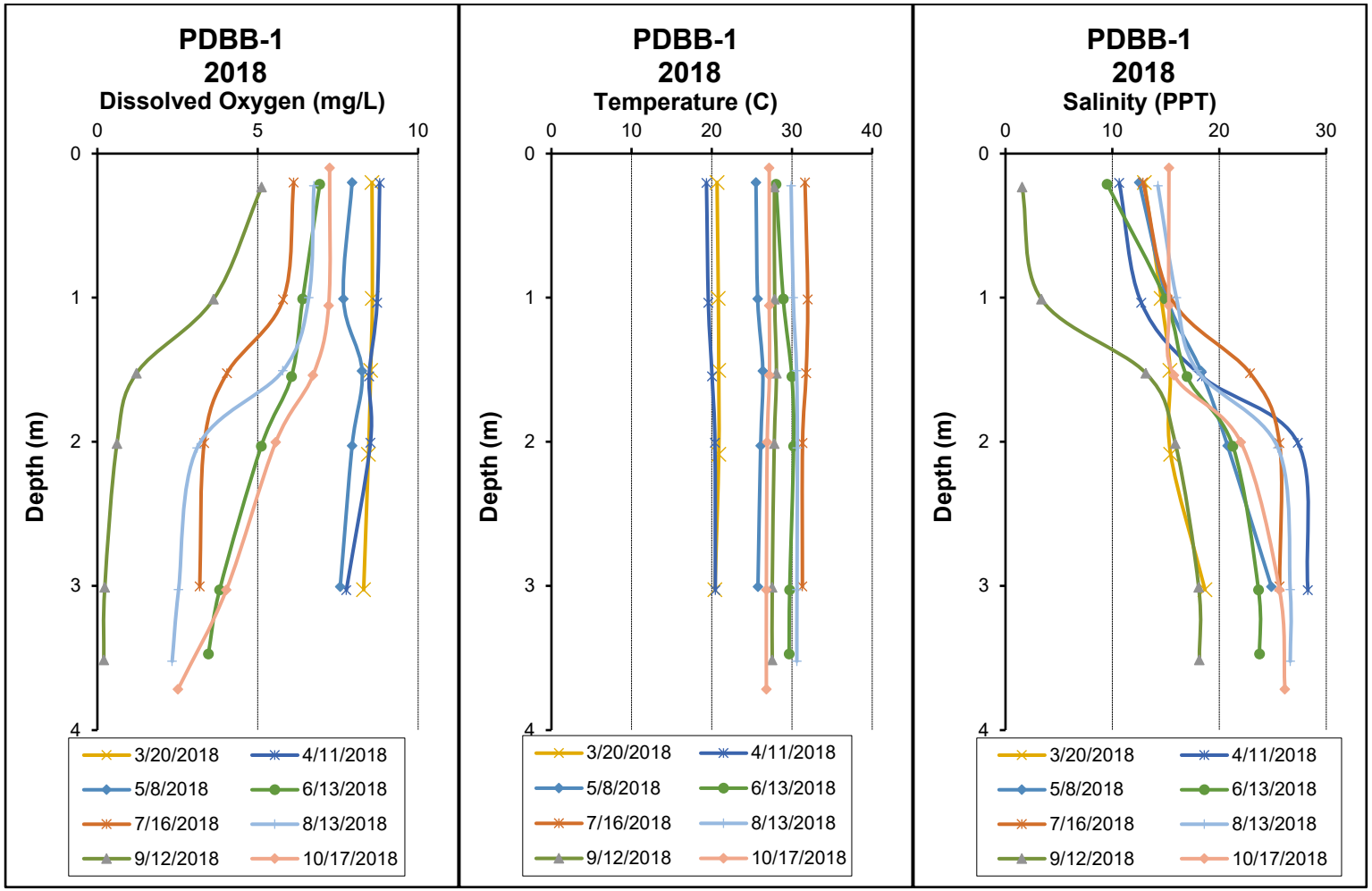


Figure 11. (continued)

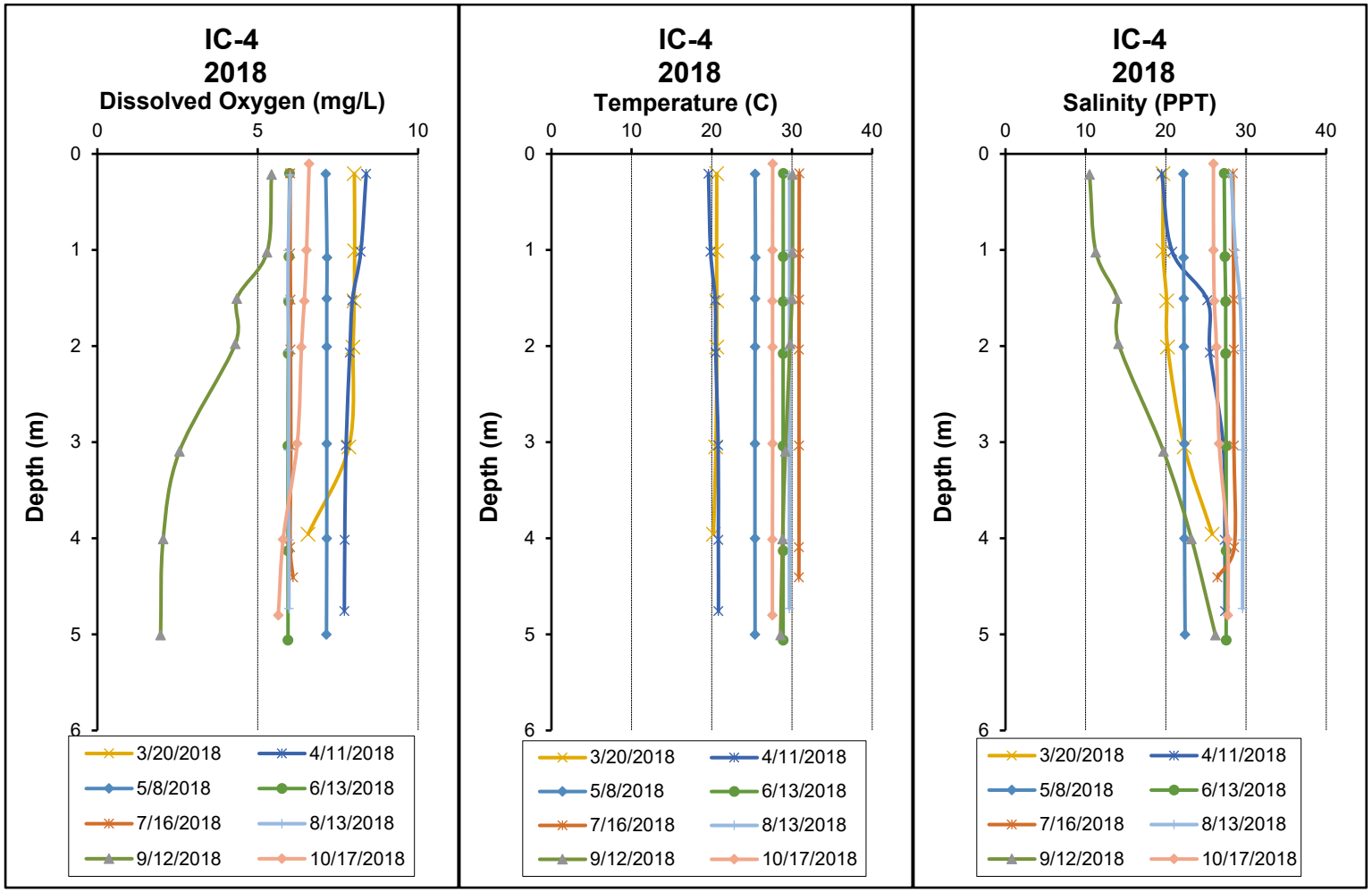


Figure 11. (continued)

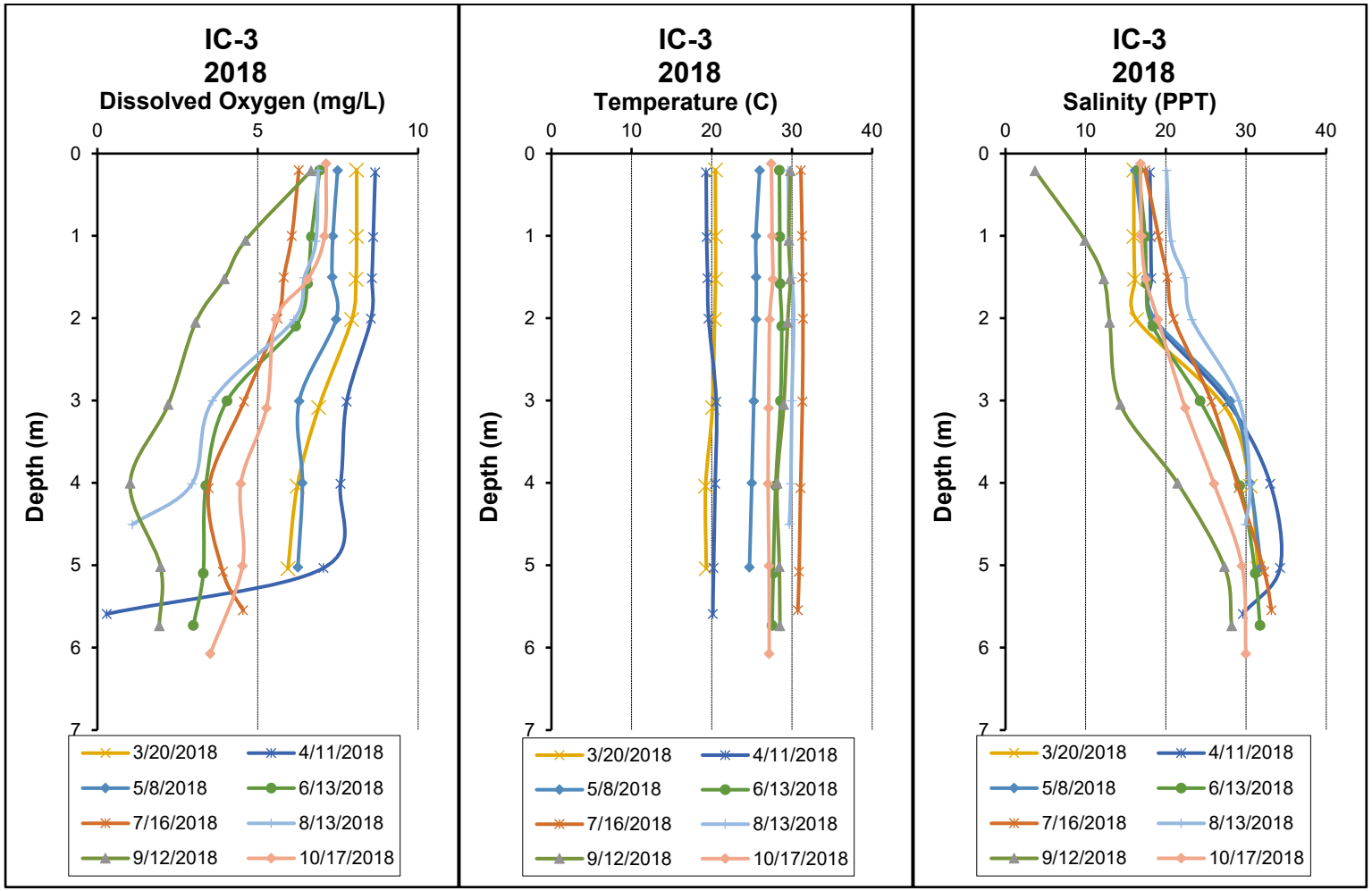


Figure 11. (continued)

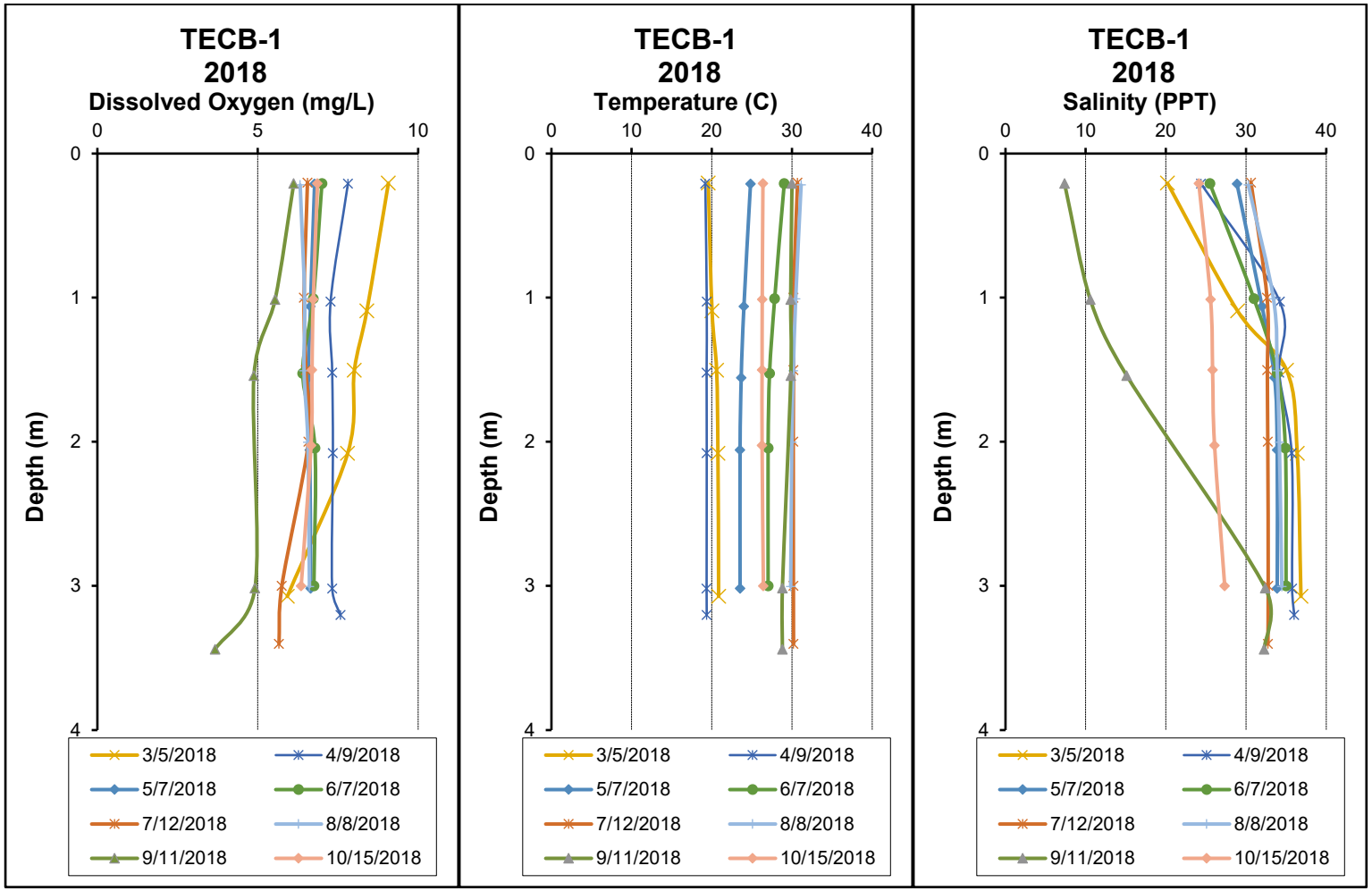


Figure 11. (continued)

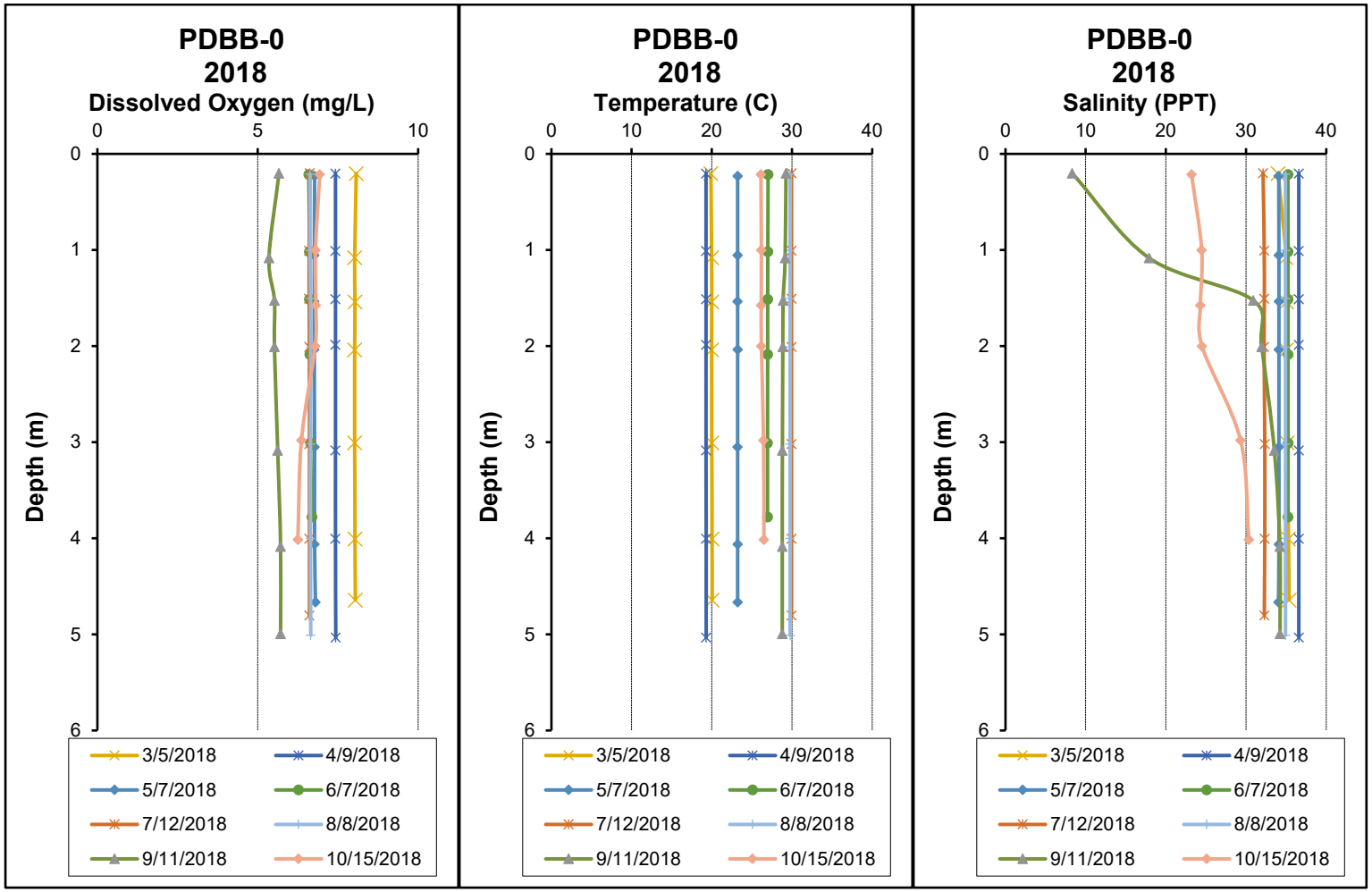
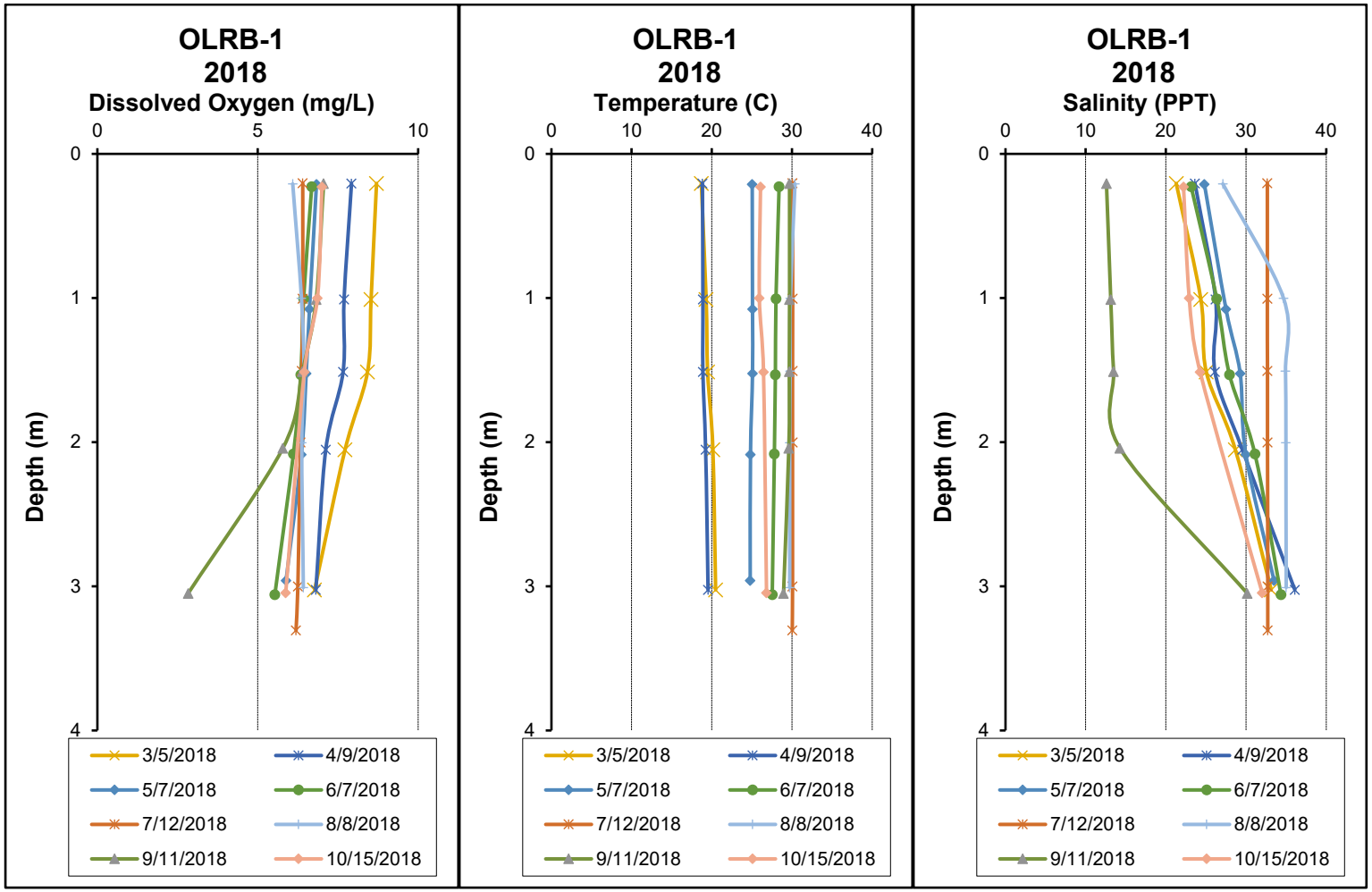


Figure 11. (continued)



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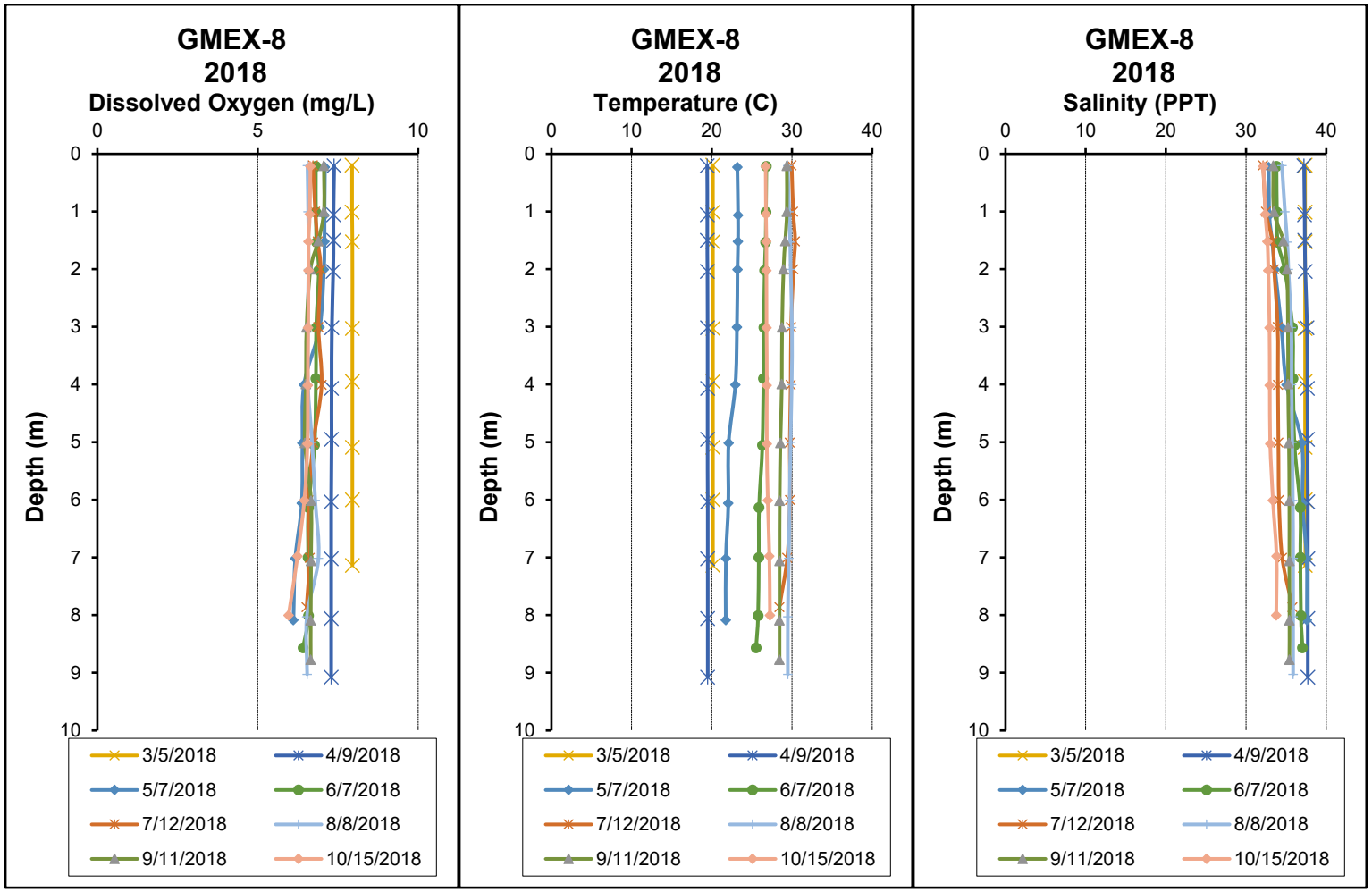
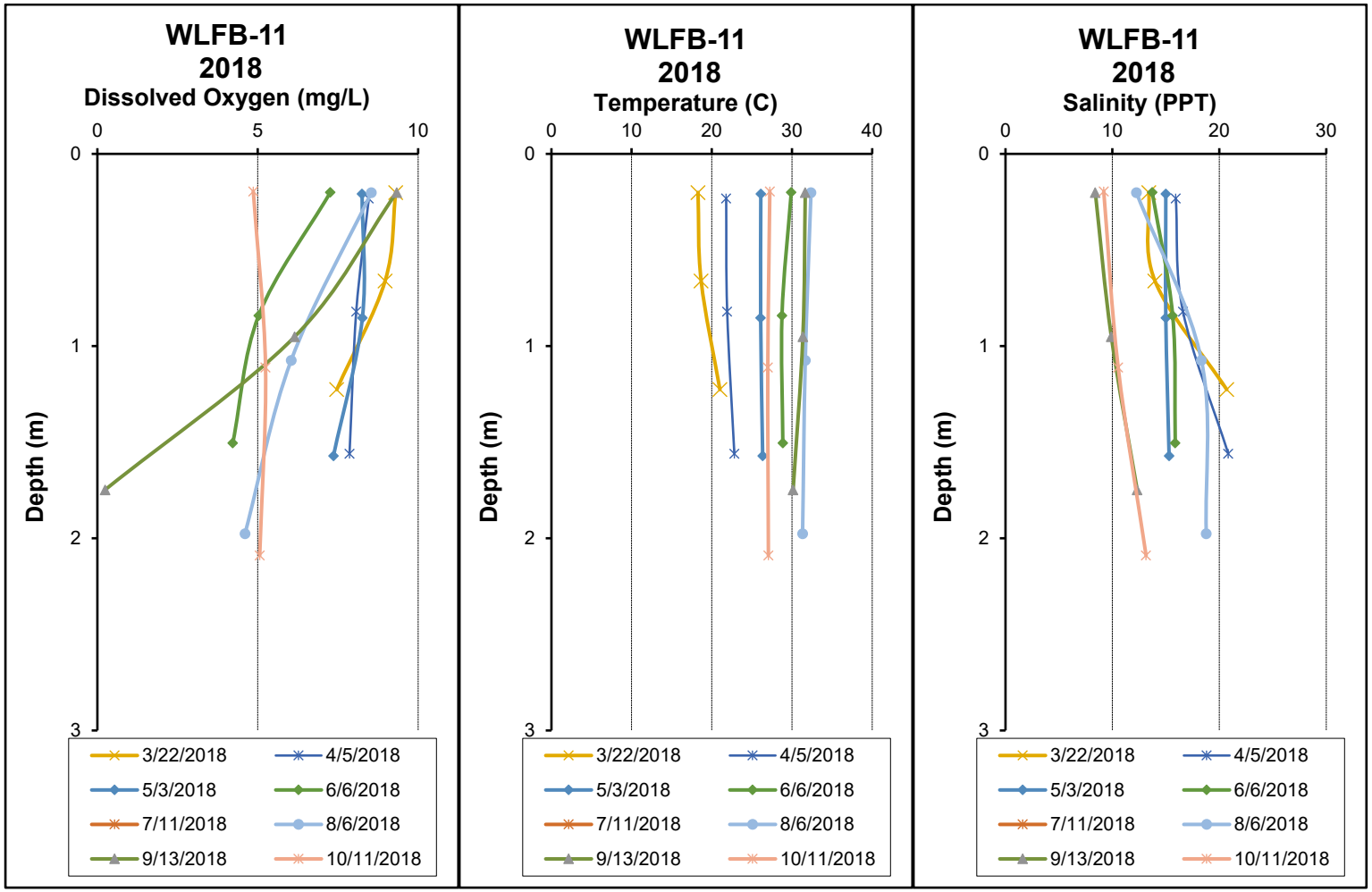


Figure 11. (continued)



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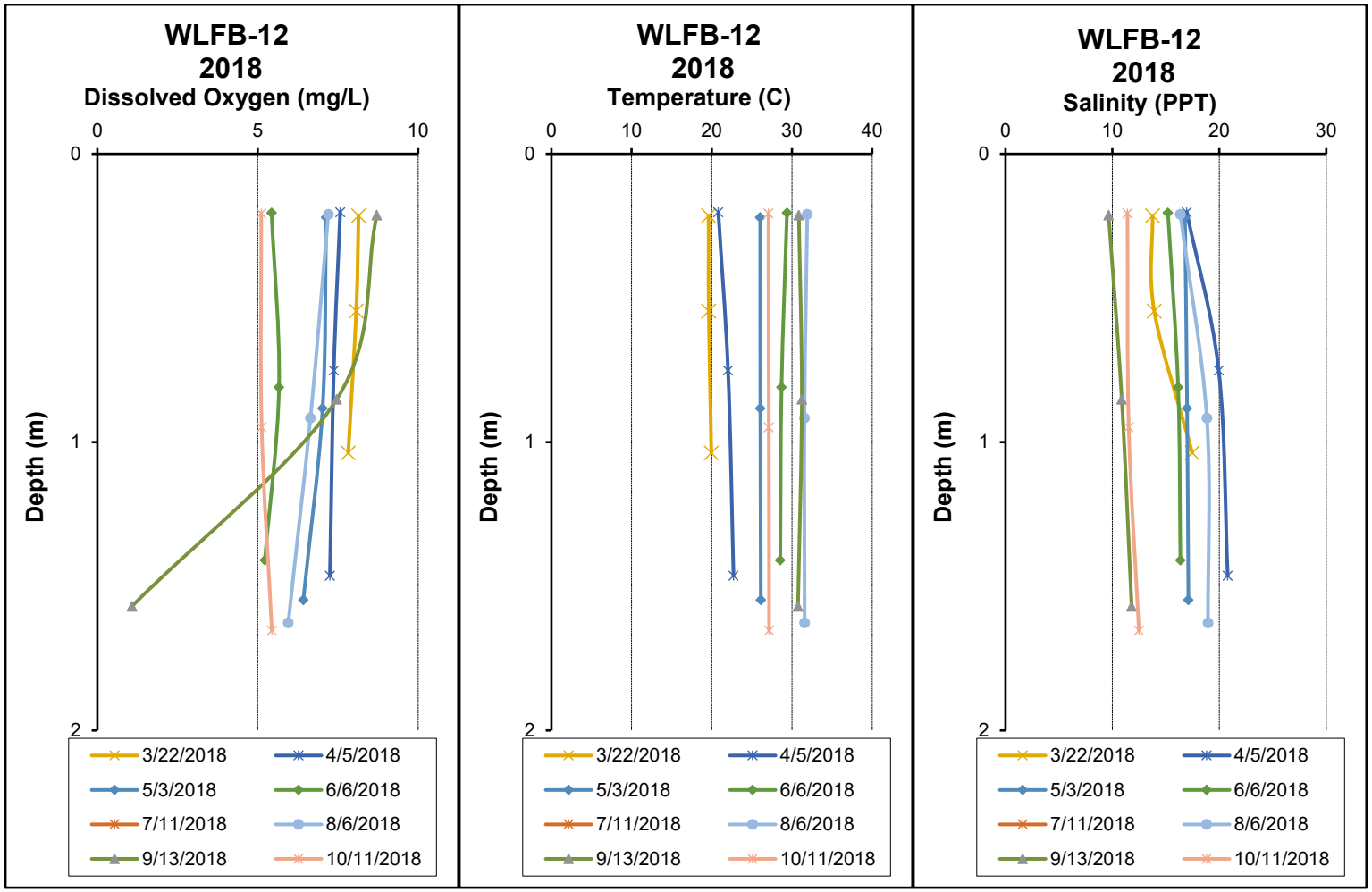

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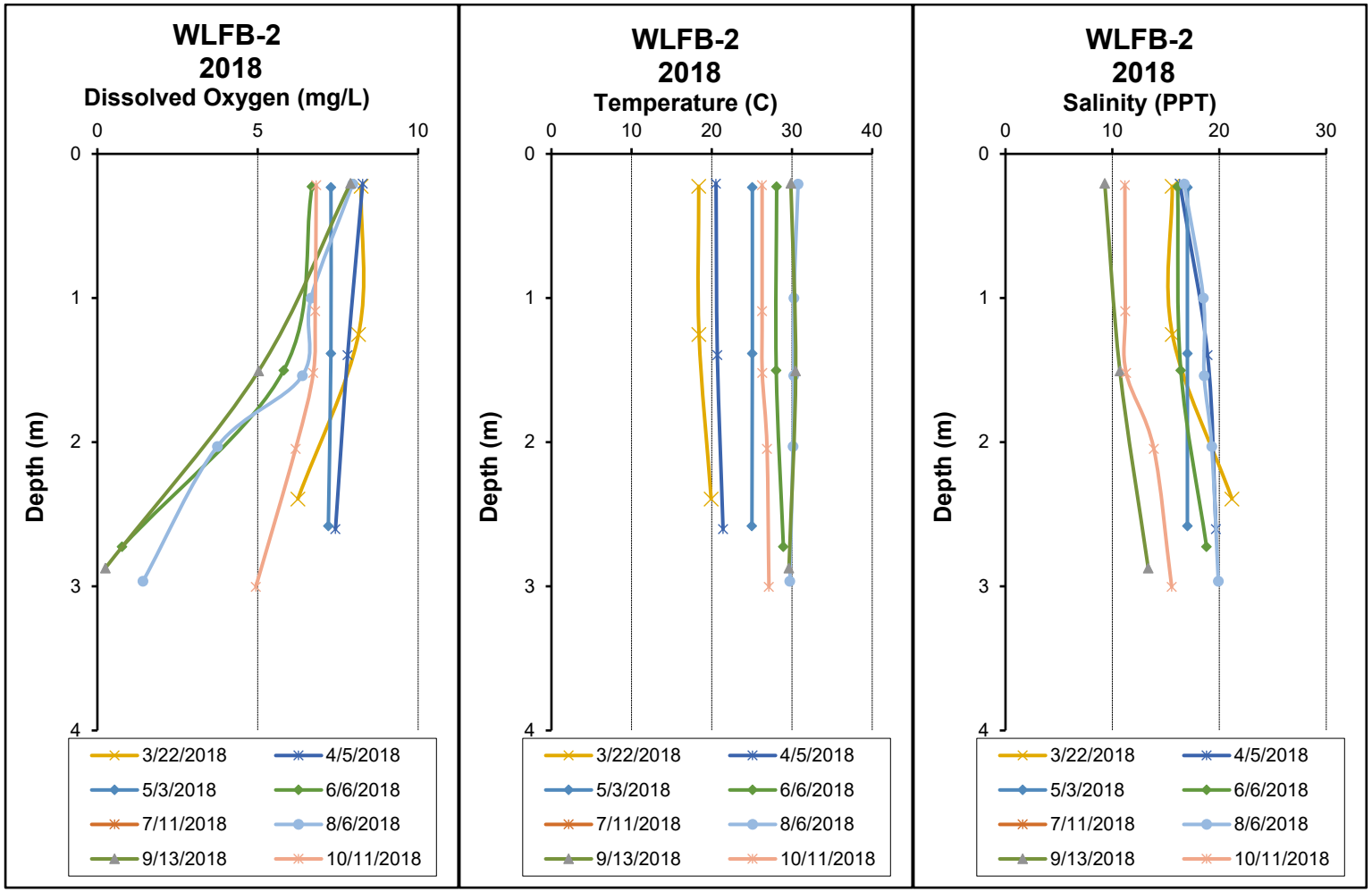


Figure 11. (continued)

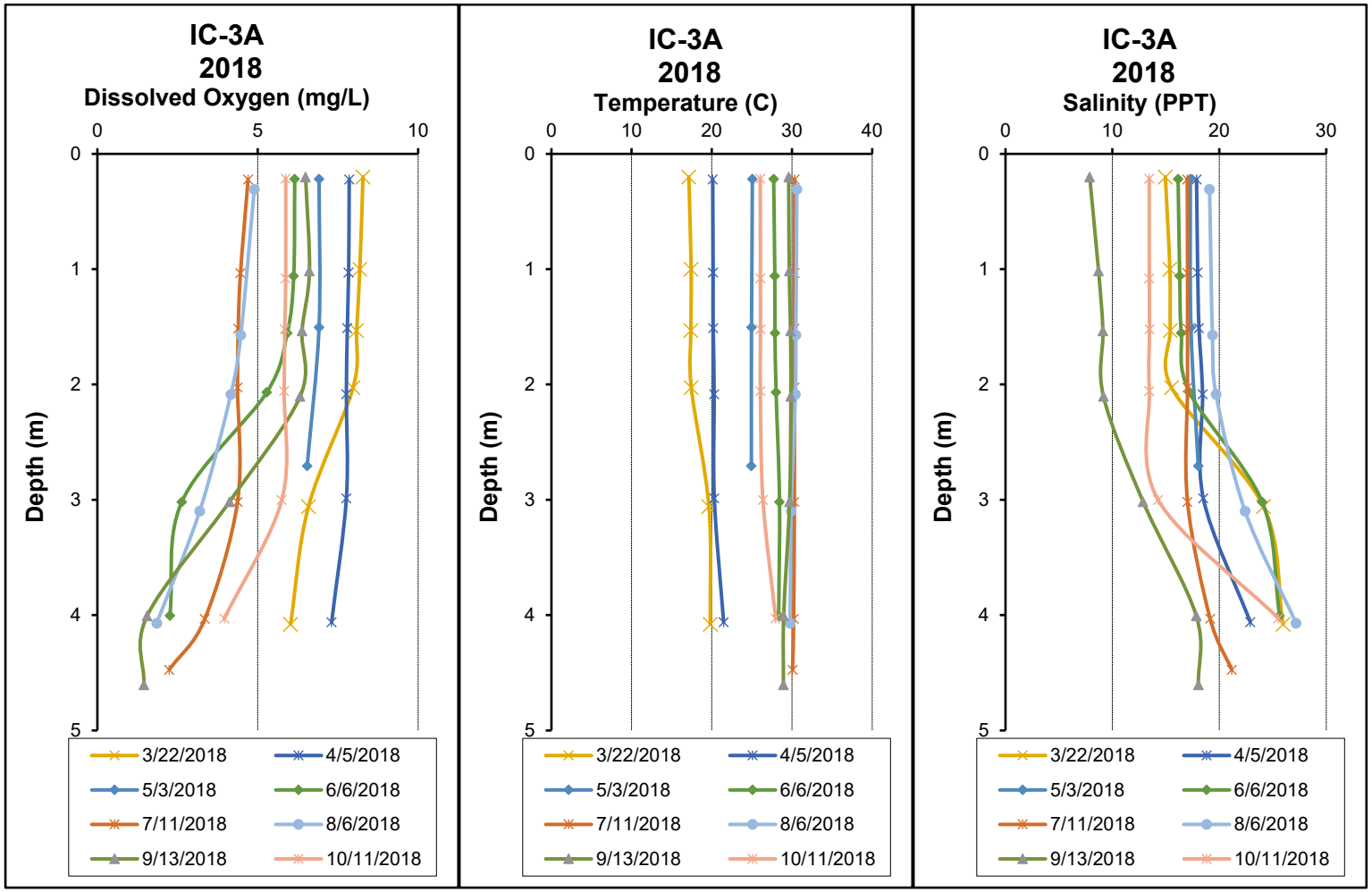


Figure 11. (continued)

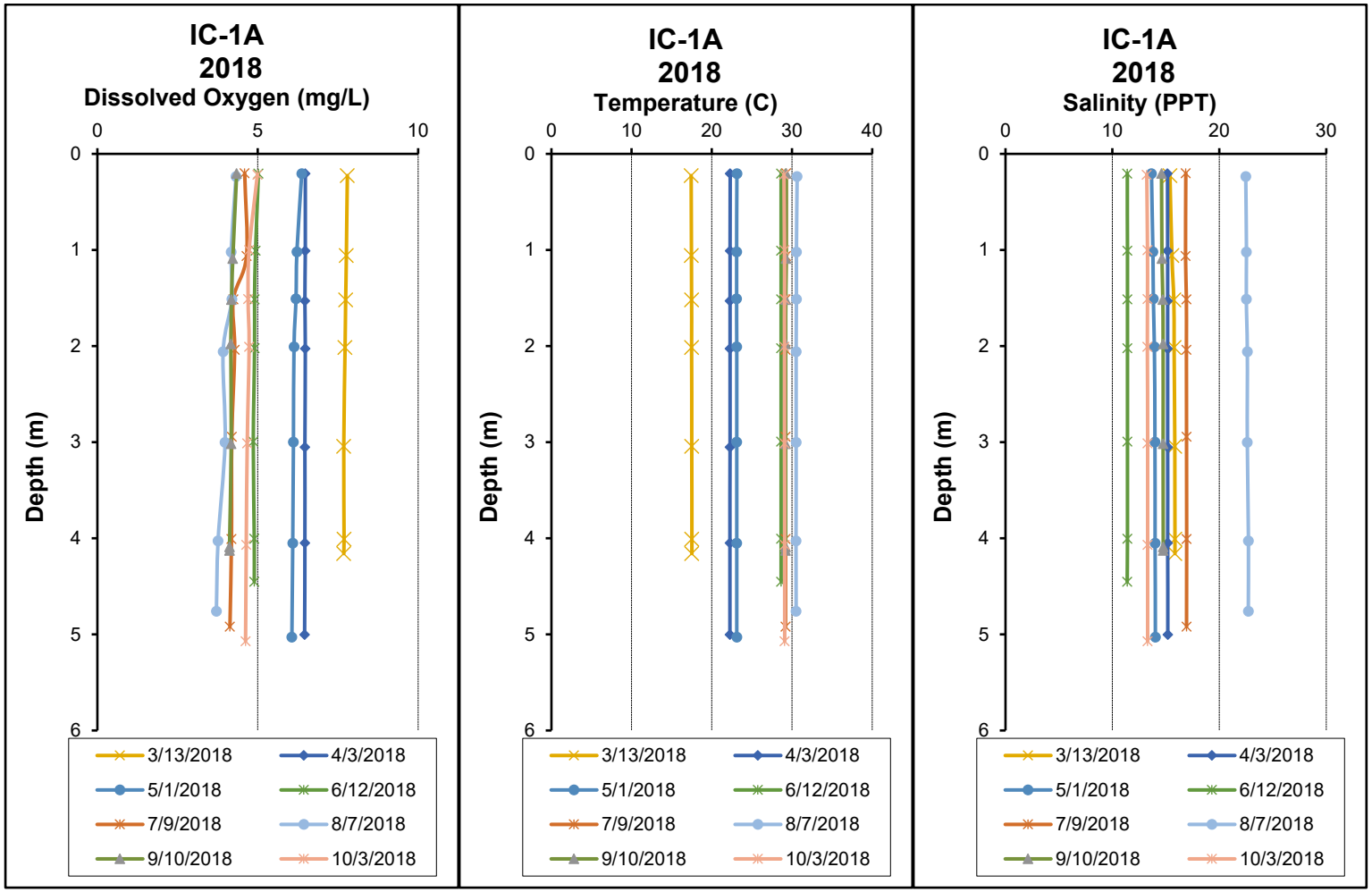
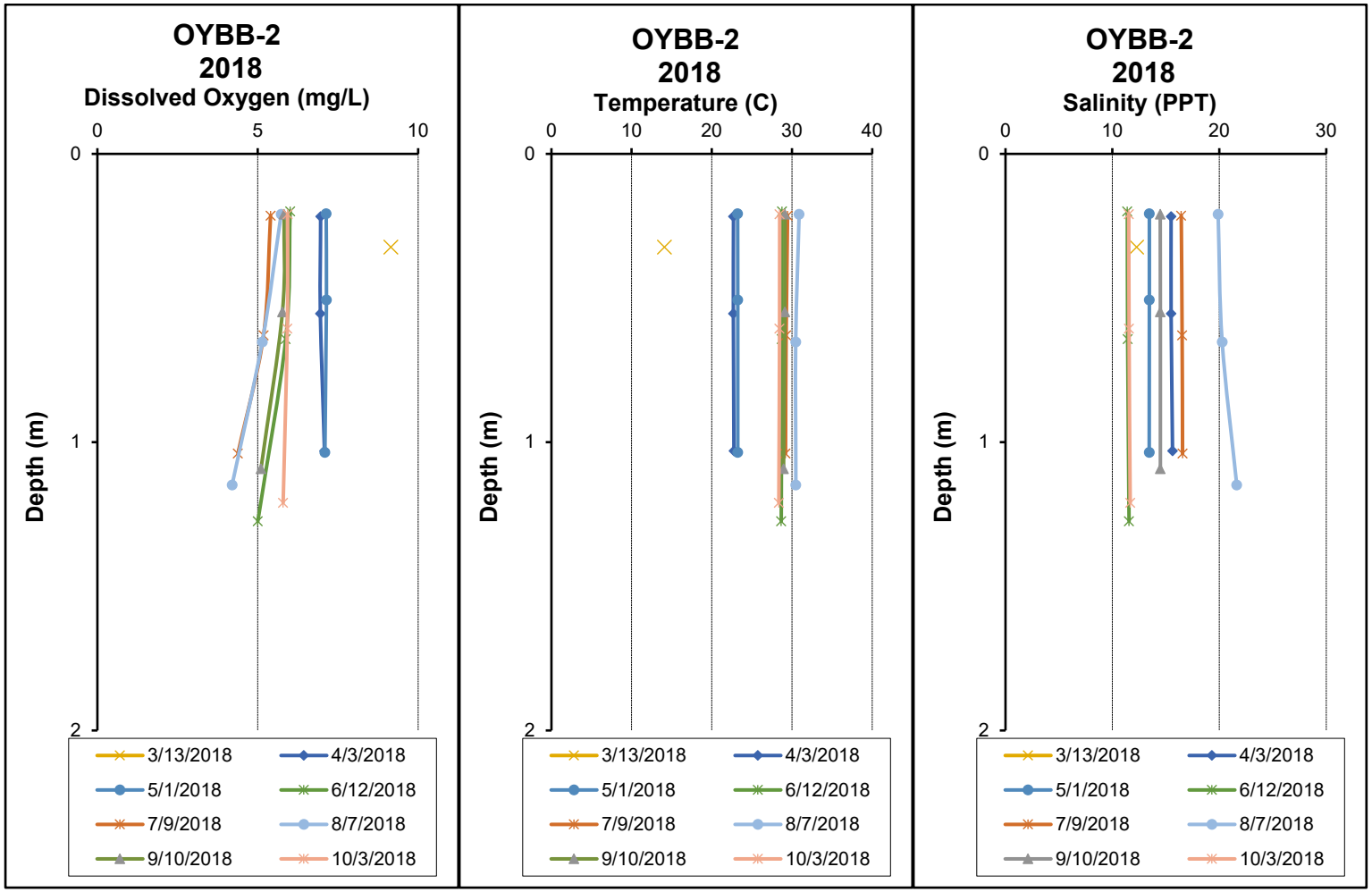


Figure 11. (continued)



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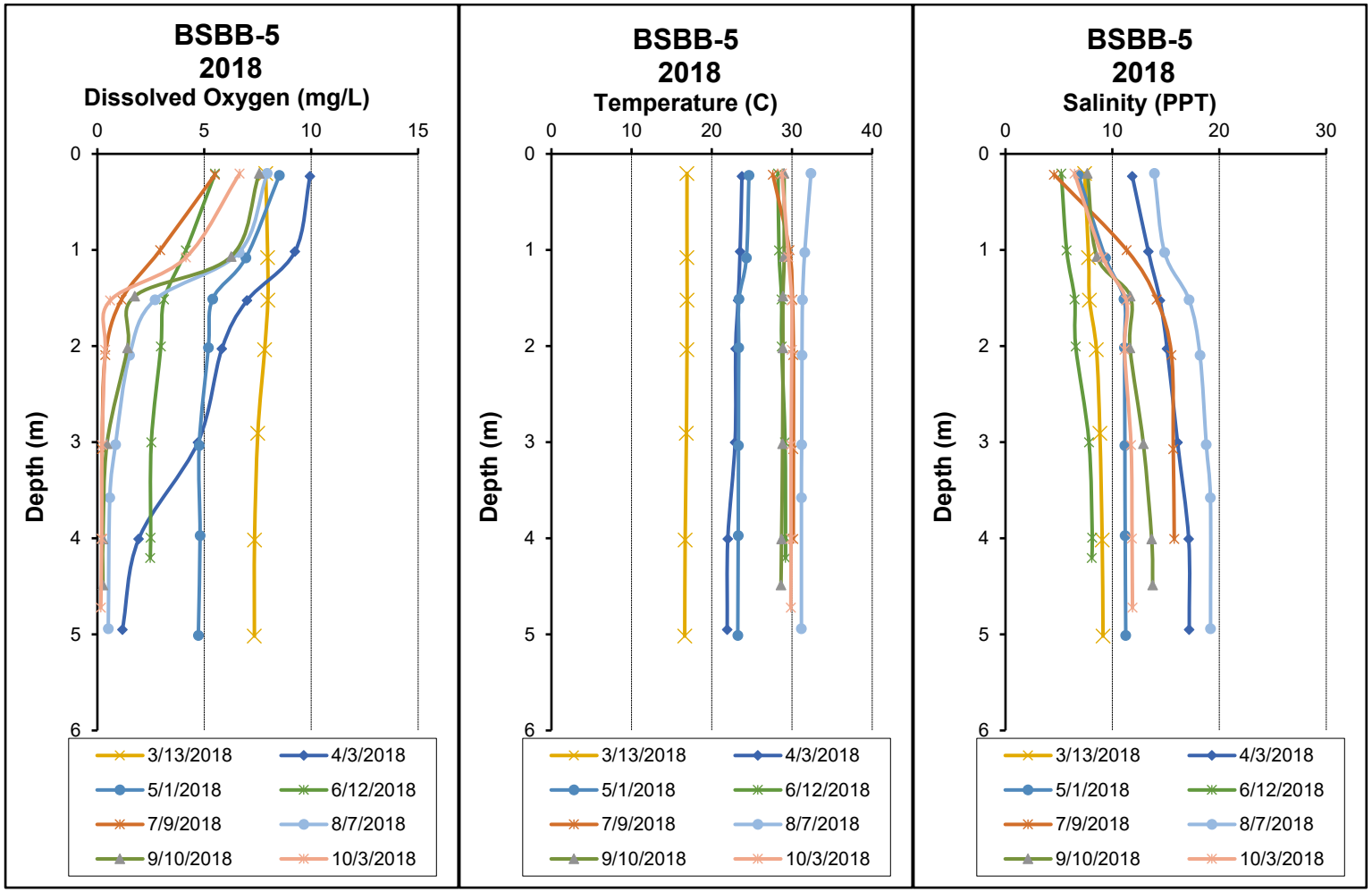


Figure 11. (continued)

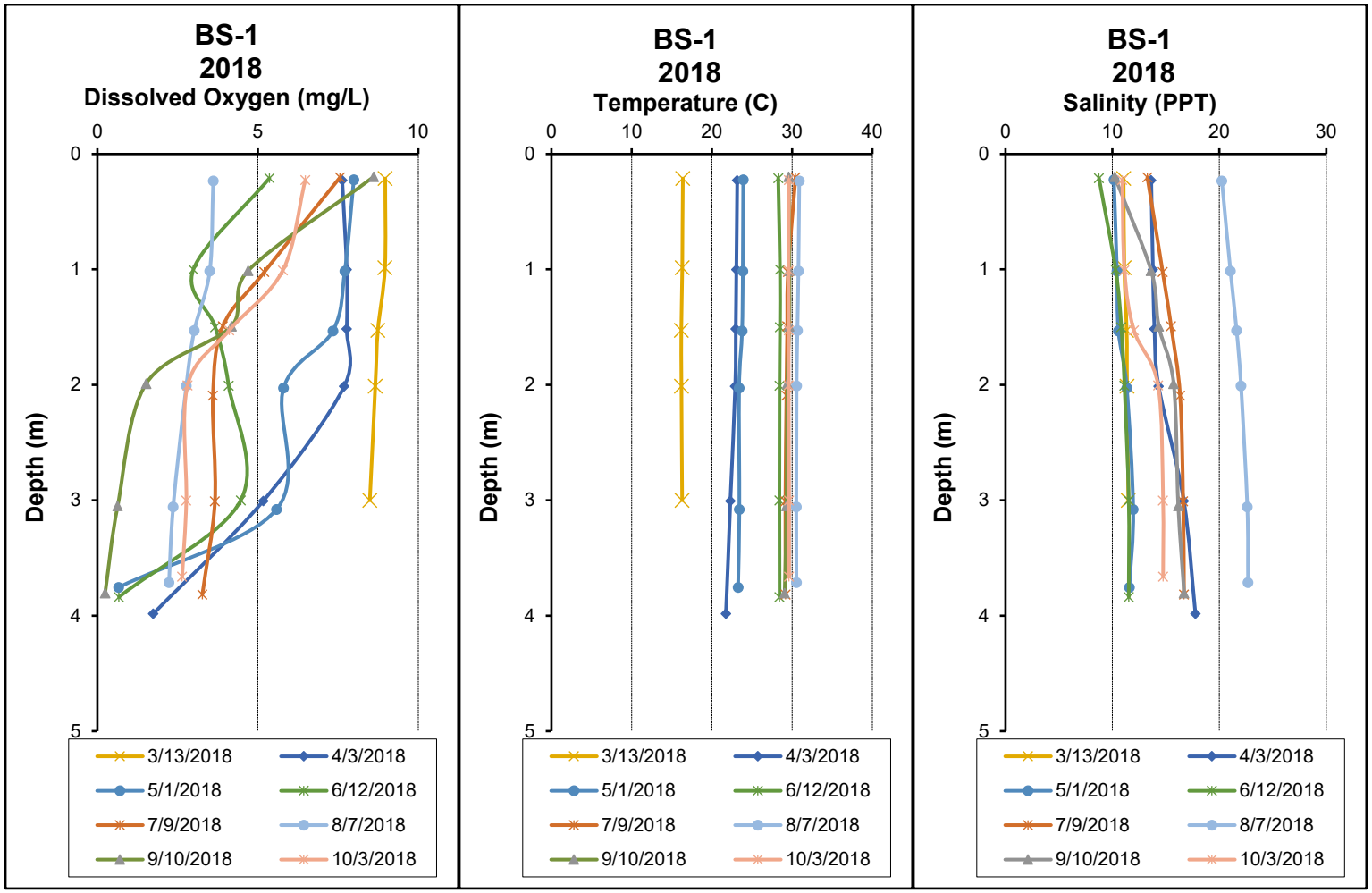
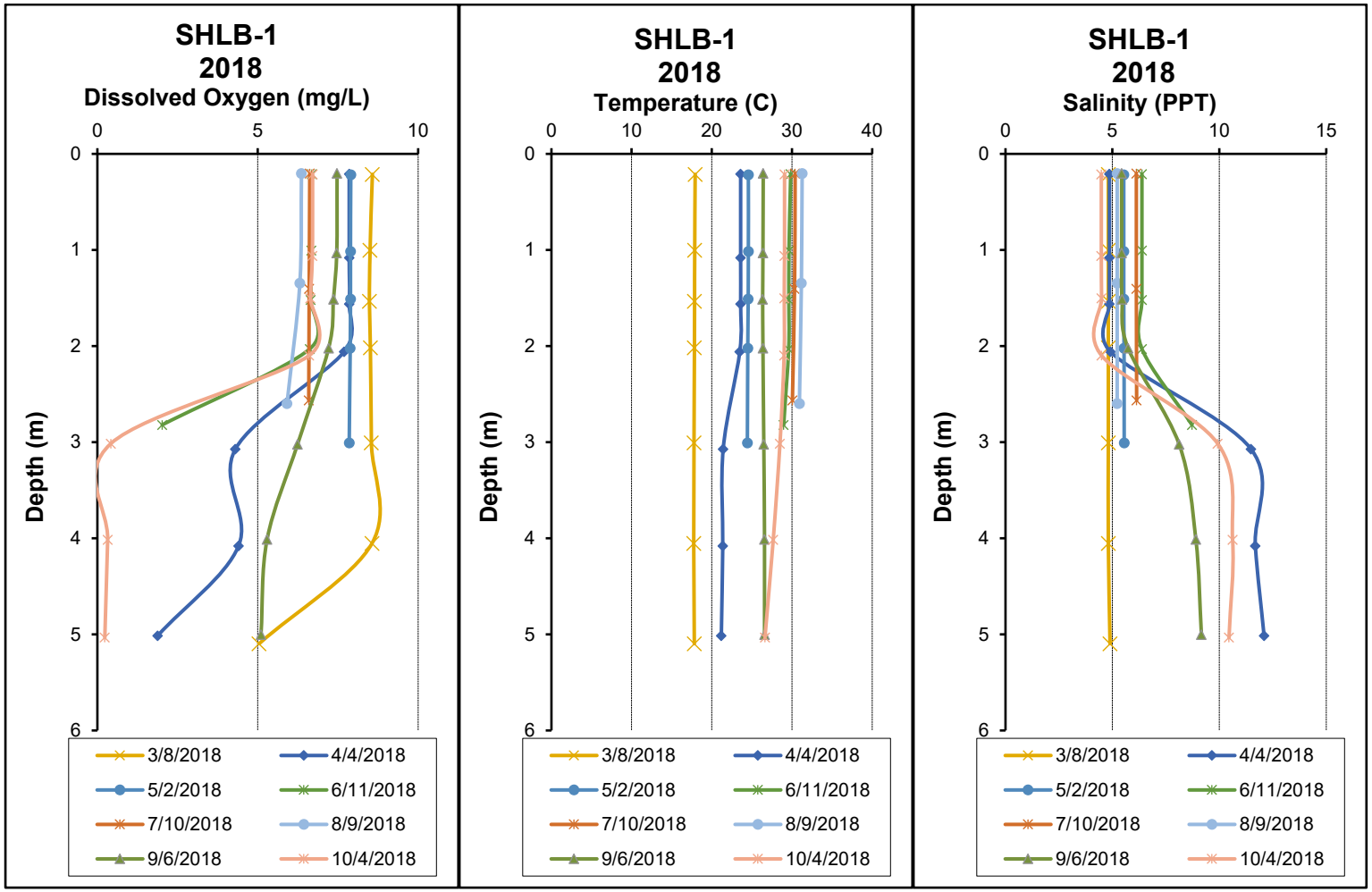


Figure 11. (continued)



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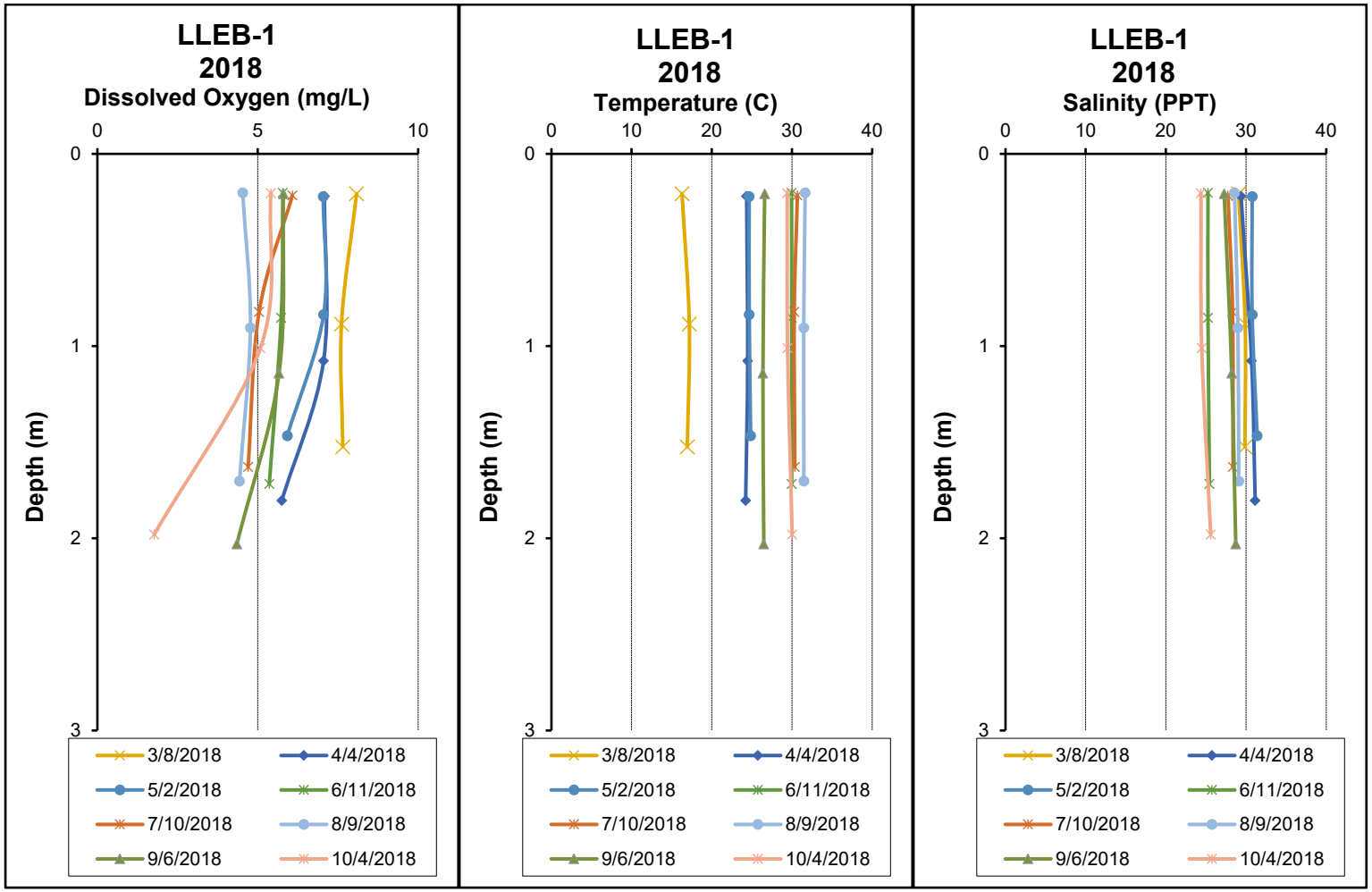

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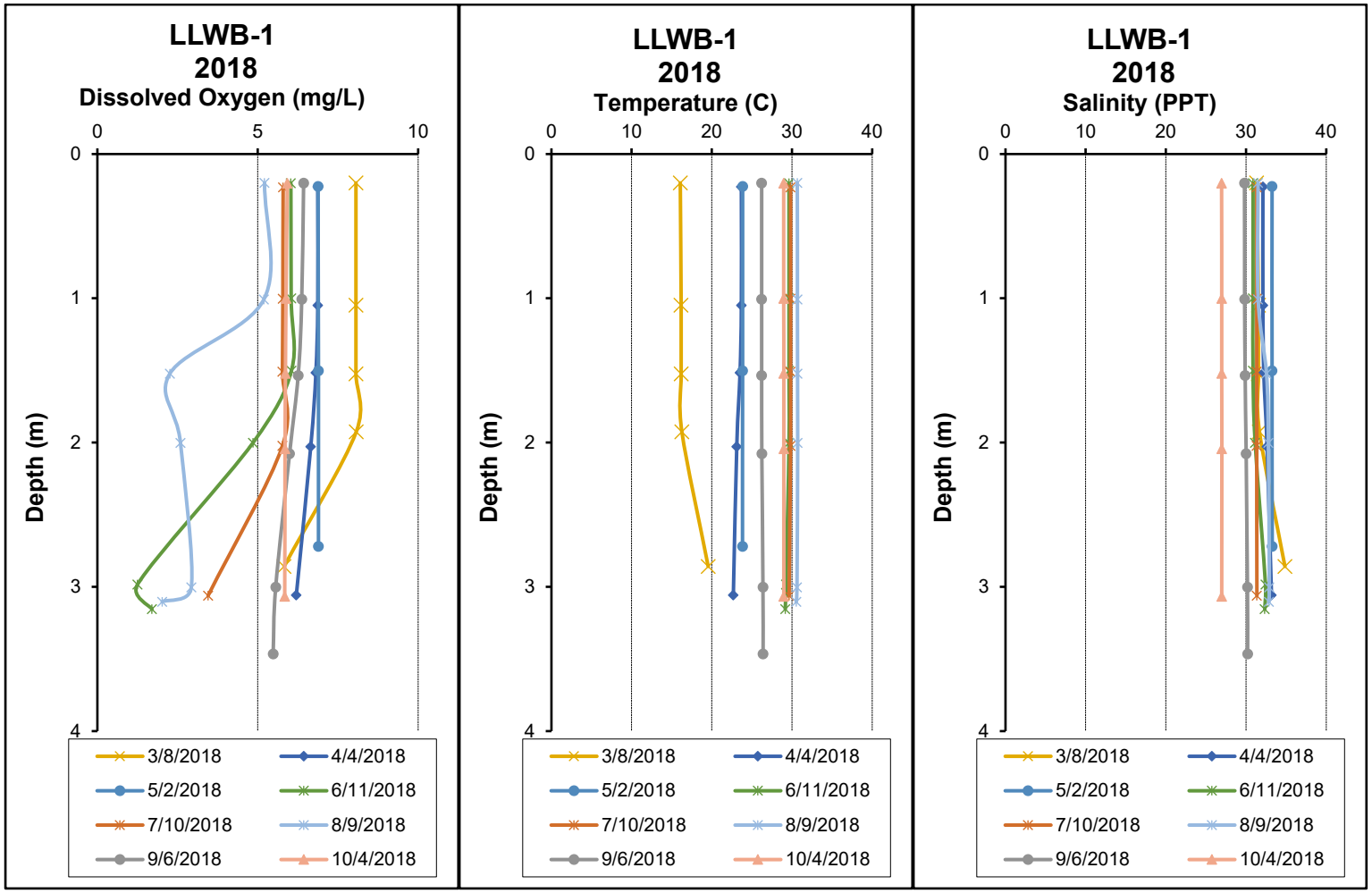

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APPENDIX

Appendix Table 1. Summary of water quality data collected within the Perdido and Wolf Bay watersheds and vicinity, March-October, 2018. 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.

	Parameter	N	Min		Max	Med	Avg	SD	E
BS-1	**Physical**								
	Temperature (°C)	8	16.2		30.7	28.9	26.3	5.0	
	Turbidity (NTU)	8	9.4		25.8	12.6	14.3	5.3	
	Total Dissolved Solids (mg/L)	8	9750.0		21100.0	12100.0	13318.8	3671.3	
	Total Suspended Solids (mg/L)	8	10.0		19.0	12.0	13.6	3.3	
	Specific Conductance	8	17880.0		34602.8	21642.1	22811.2	5507.5	
	Hardness (mg/L)	3	1340.0		1770.0	1520.0	1543.3	215.9	
	Alkalinity (mg/L)	8	30.3		94.4	59.5	57.4	20.5	
	Chemical								
	Dissolved Oxygen (mg/L)	8	3.0 C		8.7	4.1	5.3	2.2	5
	pH (SU)	8	7.1		7.9	7.4	7.4	0.2	
J	Ammonia Nitrogen (mg/L)	8	< 0.028		0.150	0.014	0.031	0.048	
J	Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.014		0.039	0.020	0.021	0.007	
	Total Kjeldahl Nitrogen (mg/L)	8	0.800		1.600	1.200	1.161	0.287	
J	Total Nitrogen (mg/L)	8	< 0.814		1.620	1.220	1.182	0.285	
	Dis Reactive Phosphorus (mg/L)	8	< 0.001		0.052	0.024	0.027	0.016	
J	Total Phosphorus (mg/L)	8	0.048		0.180	0.102	0.116	0.043	
J	CBOD-5 (mg/L)	8	< 2.0		5.0	3.3	3.5	1.5	
	Chlorides (mg/L)	8	5600.0		11000.0	6700.0	7225.0	1767.8	
	Total Metals								
	Aluminum (T) (mg/L)	3	0.255		0.581	0.286	0.374	0.180	
J	Iron (T) (mg/L)	3	0.179		0.362	0.246	0.262	0.092	
J	Manganese (T) (mg/L)	3	0.060		0.184	0.097	0.114	0.064	
	Dissolved Metals								
J	Aluminum (mg/L)	3	< 0.023		0.030	0.012	0.018	0.011	
	Antimony (µg/L)	3	< 1.480	<	1.480	0.740	0.740	0.000	
J	Arsenic (µg/L)	3	1.890		6.770	4.280	4.313	2.440	
	Cadmium (µg/L)	3	< 0.202	<	0.202	0.101	0.101	0.000	
J	Chromium (µg/L)	3	< 0.299		1.240	0.829	0.740	0.551	
J	Copper (µg/L)	3	< 0.394		22.400	0.477	7.691	12.739	
	Iron (mg/L)	3	< 0.063	<	0.063	0.032	0.032	0.000	
	Lead (µg/L)	3	< 0.277	<	0.277	0.138	0.138	0.000	
J	Manganese (mg/L)	3	< 0.004		0.082	0.026	0.037	0.041	
J	Nickel (µg/L)	3	< 0.328		3.200	2.860	2.075	1.663	
	Selenium (µg/L)	3	< 2.150		5.420	1.075	2.523	2.508	
	Silver (µg/L)	3	< 1.970	<	1.970	0.985	0.985	0.000	
	Thallium (µg/L)	3	< 0.239	<	0.239	0.120	0.120	0.000	
J	Zinc (µg/L)	3	< 0.662		2.660	1.990	1.660	1.199	
	Biological								
	Chlorophyll a (mg/m³)	8	1.70		23.00	7.90	8.64	6.48	
J,L	Enterococci (MPN/DL)	8	10		100	26	33	31	

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

	Parameter	N	Min		Max	Med	Avg	SD	E
BSBB-5	**Physical**								
	Temperature (°C)	8	16.9		31.3	28.8	26.6	4.9	
	Turbidity (NTU)	8	8.0		13.4	10.2	10.1	1.9	
	Total Dissolved Solids (mg/L)	8	5520.0		16600.0	9330.0	10288.8	3604.6	
J	Total Suspended Solids (mg/L)	8	3.0		17.0	11.0	10.8	3.8	
	Specific Conductance	8	11435.2		28095.5	19400.0	19739.4	5472.0	
	Hardness (mg/L)	3	1190.0		1450.0	1280.0	1306.7	132.0	
	Alkalinity (mg/L)	8	16.7		73.0	45.2	44.5	18.5	
	Chemical								
	Dissolved Oxygen (mg/L)	8	0.6 C		8.0	2.9	3.7	2.8	5
	pH (SU)	8	6.8		7.6	7.1	7.1	0.3	
J	Ammonia Nitrogen (mg/L)	8	< 0.028	<	0.029	0.014	0.014	0.000	
J	Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.013		0.431	0.060	0.107	0.141	
	Total Kjeldahl Nitrogen (mg/L)	8	0.690		1.500	1.085	1.121	0.321	
J	Total Nitrogen (mg/L)	8	< 0.873		1.550	1.170	1.228	0.270	
J	Dis Reactive Phosphorus (mg/L)	8	< 0.001		0.027	0.014	0.013	0.007	
J	Total Phosphorus (mg/L)	8	0.042		0.132	0.092	0.089	0.033	
J	CBOD-5 (mg/L)	8	2.4		6.0	5.0	4.3	1.3	
	Chlorides (mg/L)	8	3200.0		8400.0	5300.0	5637.5	1710.4	
	Total Metals								
	Aluminum (T) (mg/L)	3	0.229		0.314	0.307	0.283	0.047	
J	Iron (T) (mg/L)	3	0.188		0.284	0.237	0.236	0.048	
J	Manganese (T) (mg/L)	3	0.054		0.237	0.122	0.138	0.092	
	Dissolved Metals								
J	Aluminum (mg/L)	3	< 0.023		0.041	0.031	0.028	0.015	
	Antimony (µg/L)	3	< 1.480	<	1.480	0.740	0.740	0.000	
J	Arsenic (µg/L)	3	1.770		5.860	3.560	3.730	2.050	
	Cadmium (µg/L)	3	< 0.202	<	0.202	0.101	0.101	0.000	
J	Chromium (µg/L)	3	0.473		1.230	0.797	0.833	0.380	
J	Copper (µg/L)	3	< 0.394		14.900	0.435	5.177	8.421	
J	Iron (mg/L)	3	< 0.063		0.074	0.032	0.046	0.024	
	Lead (µg/L)	3	< 0.277	<	0.277	0.138	0.138	0.000	
J	Manganese (mg/L)	3	< 0.004		0.230	0.113	0.115	0.114	
J	Nickel (µg/L)	3	< 0.328		2.550	2.200	1.638	1.288	
	Selenium (µg/L)	3	< 2.150		7.680	1.075	3.277	3.813	
	Silver (µg/L)	3	< 1.970	<	1.970	0.985	0.985	0.000	
	Thallium (µg/L)	3	< 0.239	<	0.239	0.120	0.120	0.000	
J	Zinc (µg/L)	3	< 0.662		2.430	2.310	1.690	1.179	
	Biological								
	Chlorophyll a (mg/m³)	8	4.10		17.00	12.50	11.01	5.54	
J,L	Enterococci (MPN/DL)	8	10		230 H	10	46	77	1

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

		Parameter	N	Min		Max	Med	Avg	SD	E
GMEX-8		**Physical**								
		Temperature (°C)	8	19.4		30.4	26.8	25.7	4.3	
		Turbidity (NTU)	8	0.2		1.8	0.7	0.8	0.5	
		Total Dissolved Solids (mg/L)	8	34400.0		36300.0	35750.0	35687.5	612.8	
		Total Suspended Solids (mg/L)	8	7.0		16.0	13.0	12.8	2.9	
		Specific Conductance	8	49959.9		56135.5	52233.4	52710.3	2376.9	
		Hardness (mg/L)	3	2710.0		2880.0	2740.0	2776.7	90.7	
		Alkalinity (mg/L)	8	88.1		120.0	103.0	104.9	12.9	
		Chemical								
		Dissolved Oxygen (mg/L)	8	6.6		8.0	6.9	7.0	0.4	
		pH (SU)	8	7.9		8.1	8.0	8.0	0.1	
	J	Ammonia Nitrogen (mg/L)	8	< 0.028		0.029	0.014	0.014	0.000	
		Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.009		0.039	0.020	0.020	0.009	
	J	Total Kjeldahl Nitrogen (mg/L)	8	0.530		2.600	1.550	1.504	0.607	
	J	Total Nitrogen (mg/L)	8	< 0.550		2.604	1.579	1.524	0.604	
	J	Dis Reactive Phosphorus (mg/L)	8	< 0.001		0.006	0.003	0.003	0.001	
	J	Total Phosphorus (mg/L)	8	< 0.005		0.062	0.013	0.018	0.018	
	J	CBOD-5 (mg/L)	8	< 2.0		2.0	1.0	1.0	0.0	
		Chlorides (mg/L)	8	19000.0		20000.0	19000.0	19250.0	462.9	
		Total Metals								
	J	Aluminum (T) (mg/L)	3	< 0.023		0.050	0.012	0.024	0.022	
		Iron (T) (mg/L)	3	< 0.063		0.063	0.032	0.032	0.000	
	J	Manganese (T) (mg/L)	3	< 0.004		0.016	0.002	0.007	0.008	
		Dissolved Metals								
	J	Aluminum (mg/L)	3	< 0.023		0.037	0.012	0.020	0.015	
	J	Antimony (µg/L)	3	< 1.480	<	1.480	0.740	0.740	0.000	
	J	Arsenic (µg/L)	3	< 0.226		18.100	2.160	6.791	9.847	
	J	Cadmium (µg/L)	3	< 0.202	<	0.202	0.101	0.101	0.000	
	J	Chromium (µg/L)	3	0.427		1.500	0.520	0.816	0.594	
	J	Copper (µg/L)	3	0.782		3.710	2.270	2.254	1.464	
		Iron (mg/L)	3	< 0.063	<	0.063	0.032	0.032	0.000	
	J	Lead (µg/L)	3	< 0.277		0.908	0.339	0.462	0.399	
	J	Manganese (mg/L)	3	< 0.004		0.014	0.002	0.006	0.007	
	J	Nickel (µg/L)	3	< 0.328		11.100	0.164	3.809	6.314	
	J	Selenium (µg/L)	3	< 2.150	<	2.150	1.075	1.075	0.000	
	J	Silver (µg/L)	3	< 1.970	<	1.970	0.985	0.985	0.000	
	J	Thallium (µg/L)	3	< 0.239	<	0.239	0.120	0.120	0.000	
	J	Zinc (µg/L)	3	< 0.662		2.880	1.920	1.710	1.287	
		Biological								
		Chlorophyll a (mg/m³)	8	< 1.00	<	1.00	0.50	0.50	0.00	
	L	Enterococci (MPN/DL)	8	10		10	5	5	0	

E=# samples that exceeded criteria; H=*S,F&W,SH* human health criterion exceeded;
J= estimate; L=estimate; N=# samples;

		Parameter	N	Min		Max	Med	Avg	SD	E
IC-1A		**Physical**								
		Temperature (°C)	8	17.5		30.6	28.8	26.2	4.7	
		Turbidity (NTU)	8	8.5		49.4	11.8	15.7	13.8	
		Total Dissolved Solids (mg/L)	8	11500.0		24000.0	14700.0	15625.0	3787.5	
		Total Suspended Solids (mg/L)	8	11.0		52.0	14.0	18.8	13.6	
		Specific Conductance	8	19273.1		35915.1	24625.4	25360.6	4948.8	
		Hardness (mg/L)	3	1640.0		2000.0	1660.0	1766.7	202.3	
		Alkalinity (mg/L)	8	43.4		93.3	68.2	65.6	17.1	
		Measured Stream Flow (cfs)	8	-4627.2		5862.4	3760.7	2530.0	3376.3	
		Chemical								
		Dissolved Oxygen (mg/L)	8	4.2	C	7.7	4.8	5.3	1.3	5
		pH (SU)	8	6.9		7.8	7.4	7.4	0.3	
	J	Ammonia Nitrogen (mg/L)	8	< 0.028		0.060	0.014	0.022	0.016	
	J	Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.011		0.039	0.020	0.018	0.003	
		Total Kjeldahl Nitrogen (mg/L)	8	0.650		1.400	0.860	0.948	0.288	
	J	Total Nitrogen (mg/L)	8	< 0.666		1.420	0.880	0.966	0.290	
		Dis Reactive Phosphorus (mg/L)	8	0.018		0.039	0.022	0.024	0.007	
	J	Total Phosphorus (mg/L)	8	0.041		0.111	0.070	0.071	0.025	
	J	CBOD-5 (mg/L)	8	< 2.0		4.0	1.0	1.8	1.2	
		Chlorides (mg/L)	8	6600.0		12000.0	7900.0	8275.0	1629.8	
		Total Metals								
		Aluminum (T) (mg/L)	3	0.313		0.430	0.339	0.361	0.061	
	J	Iron (T) (mg/L)	3	0.183		0.292	0.210	0.228	0.057	
	J	Manganese (T) (mg/L)	3	0.042		0.124	0.048	0.071	0.046	
		Dissolved Metals								
	J	Aluminum (mg/L)	3	< 0.023		0.054	0.026	0.030	0.022	
		Antimony (µg/L)	3	< 1.480	<	1.480	0.740	0.740	0.000	
	J	Arsenic (µg/L)	3	1.690		8.010	5.200	4.967	3.166	
		Cadmium (µg/L)	3	< 0.202	<	0.202	0.101	0.101	0.000	
	J	Chromium (µg/L)	3	0.394		1.370	1.150	0.971	0.512	
	J	Copper (µg/L)	3	< 0.394		20.300	0.551	7.016	11.506	
		Iron (mg/L)	3	< 0.063	<	0.063	0.032	0.032	0.000	
		Lead (µg/L)	3	< 0.277	<	0.277	0.138	0.138	0.000	
	J	Manganese (mg/L)	3	< 0.004		0.053	0.018	0.024	0.026	
	J	Nickel (µg/L)	3	< 0.328		4.240	3.240	2.548	2.124	
		Selenium (µg/L)	3	< 2.150		14.200	1.075	5.450	7.578	
		Silver (µg/L)	3	< 1.970	<	1.970	0.985	0.985	0.000	
		Thallium (µg/L)	3	< 0.239	<	0.239	0.120	0.120	0.000	
	J	Zinc (µg/L)	3	0.866		2.950	1.900	1.905	1.042	
		Biological								
		Chlorophyll a (mg/m³)	8	< 1.00		9.60	3.65	4.16	2.97	
	J,L	Enterococci (MPN/DL)	8	10		10	5	6	2	

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

		Parameter	N		Min		Max	Med	Avg	SD	E
IC-3		**Physical**									
		Temperature (°C)	8		19.5		31.3	28.0	26.6	4.4	
		Turbidity (NTU)	8		2.6		5.4	4.6	4.4	0.9	
		Total Dissolved Solids (mg/L)	8		8610.0		25500.0	21400.0	20551.2	5129.5	
		Total Suspended Solids (mg/L)	8		7.0		16.0	10.0	10.8	3.1	
		Specific Conductance	8		20625.9		35667.2	28590.2	28768.0	4393.5	
		Hardness (mg/L)	3		1280.0		2130.0	2100.0	1836.7	482.3	
		Alkalinity (mg/L)	8		37.2		86.8	70.0	68.5	16.5	
		Chemical									
		Dissolved Oxygen (mg/L)	8		4.0 C		8.6	6.6	6.6	1.4	1
		pH (SU)	8		6.8		8.0	7.8	7.7	0.4	
	J	Ammonia Nitrogen (mg/L)	8	<	0.028		0.040	0.014	0.018	0.009	
	J	Nitrate+Nitrite Nitrogen (mg/L)	8	<	0.009		0.039	0.020	0.016	0.007	
		Total Kjeldahl Nitrogen (mg/L)	8		0.580		1.000	0.820	0.820	0.128	
	J	Total Nitrogen (mg/L)	8	<	0.600		1.020	0.832	0.836	0.128	
		Dis Reactive Phosphorus (mg/L)	8	<	0.001		0.006	0.003	0.003	0.001	
	J	Total Phosphorus (mg/L)	8		0.023		0.046	0.033	0.034	0.007	
	J	CBOD-5 (mg/L)	8	<	2.0		2.0	1.0	1.0	0.0	
		Chlorides (mg/L)	8		4700.0		13000.0	12000.0	10962.5	2609.8	
		Total Metals									
	J	Aluminum (T) (mg/L)	3		0.087		0.237	0.116	0.147	0.080	
	J	Iron (T) (mg/L)	3	<	0.063		0.188	0.032	0.084	0.090	
	J	Manganese (T) (mg/L)	3	<	0.004		0.021	0.007	0.010	0.010	
		Dissolved Metals									
	J	Aluminum (mg/L)	3	<	0.023		0.073	0.012	0.032	0.036	
	J	Antimony (µg/L)	3	<	1.480	<	1.480	0.740	0.740	0.000	
	J	Arsenic (µg/L)	3		0.834		2.080	1.510	1.475	0.624	
	J	Cadmium (µg/L)	3	<	0.202	<	0.202	0.101	0.101	0.000	
	J	Chromium (µg/L)	3		0.496		0.697	0.586	0.593	0.101	
	J	Copper (µg/L)	3	<	0.394	<	0.394	0.197	0.197	0.000	
		Iron (mg/L)	3	<	0.063	<	0.063	0.032	0.032	0.000	
	J	Lead (µg/L)	3	<	0.277	<	0.277	0.138	0.138	0.000	
		Manganese (mg/L)	3	<	0.004	<	0.004	0.002	0.002	0.000	
	J	Nickel (µg/L)	3	<	0.328	<	0.328	0.164	0.164	0.000	
	J	Selenium (µg/L)	3	<	2.150	<	2.150	1.075	1.075	0.000	
	J	Silver (µg/L)	3	<	1.970	<	1.970	0.985	0.985	0.000	
	J	Thallium (µg/L)	3	<	0.239	<	0.239	0.120	0.120	0.000	
	J	Zinc (µg/L)	3	<	0.662		1.000	0.331	0.554	0.386	
		Biological									
		Chlorophyll a (mg/m³)	8	<	1.00		2.70	1.50	1.48	0.93	
	J,L	Enterococci (MPN/DL)	8		10		10	5	6	2	

C=*S,F&W,SH* criterion violated; E=# samples that exceeded criteria; H=*S,F&W,SH* human health criterion exceeded; J= estimate; L=estimate; N=# samples

		Parameter	N		Min		Max	Med	Avg	SD	E
IC-3A		**Physical**									
		Temperature (°C)	8		17.4		30.5	27.0	25.9	4.9	
		Turbidity (NTU)	8		6.0		15.6	10.2	10.4	4.2	
		Total Dissolved Solids (mg/L)	8		8260.0		20500.0	17150.0	16120.0	3787.6	
	J	Total Suspended Solids (mg/L)	8		4.0		25.0	15.0	14.9	6.7	
		Specific Conductance	8		15706.3		31309.8	27386.6	25848.1	4883.3	
		Hardness (mg/L)	3		1240.0		1910.0	1900.0	1683.3	384.0	
		Alkalinity (mg/L)	8		36.7		77.2	73.4	64.7	16.1	
		Chemical									
		Dissolved Oxygen (mg/L)	8		4.4	C	8.1	6.2	6.2	1.4	2
		pH (SU)	8		7.3		7.9	7.6	7.6	0.2	
	J	Ammonia Nitrogen (mg/L)	8	<	0.028		0.030	0.014	0.016	0.006	
	J	Nitrate+Nitrite Nitrogen (mg/L)	8	<	0.009		0.039	0.020	0.016	0.007	
	J	Total Kjeldahl Nitrogen (mg/L)	8		0.610		1.000	0.830	0.822	0.138	
	J	Total Nitrogen (mg/L)	8	<	0.630		1.020	0.842	0.838	0.138	
	J	Dis Reactive Phosphorus (mg/L)	8	<	0.001		0.028	0.003	0.006	0.009	
	J	Total Phosphorus (mg/L)	8		0.024		0.134	0.042	0.055	0.037	
	J	CBOD-5 (mg/L)	8	<	2.0		2.0	1.0	1.1	0.4	
		Chlorides (mg/L)	8		4600.0		10000.0	9100.0	8537.5	1782.4	
		Total Metals									
		Aluminum (T) (mg/L)	3		0.266		0.708	0.385	0.453	0.229	
	J	Iron (T) (mg/L)	3		0.178		0.356	0.213	0.249	0.094	
	J	Manganese (T) (mg/L)	3		0.005		0.046	0.029	0.027	0.021	
		Dissolved Metals									
	J	Aluminum (mg/L)	3	<	0.023		0.062	0.026	0.033	0.026	
	J	Antimony (µg/L)	3	<	1.480	<	1.480	0.740	0.740	0.000	
	J	Arsenic (µg/L)	3		0.962		14.000	1.720	5.561	7.318	
	J	Cadmium (µg/L)	3	<	0.202	<	0.202	0.101	0.101	0.000	
	J	Chromium (µg/L)	3	<	0.299		0.761	0.570	0.494	0.313	
	J	Copper (µg/L)	3		0.473		56.100	1.270	19.281	31.889	
		Iron (mg/L)	3	<	0.063	<	0.063	0.032	0.032	0.000	
	J	Lead (µg/L)	3	<	0.277	<	0.277	0.138	0.138	0.000	
		Manganese (mg/L)	3	<	0.004	<	0.004	0.002	0.002	0.000	
	J	Nickel (µg/L)	3	<	0.328		0.352	0.164	0.227	0.108	
	J	Selenium (µg/L)	3	<	2.150		15.700	1.075	5.950	8.444	
	J	Silver (µg/L)	3	<	1.970	<	1.970	0.985	0.985	0.000	
	J	Thallium (µg/L)	3	<	0.239	<	0.239	0.120	0.120	0.000	
	J	Zinc (µg/L)	3	<	0.662		4.420	1.410	2.054	2.119	
		Biological									
		Chlorophyll a (mg/m³)	8	<	1.00		5.90	1.40	2.25	2.07	
	J,L	Enterococci (MPN/DL)	8		10		10	5	6	2	

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

	Parameter	N	Min		Max	Med	Avg	SD	E
IC-4	**Physical**								
	Temperature (°C)	8	20.4		30.9	28.2	26.7	4.2	
	Turbidity (NTU)	8	1.8		3.5	2.2	2.4	0.7	
	Total Dissolved Solids (mg/L)	8	11610.0		30300.0	26450.0	24426.2	6012.4	
	Total Suspended Solids (mg/L)	8	5.0		15.0	11.5	11.2	3.4	
	Specific Conductance	8	23215.2		45360.2	40106.1	37930.7	7438.9	
	Hardness (mg/L)	3	1660.0		2530.0	2180.0	2123.3	437.8	
	Alkalinity (mg/L)	8	51.1		101.0	74.2	76.7	20.3	
	Measured Stream Flow (cfs)	6	-9535.0		3569.0	-5151.9	-3953.9	5722.2	
	Chemical								
	Dissolved Oxygen (mg/L)	8	4.4 [C]		8.0	6.2	6.5	1.2	1
	pH (SU)	8	7.1		8.0	8.0	7.9	0.3	
	Ammonia Nitrogen (mg/L)	8	< 0.028		0.029	0.014	0.014	0.000	
[J]	Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.009		0.039	0.020	0.018	0.005	
	Total Kjeldahl Nitrogen (mg/L)	8	0.680		1.400	0.990	1.000	0.260	
[J]	Total Nitrogen (mg/L)	8	< 0.700		1.420	1.002	1.018	0.260	
	Dis Reactive Phosphorus (mg/L)	8	< 0.001		0.006	0.003	0.003	0.001	
[J]	Total Phosphorus (mg/L)	8	< 0.005		0.058	0.050	0.042	0.019	
[J]	CBOD-5 (mg/L)	8	< 2.0		2.0	1.0	1.0	0.0	
	Chlorides (mg/L)	8	6500.0		16000.0	13500.0	13062.5	3364.1	
	Total Metals								
[J]	Aluminum (T) (mg/L)	3	0.035		0.167	0.073	0.092	0.068	
[J]	Iron (T) (mg/L)	3	< 0.063		0.142	0.032	0.068	0.064	
	Manganese (T) (mg/L)	3	< 0.004		0.004	0.002	0.002	0.000	
	Dissolved Metals								
[J]	Aluminum (mg/L)	3	< 0.023		0.059	0.012	0.027	0.027	
[J]	Antimony (µg/L)	3	< 1.480	<	1.480	0.740	0.740	0.000	
[J]	Arsenic (µg/L)	3	1.005		2.150	1.530	1.562	0.573	
[J]	Cadmium (µg/L)	3	< 0.202	<	0.202	0.101	0.101	0.000	
[J]	Chromium (µg/L)	3	0.415		0.548	0.526	0.496	0.071	
[J]	Copper (µg/L)	3	< 0.394		0.396	0.197	0.263	0.115	
	Iron (mg/L)	3	< 0.063	<	0.063	0.032	0.032	0.000	
[J]	Lead (µg/L)	3	< 0.277	<	0.277	0.138	0.138	0.000	
	Manganese (mg/L)	3	< 0.004	<	0.004	0.002	0.002	0.000	
[J]	Nickel (µg/L)	3	< 0.328		0.330	0.164	0.219	0.096	
[J]	Selenium (µg/L)	3	< 2.150		10.700	1.075	4.283	5.557	
[J]	Silver (µg/L)	3	< 1.970	<	1.970	0.985	0.985	0.000	
[J]	Thallium (µg/L)	3	< 0.239	<	0.239	0.120	0.120	0.000	
[J]	Zinc (µg/L)	3	< 0.662		0.856	0.331	0.506	0.303	
	Biological								
	Chlorophyll a (mg/m³)	8	< 1.00		1.80	0.50	0.95	0.63	
[J,L]	Enterococci (MPN/DL)	8	10		20	5	7	5	

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

	Parameters	N	Min		Max	Med	Avg	SD	E
LLEB-1	**Physical**								
	Temperature (°C)	8	17.2		31.4	27.9	26.7	4.7	
	Turbidity (NTU)	8	6.2		11.7	7.4	8.0	1.7	
	Total Dissolved Solids (mg/L)	8	25900.0		32400.0	29200.0	29237.5	2031.8	
	Total Suspended Solids (mg/L)	8	9.0		20.0	15.5	14.5	3.8	
	Specific Conductance	8	38654.4		47291.0	44586.2	43986.6	3215.2	
	Hardness (mg/L)	3	2410.0		2640.0	2580.0	2543.3	119.3	
	Alkalinity (mg/L)	8	74.0		105.0	89.2	89.7	11.6	
	Chemical								
	Dissolved Oxygen (mg/L)	8	4.8 [C]		7.6	5.7	6.0	1.1	1
	pH (SU)	8	7.7		8.0	8.0	7.9	0.1	
[J]	Ammonia Nitrogen (mg/L)	8	< 0.028		0.040	0.014	0.019	0.010	
[J]	Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.009		0.039	0.020	0.016	0.007	
[J]	Total Kjeldahl Nitrogen (mg/L)	8	0.890		1.600	1.350	1.311	0.266	
[J]	Total Nitrogen (mg/L)	8	< 0.910		1.620	1.362	1.327	0.267	
[J]	Dis Reactive Phosphorus (mg/L)	8	< 0.001		0.006	0.003	0.002	0.001	
[J]	Total Phosphorus (mg/L)	8	0.035		0.055	0.049	0.048	0.007	
[J]	CBOD-5 (mg/L)	8	< 2.0		2.0	1.0	1.1	0.4	
	Chlorides (mg/L)	8	14000.0		17000.0	16000.0	15500.0	1069.0	
	Total Metals								
[J]	Aluminum (T) (mg/L)	3	0.125		0.360	0.297	0.261	0.122	
[J]	Iron (T) (mg/L)	3	0.093		0.231	0.212	0.179	0.075	
[J]	Manganese (T) (mg/L)	3	< 0.004		0.044	0.002	0.016	0.024	
	Dissolved Metals								
[J]	Aluminum (mg/L)	3	< 0.023		0.047	0.012	0.023	0.020	
[J]	Antimony (µg/L)	3	< 1.480	<	1.480	0.740	0.740	0.000	
[J]	Arsenic (µg/L)	3	2.530		15.300	4.110	7.313	6.962	
[J]	Cadmium (µg/L)	3	< 0.202	<	0.202	0.101	0.101	0.000	
[J]	Chromium (µg/L)	3	0.485		1.610	0.491	0.862	0.648	
[J]	Copper (µg/L)	3	< 0.394		1.680	0.197	0.691	0.856	
	Iron (mg/L)	3	< 0.063	<	0.063	0.032	0.032	0.000	
[J]	Lead (µg/L)	3	< 0.277	<	0.277	0.138	0.138	0.000	
[J]	Manganese (mg/L)	3	< 0.004		0.015	0.002	0.006	0.008	
[J]	Nickel (µg/L)	3	< 0.328		8.730	0.164	3.019	4.946	
[J]	Selenium (µg/L)	3	< 2.150		3.920	1.075	2.023	1.642	
[J]	Silver (µg/L)	3	< 1.970	<	1.970	0.985	0.985	0.000	
[J]	Thallium (µg/L)	3	< 0.239	<	0.239	0.120	0.120	0.000	
[J]	Zinc (µg/L)	3	< 0.662	<	0.662	0.331	0.331	0.000	
	Biological								
	Chlorophyll a (mg/m³)	8	< 1.00		5.60	1.90	2.19	1.65	
[J,L]	Enterococci (MPN/DL)	8	10		20	5	7	5	

C=*S,F&W,SH* criterion violated; E=# samples that exceeded criteria; H=*S,F&W,SH* human health criterion exceeded; J= estimate; L=estimate; N=# samples

	Parameter	N	Min		Max	Med	Avg	SD	E
LLWB-1	**Physical**								
	Temperature (°C)	8	16.2		30.7	27.6	26.1	4.9	
	Turbidity (NTU)	8	4.1		6.8	5.5	5.5	1.1	
	Total Dissolved Solids (mg/L)	8	27900.0		36000.0	32350.0	31950.0	2382.7	
	Total Suspended Solids (mg/L)	8	7.0		25.0	13.0	13.4	5.2	
	Specific Conductance	8	42162.9		50635.4	48272.2	47781.8	2666.6	
	Hardness (mg/L)	3	2490.0		2770.0	2680.0	2646.7	142.9	
	Alkalinity (mg/L)	8	88.4		110.0	97.0	98.6	8.1	
	Chemical								
	Dissolved Oxygen (mg/L)	8	2.3 [C]		8.1	6.2	6.0	1.7	1
	pH (SU)	8	7.8		8.2	8.0	8.0	0.2	
	Ammonia Nitrogen (mg/L)	8	< 0.028		0.029	0.014	0.014	0.000	
[J]	Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.009		0.039	0.020	0.016	0.007	
	Total Kjeldahl Nitrogen (mg/L)	8	< 0.140		2.000	1.350	1.258	0.597	
[J]	Total Nitrogen (mg/L)	8	< 0.074		2.020	1.362	1.273	0.601	
	Dis Reactive Phosphorus (mg/L)	8	< 0.001		0.006	0.003	0.002	0.001	
[J]	Total Phosphorus (mg/L)	8	0.039		0.062	0.056	0.051	0.009	
[J]	CBOD-5 (mg/L)	8	< 2.0		2.0	1.0	1.0	0.0	
	Chlorides (mg/L)	8	16000.0		18000.0	17500.0	17250.0	886.4	
	Total Metals								
[J]	Aluminum (T) (mg/L)	3	0.143		0.155	0.152	0.150	0.006	
[J]	Iron (T) (mg/L)	3	< 0.063		0.095	0.092	0.073	0.036	
[J]	Manganese (T) (mg/L)	3	< 0.004		0.036	0.002	0.013	0.020	
	Dissolved Metals								
[J]	Aluminum (mg/L)	3	< 0.023		0.046	0.012	0.023	0.020	
[J]	Antimony (µg/L)	3	< 1.480	<	1.480	0.740	0.740	0.000	
[J]	Arsenic (µg/L)	3	2.250		14.300	3.220	6.590	6.695	
[J]	Cadmium (µg/L)	3	< 0.202	<	0.202	0.101	0.101	0.000	
[J]	Chromium (µg/L)	3	0.566		1.960	0.595	1.040	0.796	
[J]	Copper (µg/L)	3	< 0.394		1.450	0.197	0.615	0.723	
	Iron (mg/L)	3	< 0.063	<	0.063	0.032	0.032	0.000	
[J]	Lead (µg/L)	3	< 0.277	<	0.277	0.138	0.138	0.000	
[J]	Manganese (mg/L)	3	< 0.004		0.013	0.002	0.006	0.006	
[J]	Nickel (µg/L)	3	< 0.328		7.000	0.164	2.443	3.947	
[J]	Selenium (µg/L)	3	< 2.150	<	2.150	1.075	1.075	0.000	
[J]	Silver (µg/L)	3	< 1.970	<	1.970	0.985	0.985	0.000	
[J]	Thallium (µg/L)	3	< 0.239	<	0.239	0.120	0.120	0.000	
[J]	Zinc (µg/L)	3	< 0.662		4.420	0.331	1.694	2.361	
	Biological								
	Chlorophyll a (mg/m³)	8	< 1.00		3.70	1.55	1.71	1.23	
[J,L]	Enterococci (MPN/DL)	8	10		50	5	11	16	

C=*S,F&W,SH* criterion violated; E=# samples that exceeded criteria; H=*S,F&W,SH* human health criterion exceeded; J= estimate; L=estimate; N=# samples

	Parameter	N	Min		Max	Med	Avg	SD	E
OLRB-1	**Physical**								
	Temperature (°C)	8	18.9		30.1	27.2	25.9	4.5	
	Turbidity (NTU)	8	0.1		4.6	3.0	2.8	1.5	
	Total Dissolved Solids (mg/L)	8	15000.0		36300.0	28500.0	27762.5	6608.8	
J	Total Suspended Solids (mg/L)	8	4.0		17.0	9.5	10.1	4.0	
	Specific Conductance	8	22485.8		53125.8	42102.2	41573.6	9293.7	
	Hardness (mg/L)	3	1740.0		2820.0	2500.0	2353.3	554.7	
	Alkalinity (mg/L)	8	63.6		114.0	85.6	86.1	16.6	
	Chemical								
	Dissolved Oxygen (mg/L)	8	6.3		8.4	6.4	6.8	0.8	
	pH (SU)	8	7.5		8.1	8.0	7.9	0.2	
J	Ammonia Nitrogen (mg/L)	8	< 0.028		0.029	0.014	0.014	0.000	
J	Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.009		0.039	0.020	0.016	0.007	
	Total Kjeldahl Nitrogen (mg/L)	8	0.490		1.600	0.965	1.024	0.357	
J	Total Nitrogen (mg/L)	8	< 0.510		1.620	0.977	1.040	0.359	
	Dis Reactive Phosphorus (mg/L)	8	< 0.001		0.006	0.003	0.003	0.001	
J	Total Phosphorus (mg/L)	8	< 0.026		0.065	0.050	0.041	0.019	
J	CBOD-5 (mg/L)	8	< 2.0		2.0	1.0	1.0	0.0	
	Chlorides (mg/L)	8	8700.0		19000.0	16000.0	15212.5	3366.4	
	Total Metals								
J	Aluminum (T) (mg/L)	3	0.090		0.136	0.120	0.115	0.023	
J	Iron (T) (mg/L)	3	< 0.063		0.086	0.084	0.067	0.031	
J	Manganese (T) (mg/L)	3	< 0.004		0.017	0.002	0.007	0.009	
	Dissolved Metals								
J	Aluminum (mg/L)	3	< 0.023		0.045	0.035	0.030	0.017	
J	Antimony (µg/L)	3	< 1.480	<	1.480	0.740	0.740	0.000	
J	Arsenic (µg/L)	3	1.800		8.690	2.030	4.173	3.913	
J	Cadmium (µg/L)	3	< 0.202	<	0.202	0.101	0.101	0.000	
J	Chromium (µg/L)	3	0.449		1.400	0.596	0.815	0.512	
J	Copper (µg/L)	3	< 0.394		0.680	0.197	0.358	0.279	
	Iron (mg/L)	3	< 0.063	<	0.063	0.032	0.032	0.000	
J	Lead (µg/L)	3	< 0.277	<	0.277	0.138	0.138	0.000	
J	Manganese (mg/L)	3	< 0.004		0.014	0.002	0.006	0.007	
J	Nickel (µg/L)	3	< 0.328		4.380	0.164	1.569	2.434	
J	Selenium (µg/L)	3	< 2.150	<	2.150	1.075	1.075	0.000	
J	Silver (µg/L)	3	< 1.970	<	1.970	0.985	0.985	0.000	
J	Thallium (µg/L)	3	< 0.239	<	0.239	0.120	0.120	0.000	
J	Zinc (µg/L)	3	< 0.662		1.200	0.331	0.621	0.502	
	Biological								
	Chlorophyll a (mg/m³)	8	< 1.00		1.20	1.00	0.86	0.31	
J,L	Enterococci (MPN/DL)	8	10		10	5	6	2	

E=# samples that exceeded criteria; H=*S,F&W,SH* human health criterion exceeded; J= estimate; L=estimate; N=# samples

	Parameter	N	Min	Max	Med	Avg	SD	E
OYBB-2	**Physical**							
	Temperature (°C)	8	14.1	30.5	28.6	25.7	5.5	
	Turbidity (NTU)	8	7.4	27.6	15.8	16.7	6.8	
	Total Dissolved Solids (mg/L)	8	11600.0	21200.0	13600.0	14650.0	3321.8	
	Total Suspended Solids (mg/L)	8	13.0	25.0	16.5	17.5	4.0	
	Specific Conductance	8	19302.3	32640.2	23159.2	23834.4	4526.8	
	Hardness (mg/L)	3	1490.0	2220.0	1620.0	1776.7	389.4	
	Alkalinity (mg/L)	8	42.6	83.6	59.2	60.2	14.7	
	Chemical							
	Dissolved Oxygen (mg/L)	8	5.1	9.2	5.9	6.4	1.3	
	pH (SU)	8	7.2	8.0	7.6	7.6	0.3	
J	Ammonia Nitrogen (mg/L)	8 <	0.028	0.050	0.014	0.019	0.013	
J	Nitrate+Nitrite Nitrogen (mg/L)	8 <	0.009	0.039	0.020	0.016	0.007	
	Total Kjeldahl Nitrogen (mg/L)	8	0.570	1.000	0.860	0.825	0.192	
J	Total Nitrogen (mg/L)	8 <	0.590	1.020	0.880	0.841	0.196	
	Dis Reactive Phosphorus (mg/L)	8 <	0.001	0.029	0.011	0.012	0.012	
J	Total Phosphorus (mg/L)	8	0.033	0.091	0.076	0.069	0.022	
J	CBOD-5 (mg/L)	8 <	2.0	3.0	1.0	1.5	0.8	
	Chlorides (mg/L)	8	6400.0	11000.0	7400.0	7912.5	1561.5	
	Total Metals							
	Aluminum (T) (mg/L)	3	0.635	0.825	0.771	0.744	0.098	
	Iron (T) (mg/L)	3	0.435	0.511	0.464	0.470	0.038	
J	Manganese (T) (mg/L)	3	0.060	0.089	0.067	0.072	0.015	
	Dissolved Metals							
	Aluminum (mg/L)	3 <	0.023	< 0.023	0.012	0.012	0.000	
	Antimony (µg/L)	3 <	1.480	< 1.480	0.740	0.740	0.000	
J	Arsenic (µg/L)	3	1.130	1.550	1.440	1.373	0.218	
	Cadmium (µg/L)	3 <	0.202	< 0.202	0.101	0.101	0.000	
J	Chromium (µg/L)	3	0.458	0.899	0.568	0.642	0.230	
J	Copper (µg/L)	3	0.399	2.130	0.715	1.081	0.922	
	Iron (mg/L)	3 <	0.063	< 0.063	0.032	0.032	0.000	
	Lead (µg/L)	3 <	0.277	< 0.277	0.138	0.138	0.000	
	Manganese (mg/L)	3 <	0.004	< 0.004	0.002	0.002	0.000	
J	Nickel (µg/L)	3 <	0.328	0.585	0.164	0.304	0.243	
J	Selenium (µg/L)	3 <	2.150	27.800	4.600	11.158	14.519	
	Silver (µg/L)	3 <	1.970	< 1.970	0.985	0.985	0.000	
	Thallium (µg/L)	3 <	0.239	< 0.239	0.120	0.120	0.000	
J	Zinc (µg/L)	3	0.891	3.110	1.140	1.714	1.216	
	Biological							
	Chlorophyll a (mg/m³)	8 <	1.00	8.10	3.90	4.04	2.88	
J,L	Enterococci (MPN/DL)	8	10	10	5	6	2	

A=*S,F&W,SH* aquatic life use criterion exceeded; E=# samples that exceeded criteria;
H=*S,F&W,SH* human health criterion exceeded; J= estimate; L=estimate; N=# samples

	Parameter	N	Min	Max	Med	Avg	SD	E
PDBB-0	**Physical**							
	Temperature (°C)	8	19.3	29.9	26.6	25.5	4.2	
	Turbidity (NTU)	8	0.2	2.3	1.6	1.5	0.8	
	Total Dissolved Solids (mg/L)	8	24900.0	40100.0	33650.0	32337.5	5266.3	
J	Total Suspended Solids (mg/L)	8	4.0	39.0	13.0	15.2	11.0	
	Specific Conductance	8	38306.6	55090.7	52415.8	50245.8	5374.1	
	Hardness (mg/L)	3	2610.0	2970.0	2840.0	2806.7	182.3	
	Alkalinity (mg/L)	8	86.3	121.0	104.0	103.7	12.6	
	Chemical							
	Dissolved Oxygen (mg/L)	8	5.5	8.0	6.7	6.8	0.7	
	pH (SU)	8	7.8	8.1	8.0	8.0	0.1	
J	Ammonia Nitrogen (mg/L)	8 <	0.028	0.029	0.014	0.014	0.000	
	Nitrate+Nitrite Nitrogen (mg/L)	8 <	0.009	0.039	0.020	0.016	0.007	
	Total Kjeldahl Nitrogen (mg/L)	8	0.690	1.800	1.300	1.286	0.359	
	Total Nitrogen (mg/L)	8 <	0.710	1.804	1.320	1.302	0.354	
	Dis Reactive Phosphorus (mg/L)	8 <	0.001	0.006	0.003	0.003	0.001	
J	Total Phosphorus (mg/L)	8 <	0.005	0.066	0.013	0.026	0.022	
J	CBOD-5 (mg/L)	8 <	2.0	2.0	1.0	1.0	0.0	
	Chlorides (mg/L)	8	12000.0	20000.0	18000.0	17500.0	2507.1	
	Total Metals							
J	Aluminum (T) (mg/L)	3 <	0.023	0.043	0.012	0.022	0.018	
	Iron (T) (mg/L)	3 <	0.063	0.063	0.032	0.032	0.000	
	Manganese (T) (mg/L)	3 <	0.004	0.004	0.002	0.002	0.000	
	Dissolved Metals							
	Aluminum (mg/L)	3 <	0.023	< 0.023	0.012	0.012	0.000	
	Antimony (µg/L)	3 <	1.480	< 1.480	0.740	0.740	0.000	
J	Arsenic (µg/L)	3	1.140	2.110	1.460	1.570	0.494	
	Cadmium (µg/L)	3 <	0.202	< 0.202	0.101	0.101	0.000	
J	Chromium (µg/L)	3	0.654	1.510	0.874	1.013	0.444	
J	Copper (µg/L)	3 <	0.394	1.410	0.506	0.704	0.630	
	Iron (mg/L)	3 <	0.063	< 0.063	0.032	0.032	0.000	
	Lead (µg/L)	3 <	0.277	< 0.277	0.138	0.138	0.000	
	Manganese (mg/L)	3 <	0.004	< 0.004	0.002	0.002	0.000	
J	Nickel (µg/L)	3 <	0.328	0.411	0.164	0.246	0.143	
J	Selenium (µg/L)	3 <	2.150	63.100	1.075	21.750	35.810	
	Silver (µg/L)	3 <	1.970	< 1.970	0.985	0.985	0.000	
	Thallium (µg/L)	3 <	0.239	< 0.239	0.120	0.120	0.000	
J	Zinc (µg/L)	3	0.794	3.210	0.934	1.646	1.356	
	Biological							
	Chlorophyll a (mg/m³)	8 <	1.00	1.80	0.50	0.66	0.46	
L	Enterococci (MPN/DL)	8	10	10	5	5	0	

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H=*S,F&W,SH* human health criterion exceeded; J= estimate; L=estimate; N=# samples

	Parameter	N	Min		Max	Med	Avg	SD	E
PDBB-1	**Physical**								
	Temperature (°C)	8	20.0		31.8	27.6	26.8	4.3	
	Turbidity (NTU)	8	2.7		5.2	3.8	3.8	0.9	
	Total Dissolved Solids (mg/L)	8	5150.0		20700.0	16750.0	15831.2	5039.9	
J	Total Suspended Solids (mg/L)	8	3.0		10.0	6.5	6.6	2.6	
	Specific Conductance	8	21933.6		36476.8	28495.8	28214.0	4264.2	
	Hardness (mg/L)	3	1810.0		2220.0	2200.0	2076.7	231.2	
	Alkalinity (mg/L)	8	24.1		74.6	55.3	50.7	21.1	
	Chemical								
	Dissolved Oxygen (mg/L)	8	1.2	C	8.5	6.4	6.1	2.5	2
	pH (SU)	8	6.2		8.0	7.8	7.6	0.6	
	Ammonia Nitrogen (mg/L)	8	< 0.028		0.080	0.014	0.022	0.023	
J	Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.010		0.041	0.020	0.023	0.010	
	Total Kjeldahl Nitrogen (mg/L)	8	0.300		1.100	0.755	0.740	0.248	
J	Total Nitrogen (mg/L)	8	< 0.320		1.120	0.785	0.763	0.249	
	Dis Reactive Phosphorus (mg/L)	8	< 0.001		0.006	0.003	0.003	0.001	
J	Total Phosphorus (mg/L)	8	< 0.017		0.041	0.030	0.027	0.011	
J	CBOD-5 (mg/L)	8	< 2.0		2.0	1.0	1.0	0.0	
	Chlorides (mg/L)	8	2900.0		11000.0	9250.0	8550.0	2693.4	
	Total Metals								
J	Aluminum (T) (mg/L)	3	0.058		0.141	0.077	0.092	0.043	
J	Iron (T) (mg/L)	3	< 0.063		0.077	0.032	0.047	0.026	
J	Manganese (T) (mg/L)	3	< 0.004		0.012	0.002	0.005	0.006	
	Dissolved Metals								
J	Aluminum (mg/L)	3	< 0.023		0.035	0.029	0.025	0.012	
	Antimony (µg/L)	3	< 1.480	<	1.480	0.740	0.740	0.000	
J	Arsenic (µg/L)	3	1.010		1.770	1.290	1.357	0.384	
	Cadmium (µg/L)	3	< 0.202	<	0.202	0.101	0.101	0.000	
J	Chromium (µg/L)	3	0.356		0.904	0.460	0.573	0.291	
J	Copper (µg/L)	3	< 0.394		0.397	0.197	0.264	0.115	
	Iron (mg/L)	3	< 0.063	<	0.063	0.032	0.032	0.000	
	Lead (µg/L)	3	< 0.277	<	0.277	0.138	0.138	0.000	
	Manganese (mg/L)	3	< 0.004	<	0.004	0.002	0.002	0.000	
	Nickel (µg/L)	3	< 0.328	<	0.328	0.164	0.164	0.000	
J	Selenium (µg/L)	3	< 2.150		53.500	9.540	21.372	28.144	
	Silver (µg/L)	3	< 1.970	<	1.970	0.985	0.985	0.000	
	Thallium (µg/L)	3	< 0.239	<	0.239	0.120	0.120	0.000	
J	Zinc (µg/L)	3	1.220		3.290	1.290	1.933	1.175	
	Biological								
	Chlorophyll a (mg/m³)	7	< 1.00		5.30	1.50	1.83	1.66	
J,L	Enterococci (MPN/DL)	8	10		10	5	6	2	

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

	Parameter	N	Min		Max	Med	Avg	SD	E
PDBB-3	**Physical**								
	Temperature (°C)	8	20.4		31.0	27.0	26.2	3.6	
	Turbidity (NTU)	8	3.5		7.5	4.4	5.3	1.7	
	Total Dissolved Solids (mg/L)	8	1390.0		19700.0	7170.0	8315.0	5912.9	
J	Total Suspended Solids (mg/L)	8	4.0		12.0	5.5	6.9	3.1	
	Specific Conductance	8	216.3		30716.0	12785.8	14460.5	9542.3	
	Hardness (mg/L)	3	786.0		1680.0	1350.0	1272.0	452.1	
J	Alkalinity (mg/L)	8	< 0.6		55.3	32.2	29.1	19.6	
	Chemical								
	Dissolved Oxygen (mg/L)	8	4.5 C		10.1	6.9	7.4	1.8	1
	pH (SU)	8	4.9 C		7.9	7.4	7.1	1.0	1
	Ammonia Nitrogen (mg/L)	8	< 0.028		0.060	0.014	0.020	0.016	
J	Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.039		0.154	0.042	0.060	0.045	
	Total Kjeldahl Nitrogen (mg/L)	8	0.360		0.740	0.650	0.599	0.145	
J	Total Nitrogen (mg/L)	8	< 0.450		0.781	0.670	0.658	0.118	
J	Dis Reactive Phosphorus (mg/L)	8	< 0.003		0.012	0.003	0.005	0.004	
J	Total Phosphorus (mg/L)	8	0.012		0.042	0.026	0.028	0.009	
J	CBOD-5 (mg/L)	8	< 2.0		2.0	1.0	1.0	0.0	
J	Chlorides (mg/L)	8	52.0		10000.0	4150.0	4619.0	3001.7	
	Total Metals								
J	Aluminum (T) (mg/L)	3	0.083		0.099	0.097	0.093	0.009	
J	Iron (T) (mg/L)	3	0.123		0.186	0.156	0.155	0.032	
J	Manganese (T) (mg/L)	3	< 0.004		0.032	0.018	0.017	0.015	
	Dissolved Metals								
J	Aluminum (mg/L)	3	< 0.023		0.058	0.053	0.041	0.026	
	Antimony (µg/L)	3	< 1.480	<	1.480	0.740	0.740	0.000	
J	Arsenic (µg/L)	3	0.659		2.060	0.905	1.208	0.748	
	Cadmium (µg/L)	3	< 0.202	<	0.202	0.101	0.101	0.000	
J	Chromium (µg/L)	3	0.369		0.692	0.573	0.545	0.163	
	Copper (µg/L)	3	< 0.394	<	0.394	0.197	0.197	0.000	
	Iron (mg/L)	3	< 0.063		0.063	0.032	0.032	0.000	
	Lead (µg/L)	3	< 0.277	<	0.277	0.138	0.138	0.000	
J	Manganese (mg/L)	3	< 0.004		0.007	0.002	0.004	0.003	
J	Nickel (µg/L)	3	< 0.328		1.550	0.164	0.626	0.800	
J	Selenium (µg/L)	3	4.610		28.700	11.300	14.870	12.435	
	Silver (µg/L)	3	< 1.970	<	1.970	0.985	0.985	0.000	
	Thallium (µg/L)	3	< 0.239	<	0.239	0.120	0.120	0.000	
J	Zinc (µg/L)	3	2.020		2.870	2.810	2.567	0.474	
	Biological								
	Chlorophyll a (mg/m³)	7	< 1.00		6.90	1.30	1.91	2.28	
J,L	Enterococci (MPN/DL)	8	10		10	5	6	2	

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

	Parameter	N	Min		Max	Med	Avg	SD	E
SHLB-1	**Physical**								
	Temperature (°C)	8	17.8		31.2	27.7	26.5	4.5	
	Turbidity (NTU)	8	0.8		4.2	1.8	2.2	1.4	
	Total Dissolved Solids (mg/L)	8	4380.0		6480.0	5150.0	5258.8	755.9	
	J Total Suspended Solids (mg/L)	8	2.0		6.0	3.5	3.6	1.4	
	Specific Conductance	8	8137.2		11296.3	9557.0	9570.3	1107.3	
	Hardness (mg/L)	3	781.0		966.0	829.0	858.7	96.0	
	Alkalinity (mg/L)	8	17.1		43.7	40.5	36.7	9.7	
	Chemical								
	Dissolved Oxygen (mg/L)	8	6.3		8.5	7.0	7.2	0.8	
	pH (SU)	8	7.5		7.7	7.6	7.6	0.1	
	Ammonia Nitrogen (mg/L)	8	< 0.028		0.029	0.014	0.014	0.000	
	J Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.009		0.039	0.020	0.016	0.007	
	Total Kjeldahl Nitrogen (mg/L)	8	< 0.140		1.200	0.660	0.638	0.414	
	J Total Nitrogen (mg/L)	8	< 0.074		1.220	0.680	0.653	0.417	
	J Dis Reactive Phosphorus (mg/L)	8	< 0.001		0.012	0.003	0.005	0.004	
	J Total Phosphorus (mg/L)	8	< 0.012		0.029	0.013	0.015	0.006	
	J CBOD-5 (mg/L)	8	< 2.0		2.0	1.0	1.0	0.0	
	Chlorides (mg/L)	8	2500.0		3800.0	2900.0	2975.0	492.1	
	Total Metals								
	J Aluminum (T) (mg/L)	3	0.030		0.062	0.038	0.043	0.017	
	J Iron (T) (mg/L)	3	< 0.063		0.188	0.084	0.101	0.080	
	Manganese (T) (mg/L)	3	< 0.004		0.004	0.002	0.002	0.000	
	Dissolved Metals								
	J Aluminum (mg/L)	3	< 0.023		0.037	0.024	0.024	0.013	
	Antimony (µg/L)	3	< 1.480	<	1.480	0.740	0.740	0.000	
	J Arsenic (µg/L)	3	0.670		0.770	0.708	0.716	0.050	
	Cadmium (µg/L)	3	< 0.202	<	0.202	0.101	0.101	0.000	
	J Chromium (µg/L)	3	0.628		0.984	0.867	0.826	0.181	
	J Copper (µg/L)	3	< 0.394		0.715	0.669	0.527	0.287	
	J Iron (mg/L)	3	< 0.063		0.134	0.032	0.066	0.059	
	Lead (µg/L)	3	< 0.277	<	0.277	0.138	0.138	0.000	
	Manganese (mg/L)	3	< 0.004	<	0.004	0.002	0.002	0.000	
	Nickel (µg/L)	3	< 0.328	<	0.328	0.164	0.164	0.000	
	J Selenium (µg/L)	3	3.080		7.530	5.200	5.270	2.226	
	Silver (µg/L)	3	< 1.970	<	1.970	0.985	0.985	0.000	
	Thallium (µg/L)	3	< 0.239	<	0.239	0.120	0.120	0.000	
	J Zinc (µg/L)	3	1.400		4.060	1.530	2.330	1.500	
	Biological								
	Chlorophyll a (mg/m³)	8	< 1.00		2.70	0.50	0.90	0.81	
	L Enterococci (MPN/DL)	8	10		10	5	5	0	

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	Parameter	N	Min		Max	Med	Avg	SD	E
TECB-1	**Physical**								
	Temperature (°C)	8	19.3		30.2	26.7	25.9	4.3	
	Turbidity (NTU)	8	1.9		26.7	3.6	6.2	8.3	
	Total Dissolved Solids (mg/L)	8	17300.0		35800.0	32500.0	30800.0	6011.2	
	Total Suspended Solids (mg/L)	8	8.0		65.0	13.0	19.0	18.7	
	Specific Conductance	8	24982.0		53042.4	51337.2	46848.4	9686.2	
	Hardness (mg/L)	3	2580.0		2920.0	2760.0	2753.3	170.1	
	Alkalinity (mg/L)	8	68.0		121.0	92.0	95.8	17.6	
	Chemical								
	Dissolved Oxygen (mg/L)	8	4.9 [C]		8.0	6.5	6.6	0.9	1
	pH (SU)	8	7.4		8.1	8.0	7.9	0.2	
[J]	Ammonia Nitrogen (mg/L)	8	< 0.028		0.029	0.014	0.014	0.000	
	Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.009		0.044	0.020	0.021	0.011	
[J]	Total Kjeldahl Nitrogen (mg/L)	8	0.630		1.800	1.300	1.248	0.433	
[J]	Total Nitrogen (mg/L)	8	< 0.650		1.804	1.320	1.268	0.433	
	Dis Reactive Phosphorus (mg/L)	8	< 0.001		0.006	0.003	0.003	0.001	
[J]	Total Phosphorus (mg/L)	8	< 0.005		0.071	0.038	0.038	0.030	
[J]	CBOD-5 (mg/L)	8	< 2.0		2.0	1.0	1.0	0.0	
	Chlorides (mg/L)	8	9200.0		19000.0	17500.0	16400.0	3138.7	
	Total Metals								
[J]	Aluminum (T) (mg/L)	3	0.094		1.610	0.095	0.600	0.875	
	Iron (T) (mg/L)	3	< 0.063		1.650	0.032	0.571	0.934	
[J]	Manganese (T) (mg/L)	3	< 0.004		0.004	0.002	0.002	0.000	
	Dissolved Metals								
	Aluminum (mg/L)	3	< 0.023	<	0.023	0.012	0.012	0.000	
	Antimony (µg/L)	3	< 1.480	<	1.480	0.740	0.740	0.000	
[J]	Arsenic (µg/L)	3	1.320		2.190	1.510	1.673	0.457	
	Cadmium (µg/L)	3	< 0.202	<	0.202	0.101	0.101	0.000	
[J]	Chromium (µg/L)	3	0.716		1.490	0.915	1.040	0.402	
[J]	Copper (µg/L)	3	0.482		0.834	0.659	0.658	0.176	
	Iron (mg/L)	3	< 0.063	<	0.063	0.032	0.032	0.000	
	Lead (µg/L)	3	< 0.277	<	0.277	0.138	0.138	0.000	
	Manganese (mg/L)	3	< 0.004	<	0.004	0.002	0.002	0.000	
	Nickel (µg/L)	3	< 0.328	<	0.328	0.164	0.164	0.000	
	Selenium (µg/L)	3	< 2.150		58.100	9.070	22.748	30.875	
	Silver (µg/L)	3	< 1.970	<	1.970	0.985	0.985	0.000	
	Thallium (µg/L)	3	< 0.239	<	0.239	0.120	0.120	0.000	
[J]	Zinc (µg/L)	3	0.795		3.730	1.350	1.958	1.559	
	Biological								
	Chlorophyll a (mg/m³)	8	< 1.00		2.70	0.50	0.94	0.77	
[L]	Enterococci (MPN/DL)	8	10		10	5	5	0	

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	Parameter	N	Min	Max	Med	Avg	SD	E
WLFB-2	**Physical**							
	Temperature (°C)	7	18.4	30.4	26.3	25.6	4.6	
	Turbidity (NTU)	8	5.4	35.1	6.4	10.4	10.2	
	Total Dissolved Solids (mg/L)	8	9450.0	19600.0	16800.0	15643.8	3359.4	
J	Total Suspended Solids (mg/L)	8	3.0	38.0	9.0	12.5	10.8	
	Specific Conductance	7	18220.6	30392.5	26856.1	25410.7	4949.4	
	Hardness (mg/L)	3	1600.0	2130.0	1860.0	1863.3	265.0	
	Alkalinity (mg/L)	8	43.3	79.2	70.8	64.5	14.6	
	Chemical							
	Dissolved Oxygen (mg/L)	7	5.0	8.1	6.7	6.7	1.1	
	pH (SU)	7	7.4	8.0	7.9	7.8	0.2	
J	Ammonia Nitrogen (mg/L)	8 <	0.028	0.029	0.014	0.014	0.000	
J	Nitrate+Nitrite Nitrogen (mg/L)	8 <	0.009	0.040	0.020	0.020	0.010	
	Total Kjeldahl Nitrogen (mg/L)	8	0.760	1.100	0.830	0.865	0.116	
J	Total Nitrogen (mg/L)	8 <	0.780	1.120	0.860	0.885	0.116	
J	Dis Reactive Phosphorus (mg/L)	8 <	0.001	0.028	0.003	0.006	0.009	
J	Total Phosphorus (mg/L)	8	0.022	0.098	0.042	0.047	0.023	
J	CBOD-5 (mg/L)	8 <	1.8	2.6	1.0	1.3	0.6	
	Chlorides (mg/L)	8	5200.0	9800.0	9200.0	8437.5	1702.9	
	Total Metals							
J	Aluminum (T) (mg/L)	3	0.107	1.140	0.113	0.453	0.595	
	Iron (T) (mg/L)	3 <	0.063	0.614	0.032	0.226	0.336	
J	Manganese (T) (mg/L)	3 <	0.004	0.087	0.037	0.042	0.043	
	Dissolved Metals							
J	Aluminum (mg/L)	3 <	0.023	0.030	0.012	0.018	0.011	
	Antimony (µg/L)	3 <	1.480	< 1.480	0.740	0.740	0.000	
J	Arsenic (µg/L)	3	1.110	1.920	1.620	1.550	0.410	
	Cadmium (µg/L)	3 <	0.202	< 0.202	0.101	0.101	0.000	
J	Chromium (µg/L)	3	0.473	1.320	0.974	0.922	0.426	
J	Copper (µg/L)	3 <	0.394	0.425	0.422	0.348	0.131	
	Iron (mg/L)	3 <	0.063	< 0.063	0.032	0.032	0.000	
	Lead (µg/L)	3 <	0.277	< 0.277	0.138	0.138	0.000	
J	Manganese (mg/L)	3 <	0.004	0.028	0.002	0.011	0.015	
J	Nickel (µg/L)	3 <	0.328	3.900	0.164	1.409	2.157	
	Selenium (µg/L)	3	18.500	30.500	23.300	24.100	6.040	
	Silver (µg/L)	3 <	1.970	< 1.970	0.985	0.985	0.000	
	Thallium (µg/L)	3 <	0.239	< 0.239	0.120	0.120	0.000	
J	Zinc (µg/L)	3	1.170	4.040	2.780	2.663	1.438	
	Biological							
	Chlorophyll a (mg/m³)	8 <	1.00	11.00	4.10	4.46	3.76	
J,L	Enterococci (MPN/DL)	8	10	10	5	6	2	

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	Parameter	N	Min		Max	Med	Avg	SD	E
WLFB-11	**Physical**								
	Temperature (°C)	7	18.6		31.6	27.0	26.5	4.8	
	Turbidity (NTU)	8	6.1		10.0	6.6	7.4	1.6	
	Total Dissolved Solids (mg/L)	8	8270.0		18200.0	14700.0	14282.9	3604.6	
	Total Suspended Solids (mg/L)	8	9.0		20.0	11.0	11.8	3.4	
	Specific Conductance	7	16978.5		29822.8	24698.1	23601.4	4707.6	
	Hardness (mg/L)	3	1480.0		2040.0	1780.0	1766.7	280.2	
	Alkalinity (mg/L)	8	43.1		81.5	61.6	61.3	14.5	
	Chemical								
	Dissolved Oxygen (mg/L)	7	5.0		9.0	6.2	6.8	1.6	
	pH (SU)	7	7.2		8.2	7.7	7.7	0.4	
J	Ammonia Nitrogen (mg/L)	8	< 0.028		0.029	0.014	0.014	0.000	
	Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.026		0.111	0.020	0.037	0.033	
	Total Kjeldahl Nitrogen (mg/L)	8	0.640		1.200	1.020	0.986	0.177	
	Total Nitrogen (mg/L)	8	< 0.660		1.220	1.070	1.023	0.178	
J	Dis Reactive Phosphorus (mg/L)	8	< 0.001		0.022	0.003	0.006	0.008	
J	Total Phosphorus (mg/L)	8	0.030		0.073	0.062	0.056	0.017	
J	CBOD-5 (mg/L)	8	< 2.0		4.8	3.0	2.9	1.3	
	Chlorides (mg/L)	8	4800.0		9600.0	8100.0	7825.0	1685.0	
	Total Metals								
J	Aluminum (T) (mg/L)	3	0.099		0.131	0.126	0.119	0.017	
J	Iron (T) (mg/L)	3	< 0.063		0.207	0.077	0.105	0.091	
J	Manganese (T) (mg/L)	3	0.033		0.058	0.053	0.048	0.013	
	Dissolved Metals								
J	Aluminum (mg/L)	3	< 0.023		0.030	0.012	0.018	0.011	
	Antimony (µg/L)	3	< 1.480	<	1.480	0.740	0.740	0.000	
J	Arsenic (µg/L)	3	1.160		2.060	1.680	1.633	0.452	
	Cadmium (µg/L)	3	< 0.202	<	0.202	0.101	0.101	0.000	
J	Chromium (µg/L)	3	0.505		0.946	0.593	0.681	0.233	
J	Copper (µg/L)	3	< 0.394		0.408	0.197	0.267	0.122	
	Iron (mg/L)	3	< 0.063	<	0.063	0.032	0.032	0.000	
	Lead (µg/L)	3	< 0.277	<	0.277	0.138	0.138	0.000	
J	Manganese (mg/L)	3	< 0.004		0.010	0.009	0.007	0.004	
J	Nickel (µg/L)	3	< 0.328		3.730	0.164	1.353	2.059	
J	Selenium (µg/L)	3	4.660		24.900	14.400	14.653	10.122	
	Silver (µg/L)	3	< 1.970	<	1.970	0.985	0.985	0.000	
	Thallium (µg/L)	3	< 0.239	<	0.239	0.120	0.120	0.000	
J	Zinc (µg/L)	3	1.130		3.950	3.880	2.987	1.608	
	Biological								
	Chlorophyll a (mg/m³)	8	< 1.00		19.00	5.40	6.64	5.92	
J,L	Enterococci (MPN/DL)	8	10		30	8	10	8	

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	Paraameter	N	Min	Max	Med	Avg	SD	E
WLFB-12	**Physical**							
	Temperature (°C)	7	19.6	31.5	27.1	26.6	4.5	
	Turbidity (NTU)	8	6.0	13.1	7.7	8.5	2.6	
	Total Dissolved Solids (mg/L)	8	8460.0	18700.0	15150.0	14545.0	3943.6	
	Total Suspended Solids (mg/L)	8	9.0	19.0	11.0	12.4	3.4	
	Specific Conductance	7	18516.5	31933.4	26498.9	25371.3	5241.2	
	Hardness (mg/L)	3	1600.0	2090.0	1840.0	1843.3	245.0	
	Alkalinity (mg/L)	8	46.3	77.7	72.0	66.8	11.9	
	Chemical							
	Dissolved Oxygen (mg/L)	7	5.1	8.1	7.0	6.8	1.0	
	pH (SU)	7	7.3	7.9	7.8	7.7	0.2	
J	Ammonia Nitrogen (mg/L)	8 <	0.028	0.030	0.014	0.016	0.006	
J	Nitrate+Nitrite Nitrogen (mg/L)	8 <	0.033	0.125	0.020	0.034	0.037	
	Total Kjeldahl Nitrogen (mg/L)	8	0.590	1.300	0.965	0.926	0.209	
J	Total Nitrogen (mg/L)	8 <	0.610	1.320	0.984	0.961	0.198	
J	Dis Reactive Phosphorus (mg/L)	8 <	0.001	0.095	0.003	0.014	0.033	
J	Total Phosphorus (mg/L)	8	0.022	0.063	0.046	0.044	0.014	
J	CBOD-5 (mg/L)	8 <	2.0	3.0	1.0	1.6	0.9	
	Chlorides (mg/L)	8	5600.0	10000.0	8900.0	8437.5	1632.6	
	Total Metals							
J	Aluminum (T) (mg/L)	3	0.121	0.275	0.156	0.184	0.081	
J	Iron (T) (mg/L)	3 <	0.063	0.156	0.123	0.104	0.064	
J	Manganese (T) (mg/L)	3	0.010	0.060	0.046	0.039	0.026	
	Dissolved Metals							
J	Aluminum (mg/L)	3 <	0.023	0.031	0.025	0.022	0.010	
	Antimony (µg/L)	3 <	1.480	< 1.480	0.740	0.740	0.000	
J	Arsenic (µg/L)	3	0.993	2.210	1.640	1.614	0.609	
	Cadmium (µg/L)	3 <	0.202	< 0.202	0.101	0.101	0.000	
J	Chromium (µg/L)	3	0.433	1.300	0.458	0.730	0.494	
J	Copper (µg/L)	3 <	0.394	0.635	0.477	0.436	0.222	
	Iron (mg/L)	3 <	0.063	< 0.063	0.032	0.032	0.000	
	Lead (µg/L)	3 <	0.277	< 0.277	0.138	0.138	0.000	
J	Manganese (mg/L)	3 <	0.004	0.011	0.002	0.005	0.005	
J	Nickel (µg/L)	3 <	0.328	3.760	0.164	1.363	2.076	
	Selenium (µg/L)	3	11.200	30.500	20.300	20.667	9.655	
	Silver (µg/L)	3 <	1.970	< 1.970	0.985	0.985	0.000	
	Thallium (µg/L)	3 <	0.239	< 0.239	0.120	0.120	0.000	
J	Zinc (µg/L)	3	1.320	3.700	3.220	2.747	1.259	
	Biological							
	Chlorophyll a (mg/m³)	8 <	1.00	14.00	3.70	4.18	4.28	
J,L	Enterococci (MPN/DL)	8	10	60	5	14	19	

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