

Technical Memorandum
Prepared for the City of Pompano Beach
Prepared by Anthony Janicki, PhD
April 18, 2019

Review of water quality data collected as the result of accidental wastewater discharge from the Force Main at NW 15th Street and I-95 Pompano Beach, FL

On January 4, 2019, subcontractors working for FDOT ruptured a 42" force main operated by the City of Pompano Beach. This resulted in a release of raw sewage to Canal-1 to the Pompano Canal and through the G-57 structure to the Intracoastal Waterway. A bypass was put in place and discharge ceased on January 10, 2019. The total estimated wastewater spill is 52 million gallons.

A remediation plan was developed by APTIM in response to a letter from the Broward County Environmental Protection and Growth Management Department. The plan called for the placement of aerators to reduce the impacts of pollutants including bacteria. The intention of aeration is to create ideal conditions for the growth of aerobic bacteria that break down organic waste. According to City updates (http://pompanobeachfl.gov/pages/wastewater_spill), between January 11 and January 13, 2019, the City initialized operation of 67 aerators throughout the affected waterways. By January 18, 86 aerators were in operation; by January 20 there were 118 and by January 22 there were 147 aerators in operation. Between January 30 and 31, all aerators east of the G-57 structure were removed or relocated west of the structure. Between February 1 and February 7 the number of aerators operating west of the structure varied between 79 and 82. Following February 7 this number declined and by February 13, 2019 all aerators had been removed.

The remediation plan also specified that at a minimum, fecal coliform sampling should be conducted at the point of discharge, 200-400 feet upstream, and 200-400 feet downstream of the discharge point. Additionally, sampling should be continued at 24-hour intervals until the fecal coliform count is below 800 colonies/100 ml.

The City of Pompano Beach began sampling on January 8, 2019. Initially, five stations were sampled, which were subsequently expanded to 16 stations (Figure 1). Sampling was conducted daily until February 8, 2019 upon clearance by the Florida Department of Environmental Protection (FDEP) and Broward County. Parameters sampled included fecal coliform, temperature, pH and total chlorine residual.



Figure 1. City of Pompano Beach spill response sampling locations.

Broward County began sampling on January 10th and collected daily until January 16th. The county initially sampled five stations, but expanded to 10 regularly sampled stations; several other stations were sampled only a single time and some were sampled later in January solely for dissolved oxygen and turbidity (Figure 2). Parameters sampled included fecal coliform, *Escherichia coli* (*E. coli*), *Enterococci*, and turbidity.



Figure 2. Broward County spill response sampling locations.

Post-event sampling was conducted by the City of Pompano Beach (contracted to Pace) following a sampling plan provided by Janicki Environmental, Inc. Weekly sampling was initiated on February 11, 2019. Parameters include the indicator bacteria *E. coli* and *Enterococci*, nutrients (nitrogen species and phosphorus), chlorophyll *a* and physical measurements of temperature, salinity, pH and dissolved oxygen. The sampling locations for post-spill monitoring are mapped in Figure 3. Available data extend through the third week of March, 2018.

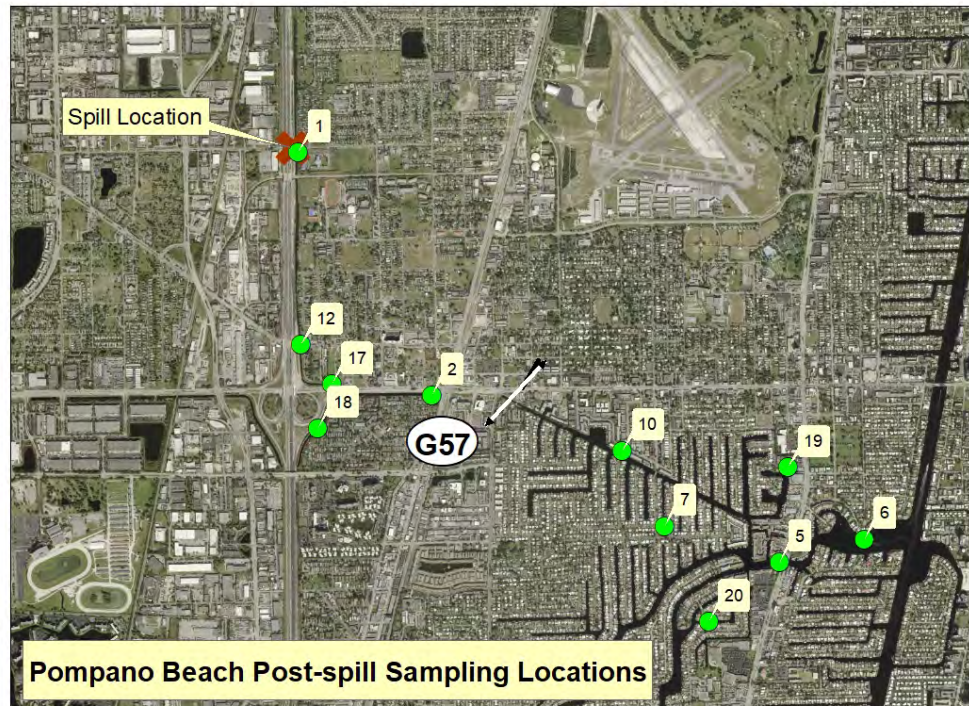


Figure 3. City of Pompano Beach post- spill response sampling locations.

Appendices A and B contain summary tables and time-series plots of the data collected by the City of Pompano Beach (Pace) and Broward County, respectively. The data for the City include both spill response sampling, and the post-spill sampling described above. The G-57 structure delineates freshwater (above the structure) from tidally influenced (saltwater, below the structure).

Appendix A plots illustrate the initial high fecal coliform values, followed by a sharp decline and consistent values below the value indicated by the remediation plan. This is observed at sampling stations both upstream and downstream of the G-57 structure. Broward County stations (Appendix B) that were sampled on more than one event also illustrate this decline in fecal coliform, as well as for *Enterococci* in the short term (January 9 – January 16). The timing of the decline appears to coincide with the timing of installation of the aerators mentioned above.

Broward County data (Appendix B) for sites located above the G-57 structure suggest an increase in dissolved oxygen levels subsequent to the installation of aerators. These stations (BC20, BC21, BC22, BC23) were only sampled twice on January 18 and January 23 but all show an increase from near zero concentrations of dissolved oxygen to greater than 10 mg/L in most cases (BC21 rose to above 6 mg/L). BC24 was also sampled on these two dates, but DO was greater than 5.0 mg/L on both dates.

As stated above, the aerators were removed from the affected area upstream of the G-57 structure on or around February 13. Broward County did not perform sampling after this date. The City of Pompano Beach (Pace) stations (Appendix A) that were sampled as part of the post-spill monitoring plan provide some indication of patterns in the data following the removal of the aerators as sampling began just prior to the removal of the aerators. The data were available only through the third week of March. Additionally, in some cases, values are indicated to be surface values, while other values are of unknown depth. The plots in Appendix A represent daily means. At station 1, dissolved oxygen levels began to

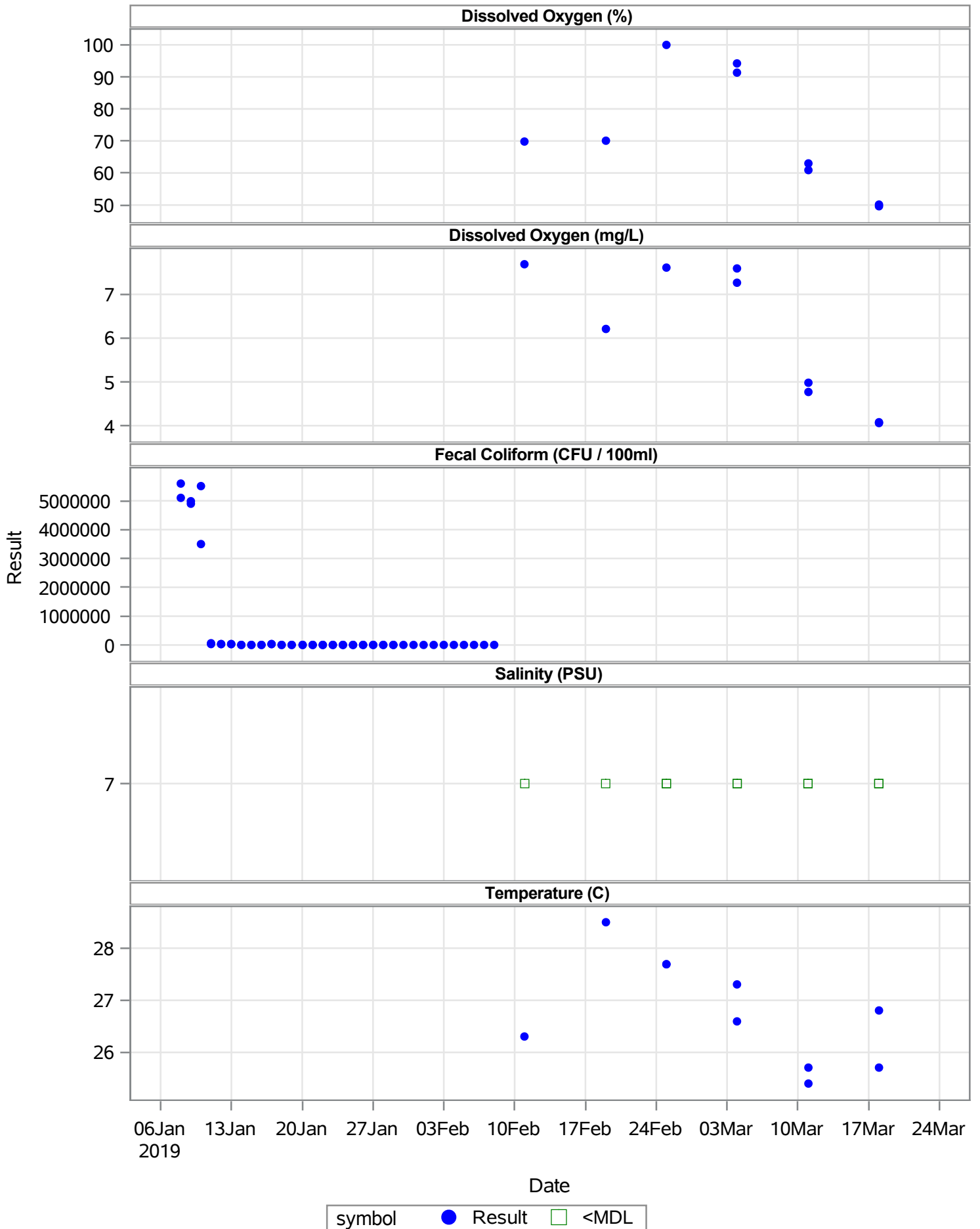
decline, as did temperature values. Stations 2 data suggest a decline in chlorophyll a and orthophosphate but a possible increase in *Enterococci*. Chlorophyll, orthophosphate, total phosphorus (TP), total Kjeldahl nitrogen (TKN) and total nitrogen (TN) data also indicate a decreasing pattern at station 12. Dissolved oxygen data at stations 17 and 18 appear to have declined following the removal of the aerators, but had not reached the level of hypoxia for the period of record available.

Appendix A - Pompano Beach

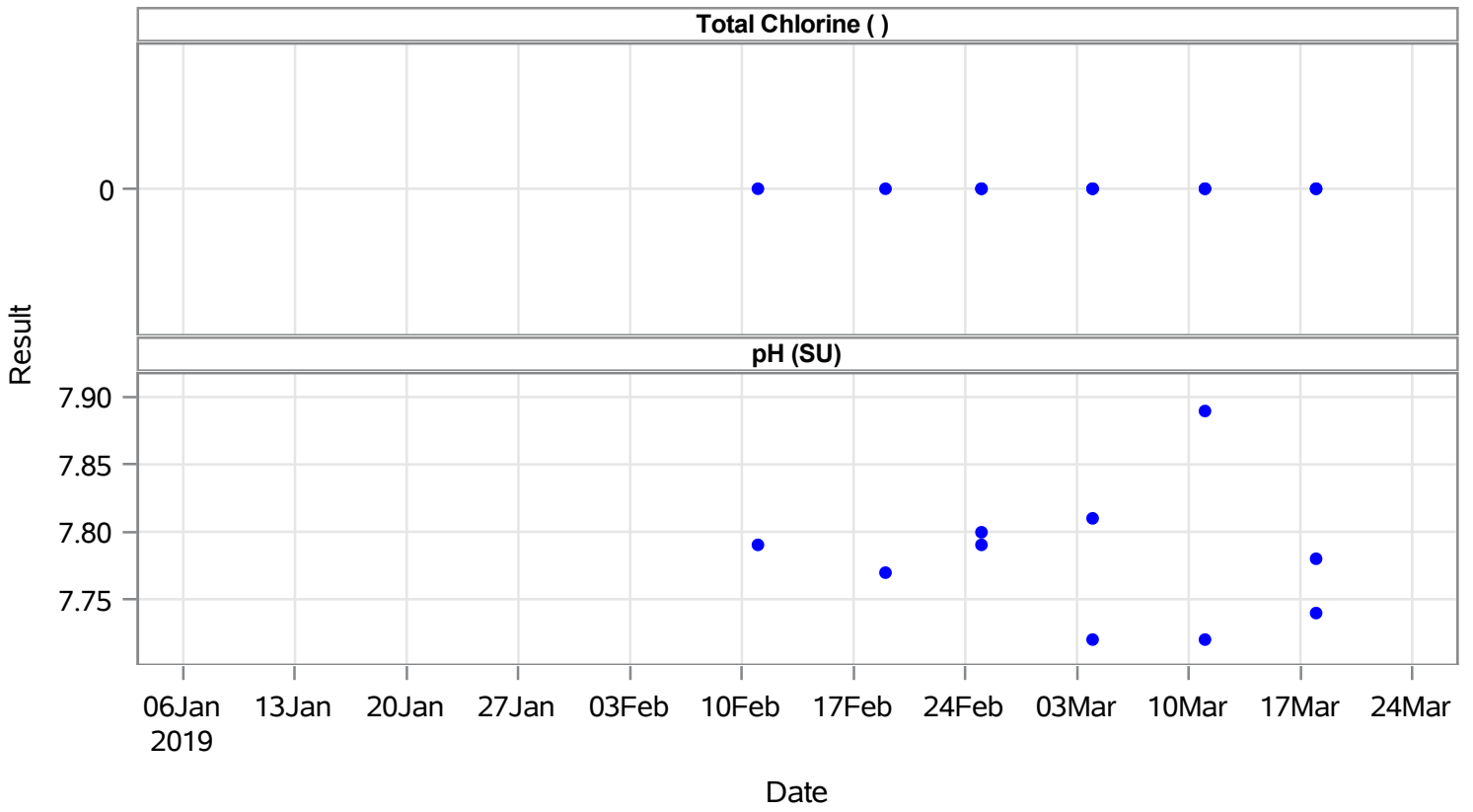
Pompano(Pace) (1)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Dissolved Oxygen	%	02/11/2019	03/18/2019	49.60	100.00	72.12	69.80	9
Dissolved Oxygen	mg/L	02/11/2019	03/18/2019	4.05	7.69	6.03	6.21	9
Fecal Coliform	CFU / 100ml	01/08/2019	02/08/2019	60.00	5600000.00	555031.33	2375.00	54
Salinity	PSU	02/11/2019	03/18/2019	7.00	7.00	7.00	7.00	10
Temperature	C	02/11/2019	03/18/2019	25.40	28.50	26.77	26.70	10
Total Chlorine		02/11/2019	03/18/2019	0.00	0.00	0.00	0.00	10
pH	SU	02/11/2019	03/18/2019	7.72	7.89	7.78	7.79	10

Pompano(Pace) 1



Pompano(Pace) 1

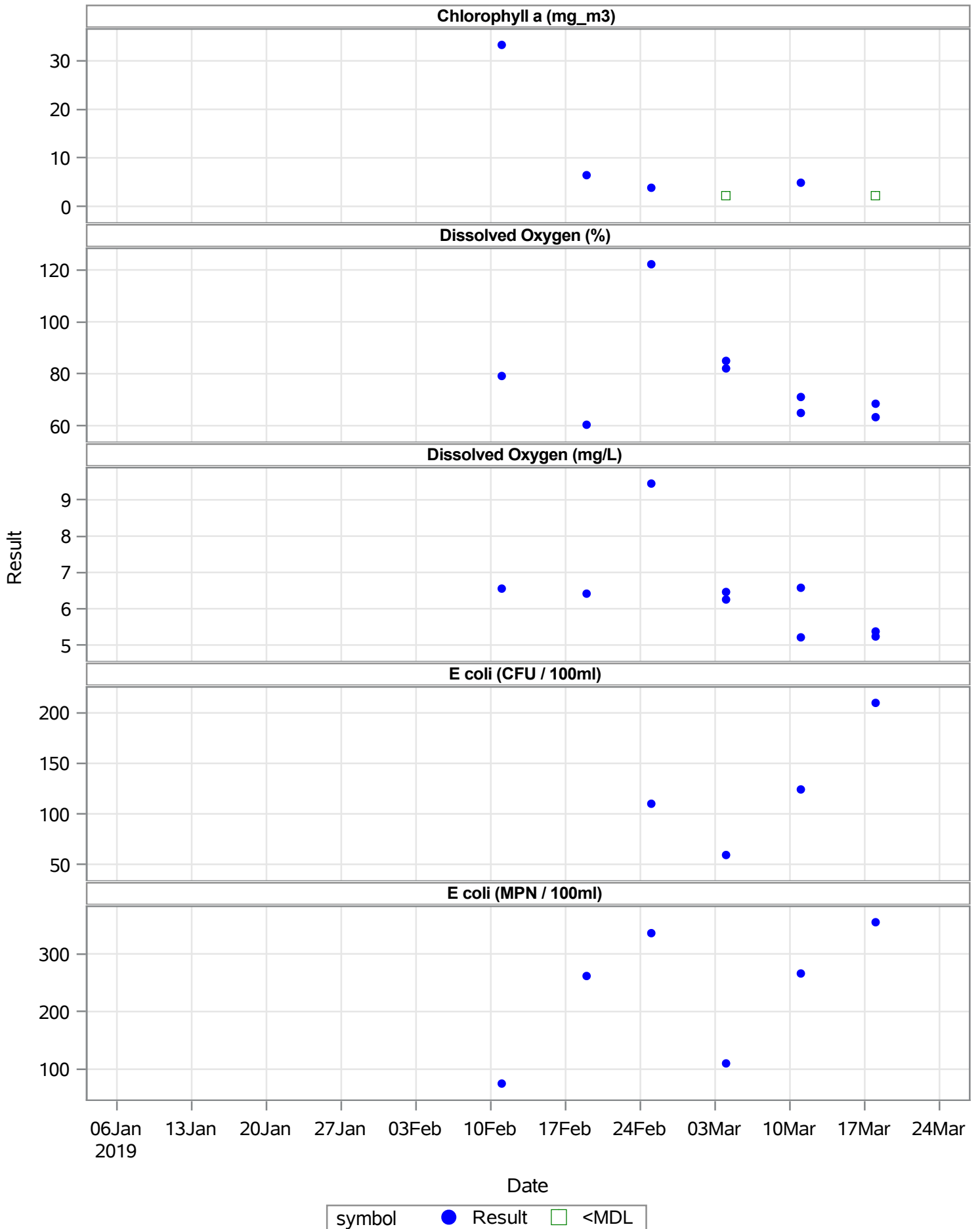


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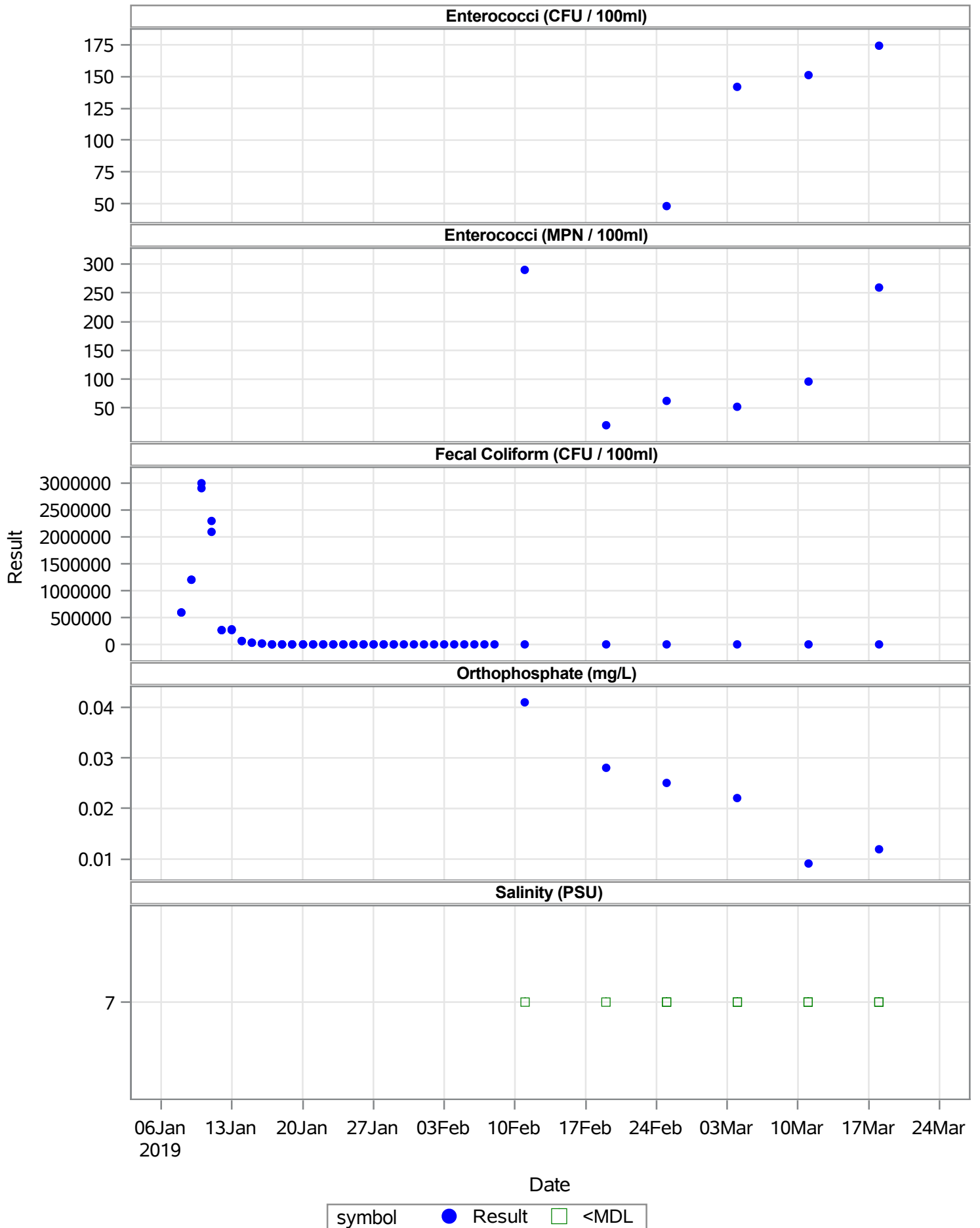
Pompano(Pace) (2)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Chlorophyll a	mg_m3	02/11/2019	03/18/2019	2.2000	33.30	8.80	4.35	6
Dissolved Oxygen	%	02/11/2019	03/18/2019	60.2000	122.20	77.31	70.90	9
Dissolved Oxygen	mg/L	02/11/2019	03/18/2019	5.2200	9.45	6.39	6.42	9
E coli	CFU / 100ml	02/25/2019	03/18/2019	59.0000	210.00	125.75	117.00	4
E coli	MPN / 100ml	02/11/2019	03/18/2019	75.0000	355.00	234.00	264.00	6
Enterococci	CFU / 100ml	02/25/2019	03/18/2019	48.0000	174.00	128.75	146.50	4
Enterococci	MPN / 100ml	02/11/2019	03/18/2019	20.0000	289.00	129.67	79.00	6
Fecal Coliform	CFU / 100ml	01/08/2019	03/18/2019	54.0000	3000000.00	253957.18	1160.00	60
Orthophosphate	mg/L	02/11/2019	03/18/2019	0.0091	0.04	0.02	0.02	6
Salinity	PSU	02/11/2019	03/18/2019	7.0000	7.00	7.00	7.00	10
TKN	mg/L	02/11/2019	03/18/2019	1.0000	1.10	1.05	1.05	6
Temperature	C	02/11/2019	03/18/2019	25.5000	29.60	27.99	28.55	10
Total Chlorine		02/11/2019	03/18/2019	0.0000	0.00	0.00	0.00	10
Total Nitrogen	mg/L	02/11/2019	03/18/2019	1.0000	1.20	1.10	1.10	6
Total Phosphorus	mg/L	02/11/2019	03/18/2019	0.0500	0.11	0.06	0.05	6
pH	SU	02/11/2019	03/18/2019	7.9000	8.10	8.01	8.03	10

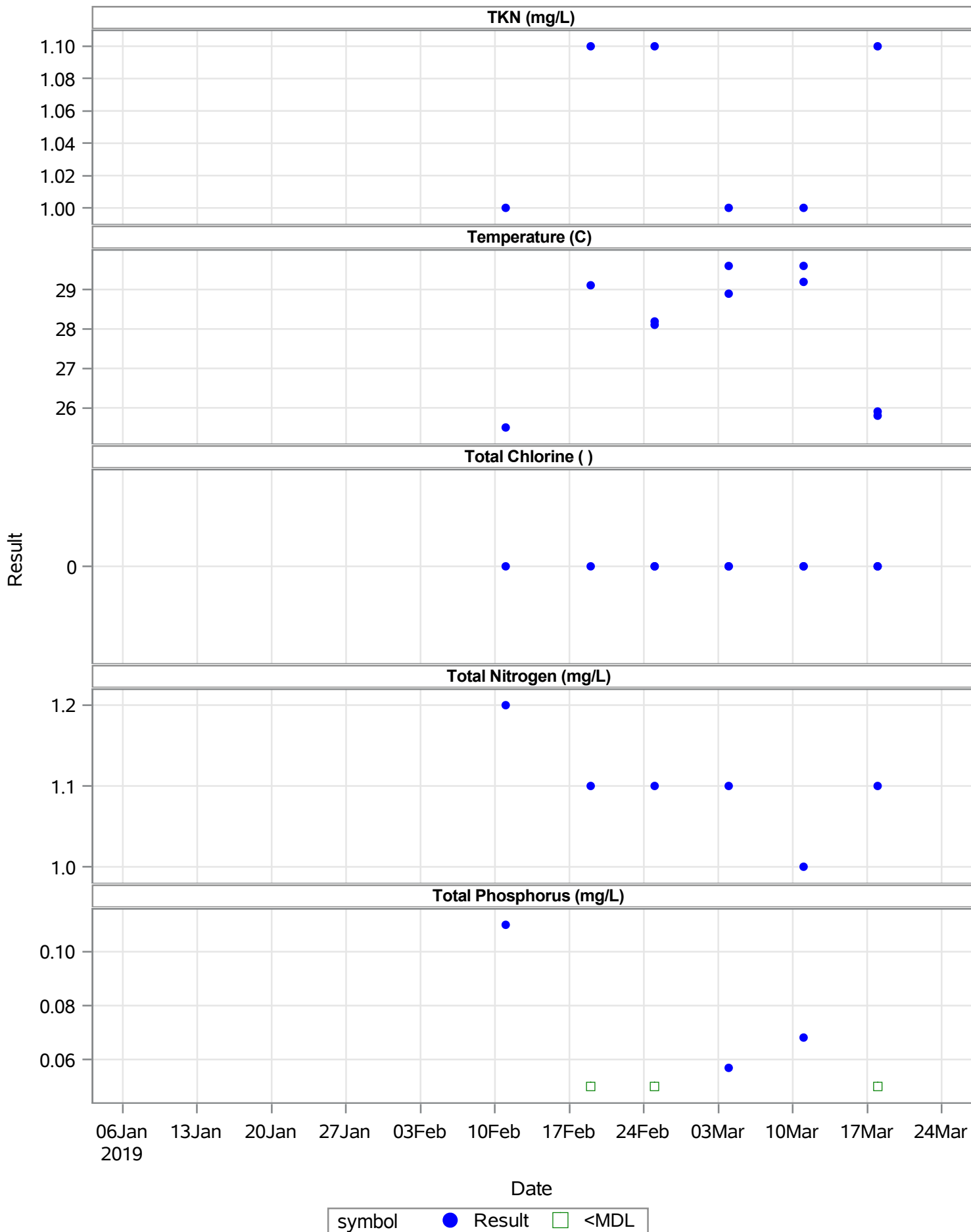
Pompano(Pace) 2



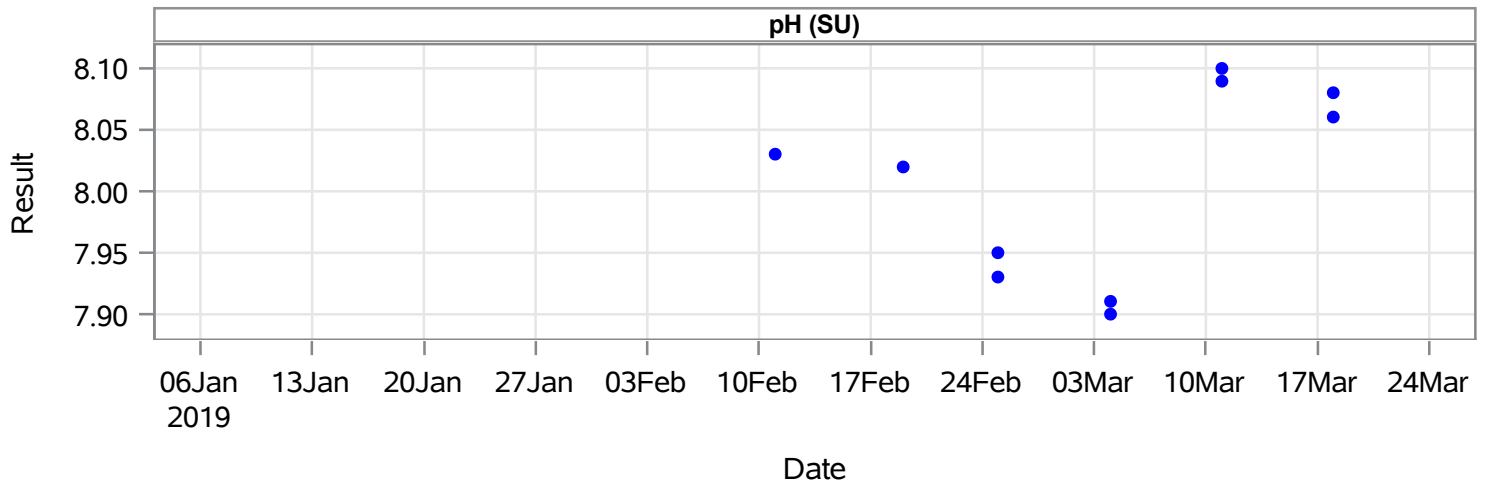
Pompano(Pace) 2



Pompano(Pace) 2



Pompano(Pace) 2

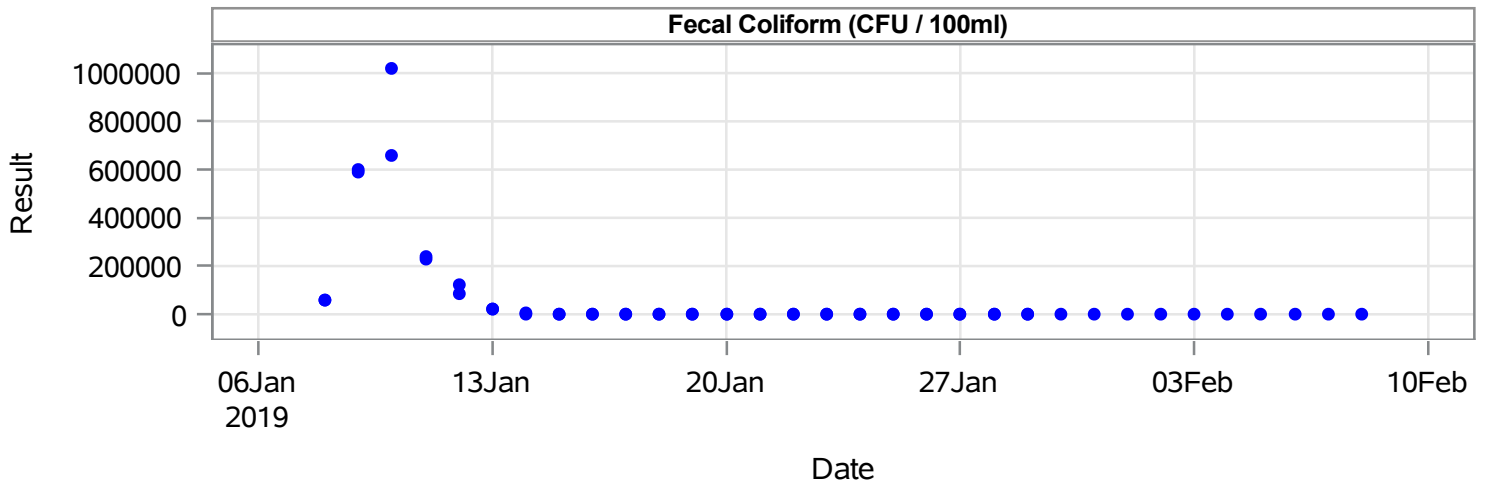


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Pompano(Pace) (3)

Analyte	Units	Start Date	End Date	Minimum Value	Maximum Value	Mean	Median	Number of obs
Fecal Coliform	CFU / 100ml	01/08/2019	02/08/2019	4	1020000	69083.85	358.5	54

Pompano(Pace) 3



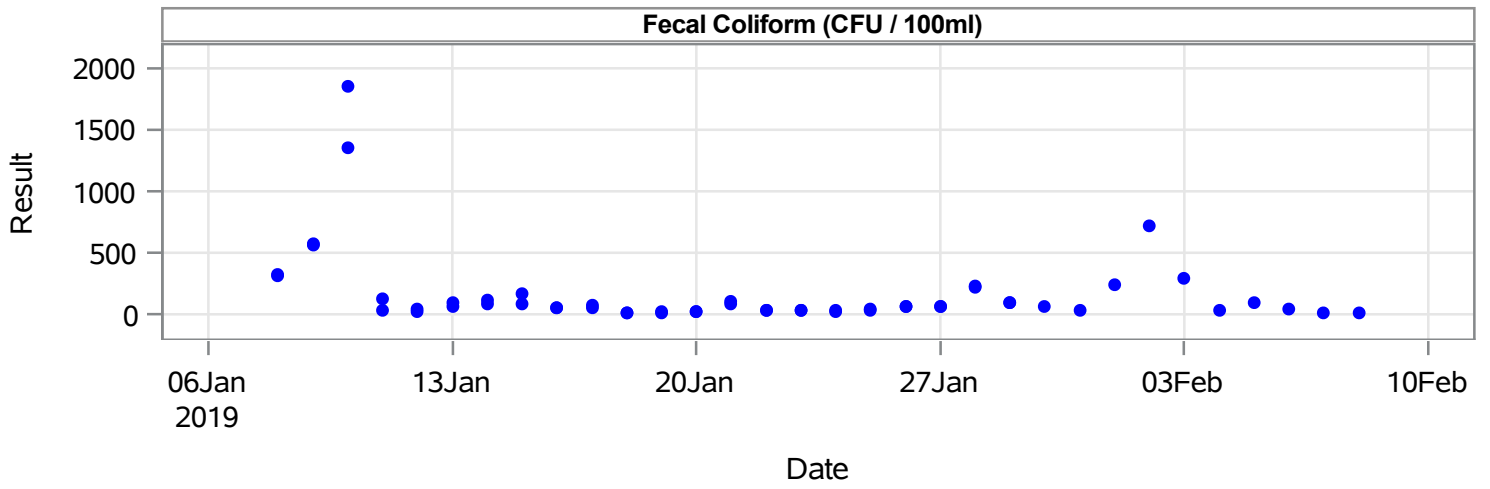
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Pompano(Pace) (4)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Fecal Coliform	CFU / 100ml	01/08/2019	02/08/2019	7	1850	165.963	60	54

Pompano(Pace) 4

Fecal Coliform (CFU / 100ml)

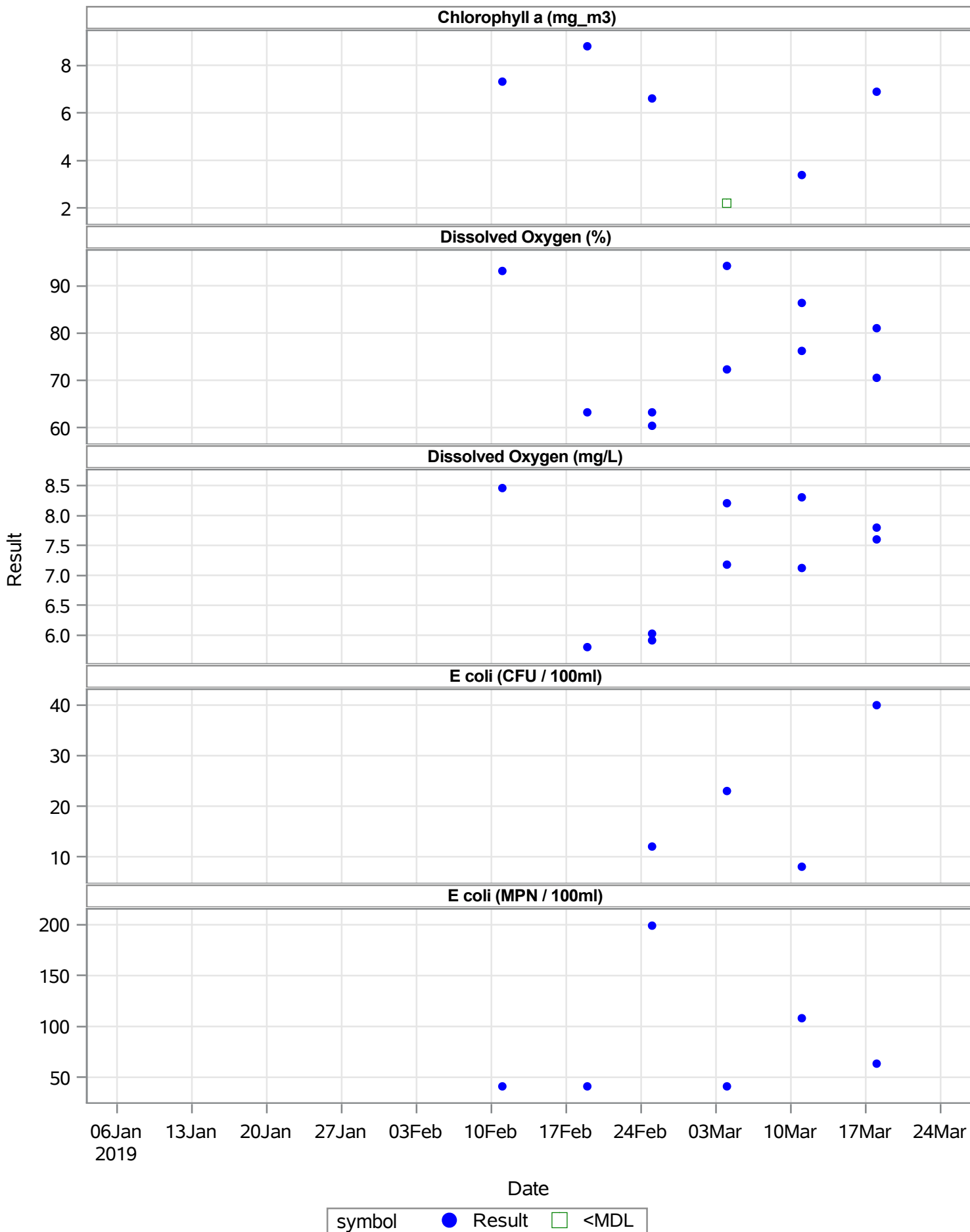


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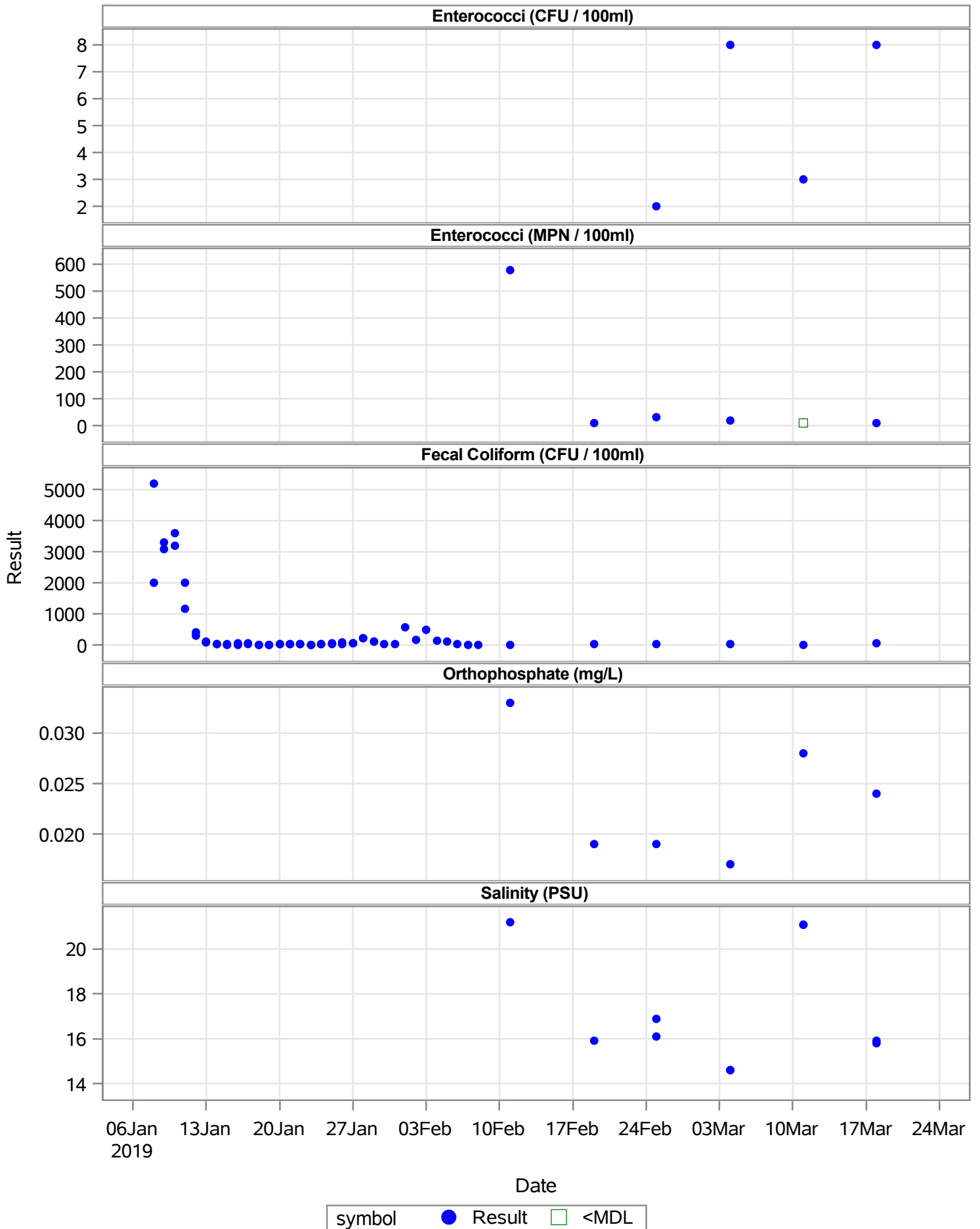
Pompano(Pace) (5)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Chlorophyll a	mg_m3	02/11/2019	03/18/2019	2.200	8.80	5.867	6.750	6
Dissolved Oxygen	%	02/11/2019	03/18/2019	60.300	94.20	76.060	74.250	10
Dissolved Oxygen	mg/L	02/11/2019	03/18/2019	5.800	8.46	7.240	7.390	10
E coli	CFU / 100ml	02/25/2019	03/18/2019	8.000	40.00	20.750	17.500	4
E coli	MPN / 100ml	02/11/2019	03/18/2019	41.000	199.00	82.167	52.000	6
Enterococci	CFU / 100ml	02/25/2019	03/18/2019	2.000	8.00	5.250	5.500	4
Enterococci	MPN / 100ml	02/11/2019	03/18/2019	10.000	579.00	110.000	15.000	6
Fecal Coliform	CFU / 100ml	01/08/2019	03/18/2019	7.000	5200.00	461.817	39.000	60
Orthophosphate	mg/L	02/11/2019	03/18/2019	0.017	0.03	0.023	0.022	6
Salinity	PSU	02/11/2019	03/18/2019	14.600	21.20	17.320	16.000	10
TKN	mg/L	02/11/2019	03/18/2019	0.340	0.53	0.435	0.430	6
Temperature	C	02/11/2019	03/18/2019	24.300	26.80	25.750	25.900	10
Total Chlorine		02/11/2019	03/18/2019	0.000	0.00	0.000	0.000	10
Total Nitrogen	mg/L	02/11/2019	03/18/2019	0.360	0.59	0.490	0.490	6
Total Phosphorus	mg/L	02/11/2019	03/18/2019	0.050	0.06	0.051	0.050	6
pH	SU	02/11/2019	03/18/2019	7.500	7.69	7.609	7.620	10

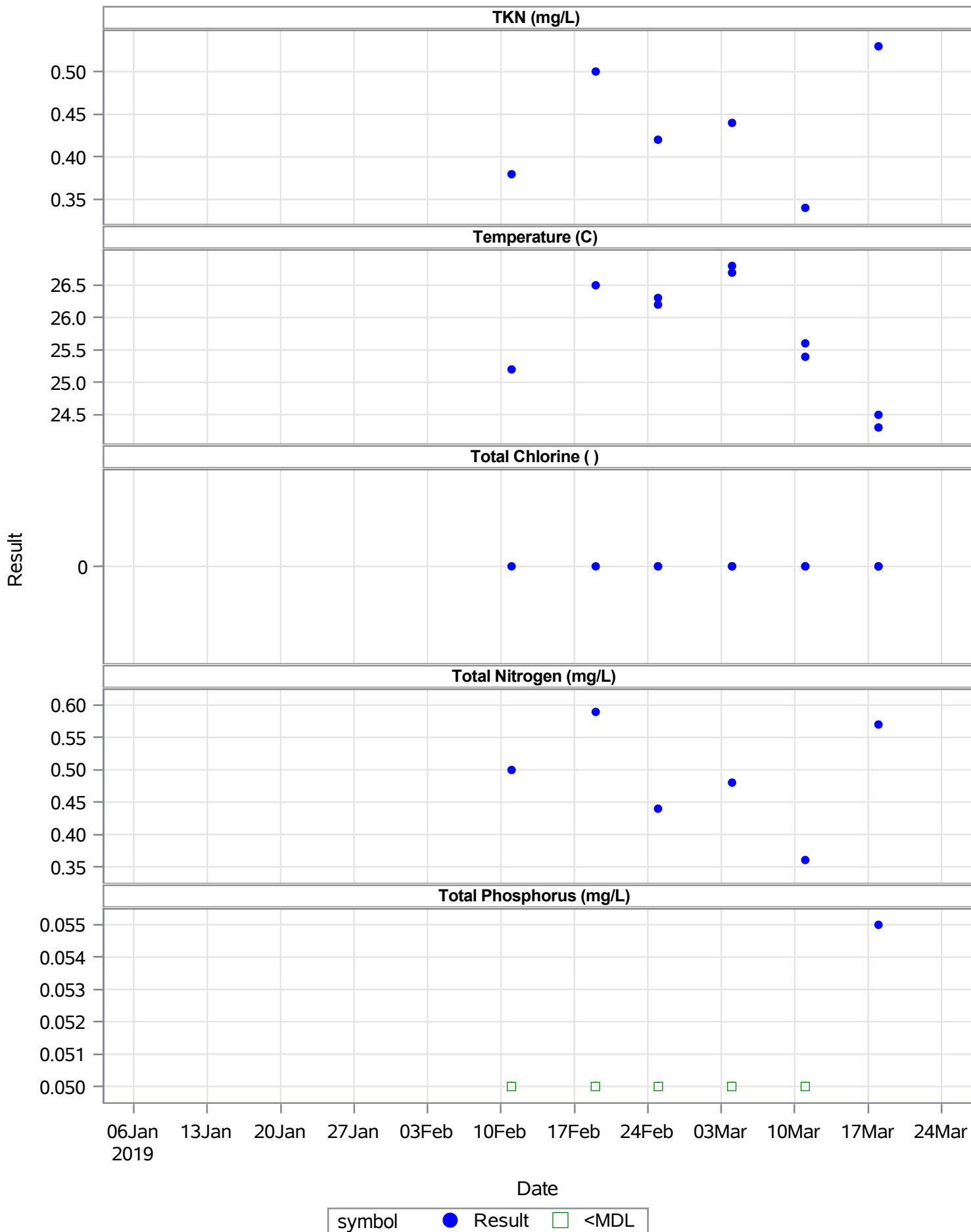
Pompano(Pace) 5



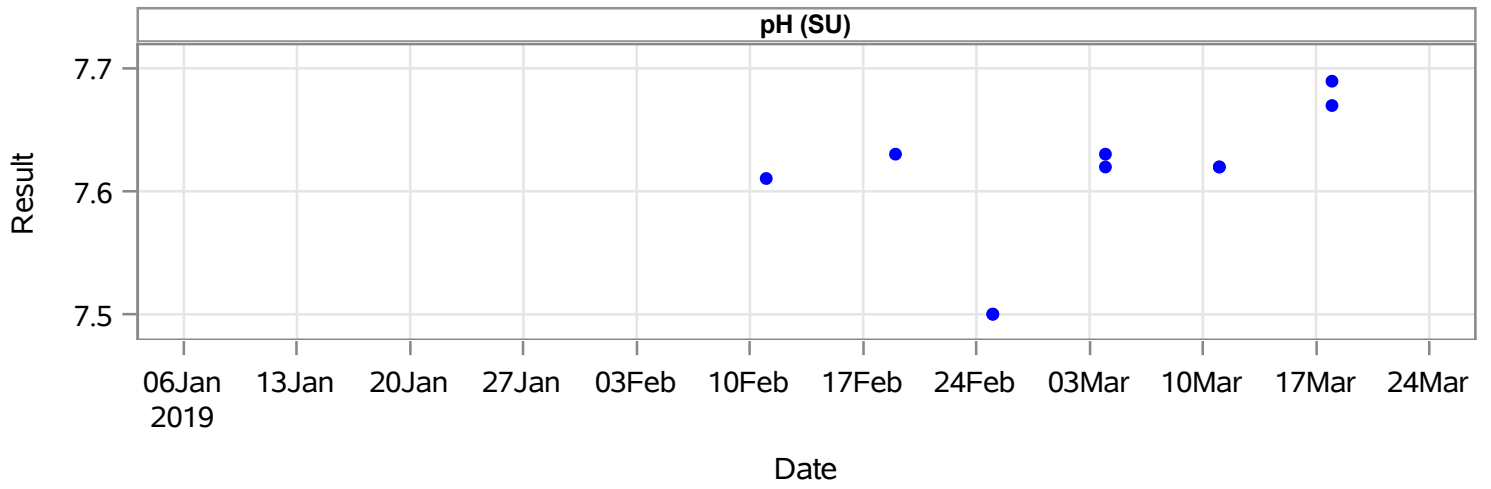
Pompano(Pace) 5



Pompano(Pace) 5



Pompano(Pace) 5

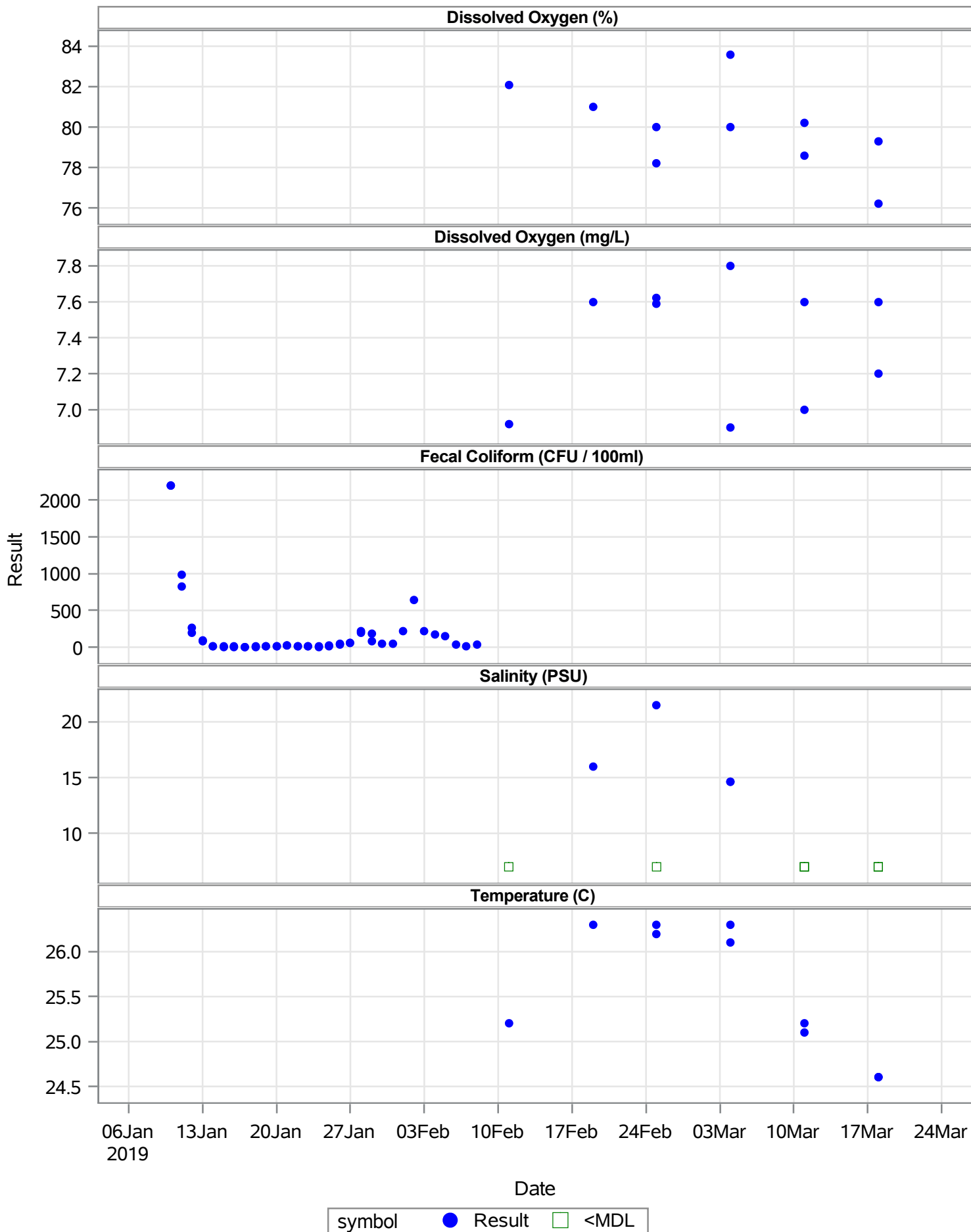


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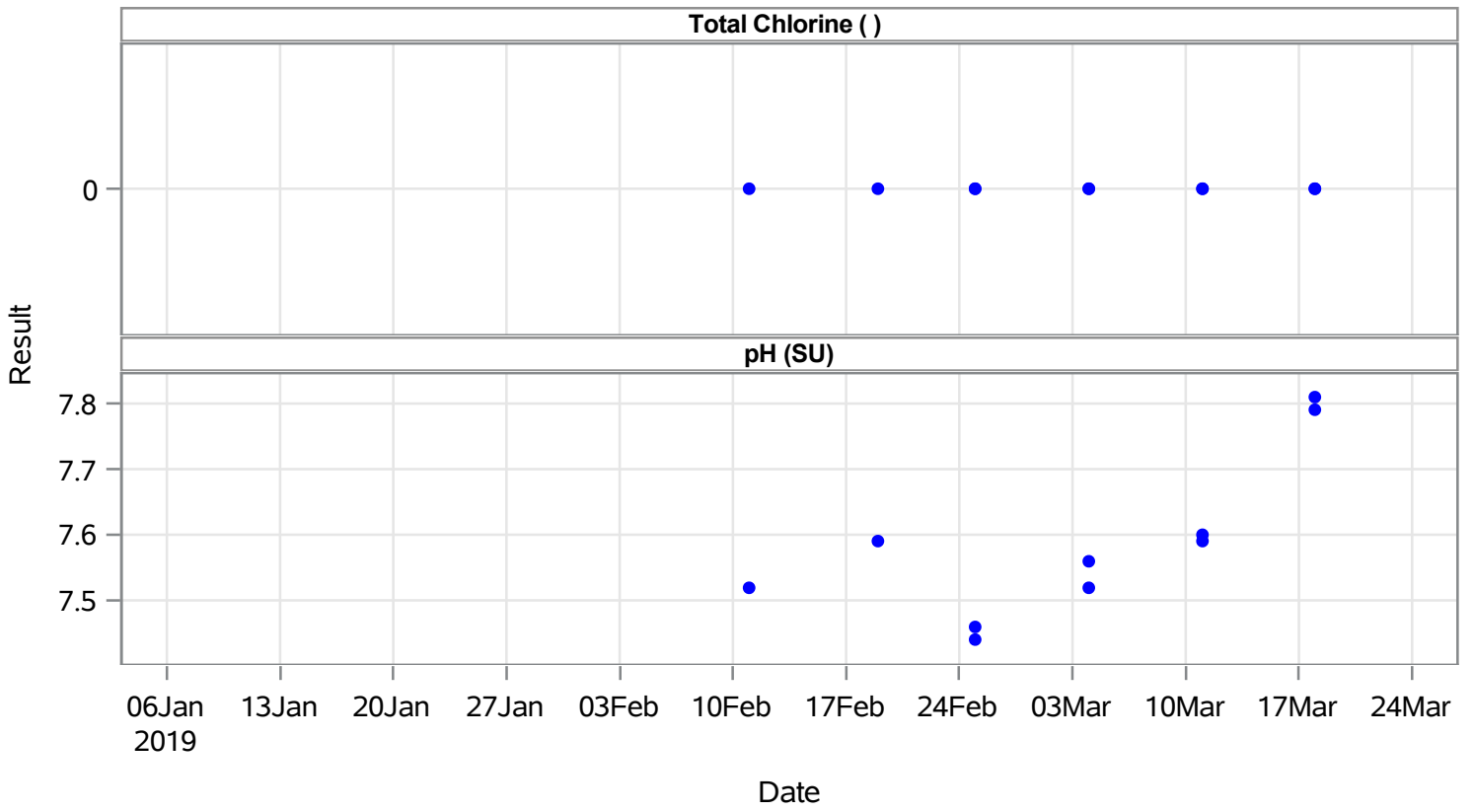
Pompano(Pace) (6)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Dissolved Oxygen	%	02/11/2019	03/18/2019	76.20	83.60	79.920	80.000	10
Dissolved Oxygen	mg/L	02/11/2019	03/18/2019	6.90	7.80	7.383	7.595	10
Fecal Coliform	CFU / 100ml	01/10/2019	02/08/2019	3.00	2200.00	191.380	31.500	50
Salinity	PSU	02/11/2019	03/18/2019	7.00	21.50	10.870	7.000	10
Temperature	C	02/11/2019	03/18/2019	24.60	26.30	25.590	25.650	10
Total Chlorine		02/11/2019	03/18/2019	0.00	0.00	0.000	0.000	10
pH	SU	02/11/2019	03/18/2019	7.44	7.81	7.588	7.575	10

Pompano(Pace) 6



Pompano(Pace) 6

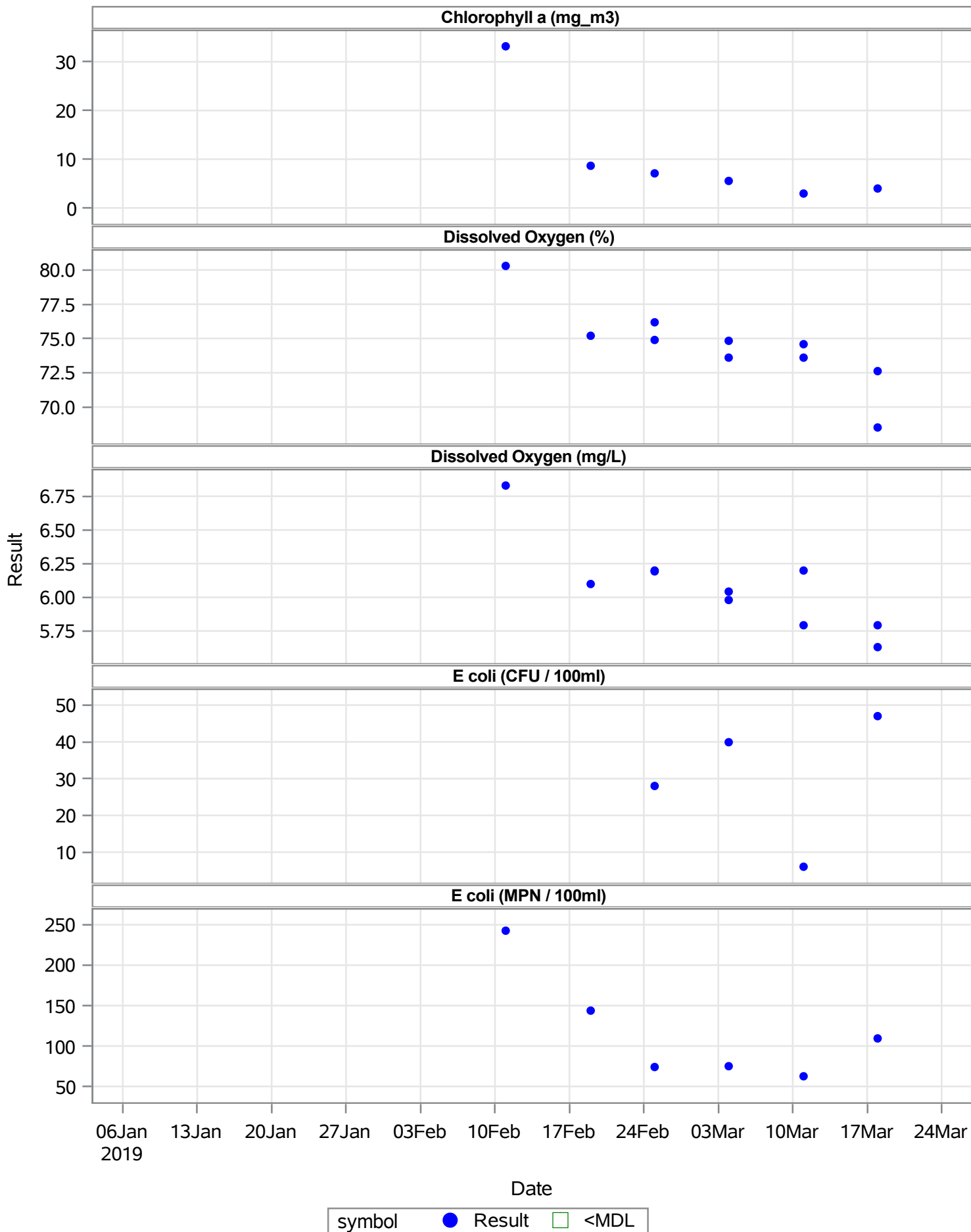


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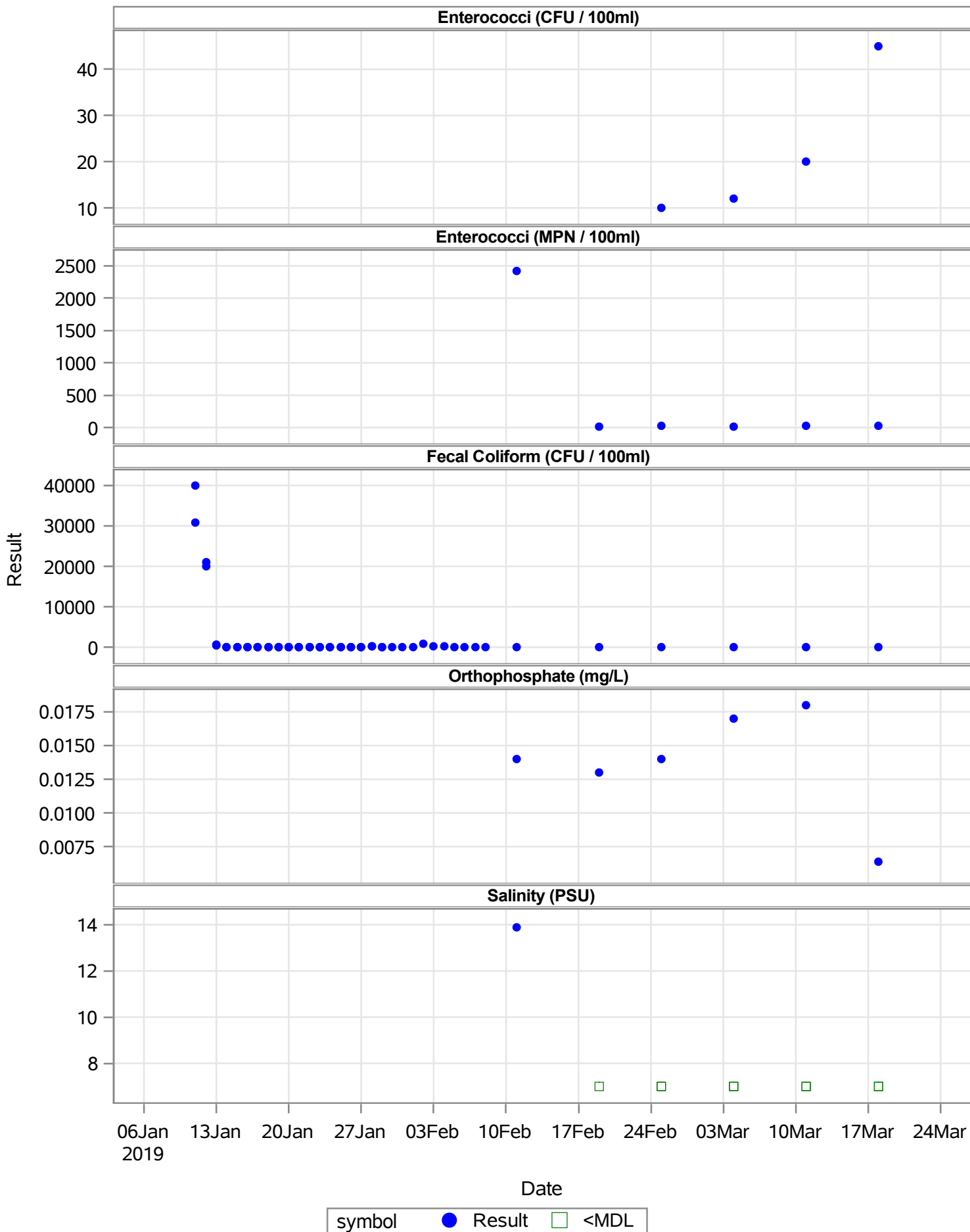
Pompano(Pace) (7)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Chlorophyll a	mg_m3	02/11/2019	03/18/2019	2.9000	33.20	10.25	6.350	6
Dissolved Oxygen	%	02/11/2019	03/18/2019	68.5000	80.30	74.43	74.700	10
Dissolved Oxygen	mg/L	02/11/2019	03/18/2019	5.6300	6.83	6.08	6.070	10
E coli	CFU / 100ml	02/25/2019	03/18/2019	6.0000	47.00	30.25	34.000	4
E coli	MPN / 100ml	02/11/2019	03/18/2019	63.0000	243.00	118.00	92.000	6
Enterococci	CFU / 100ml	02/25/2019	03/18/2019	10.0000	45.00	21.75	16.000	4
Enterococci	MPN / 100ml	02/11/2019	03/18/2019	10.0000	2419.60	423.43	30.000	6
Fecal Coliform	CFU / 100ml	01/11/2019	03/18/2019	2.0000	40000.00	2155.82	46.000	54
Orthophosphate	mg/L	02/11/2019	03/18/2019	0.0064	0.02	0.01	0.014	6
Salinity	PSU	02/11/2019	03/18/2019	7.0000	13.90	7.69	7.000	10
TKN	mg/L	02/11/2019	03/18/2019	0.5900	0.92	0.80	0.830	6
Temperature	C	02/11/2019	03/18/2019	24.0000	26.40	25.19	25.050	10
Total Chlorine		02/11/2019	03/18/2019	0.0000	0.00	0.00	0.000	10
Total Nitrogen	mg/L	02/11/2019	03/18/2019	0.6300	0.96	0.85	0.890	6
Total Phosphorus	mg/L	02/11/2019	03/18/2019	0.0500	0.06	0.05	0.050	6
pH	SU	02/11/2019	03/18/2019	7.4800	7.96	7.63	7.625	10

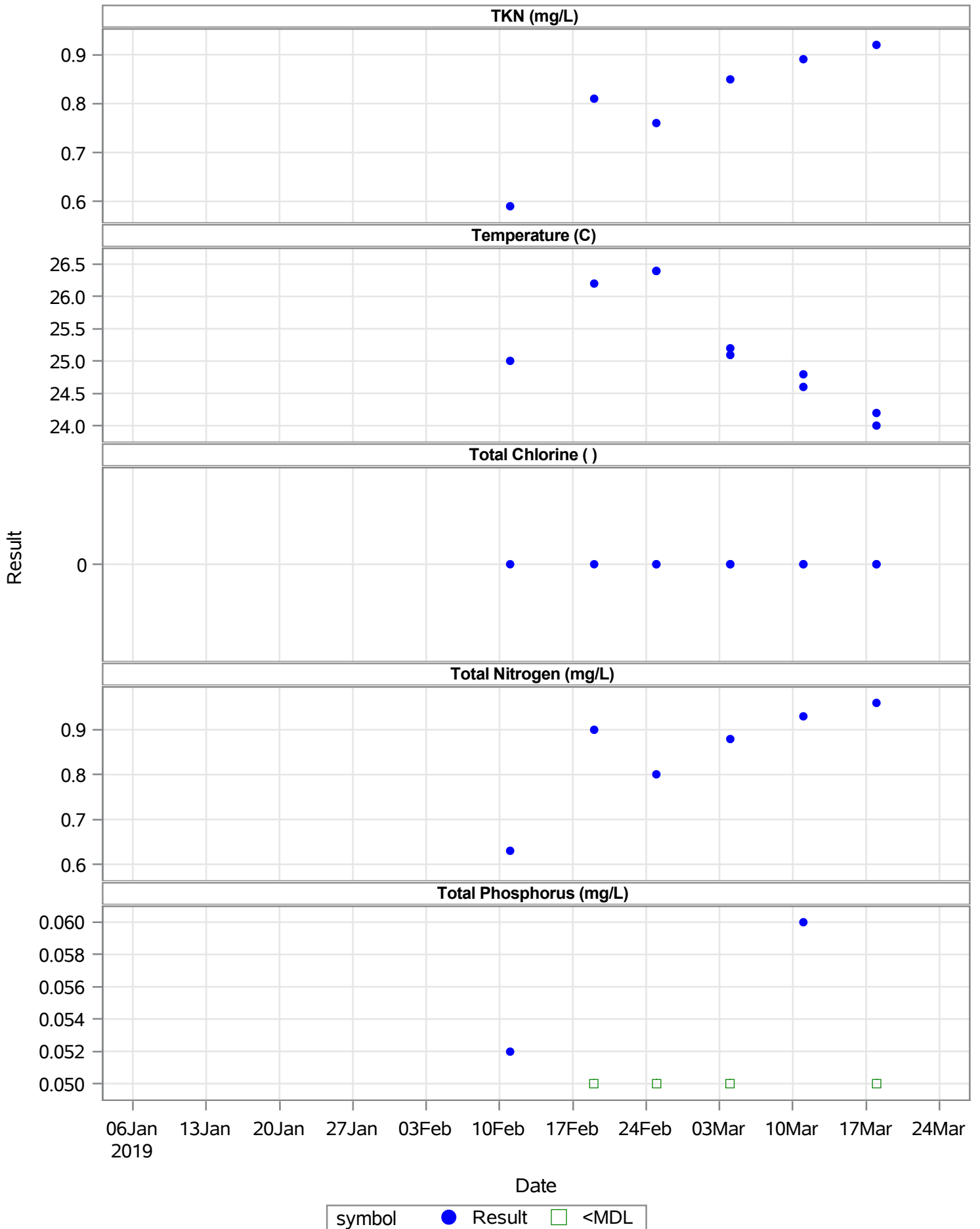
Pompano(Pace) 7



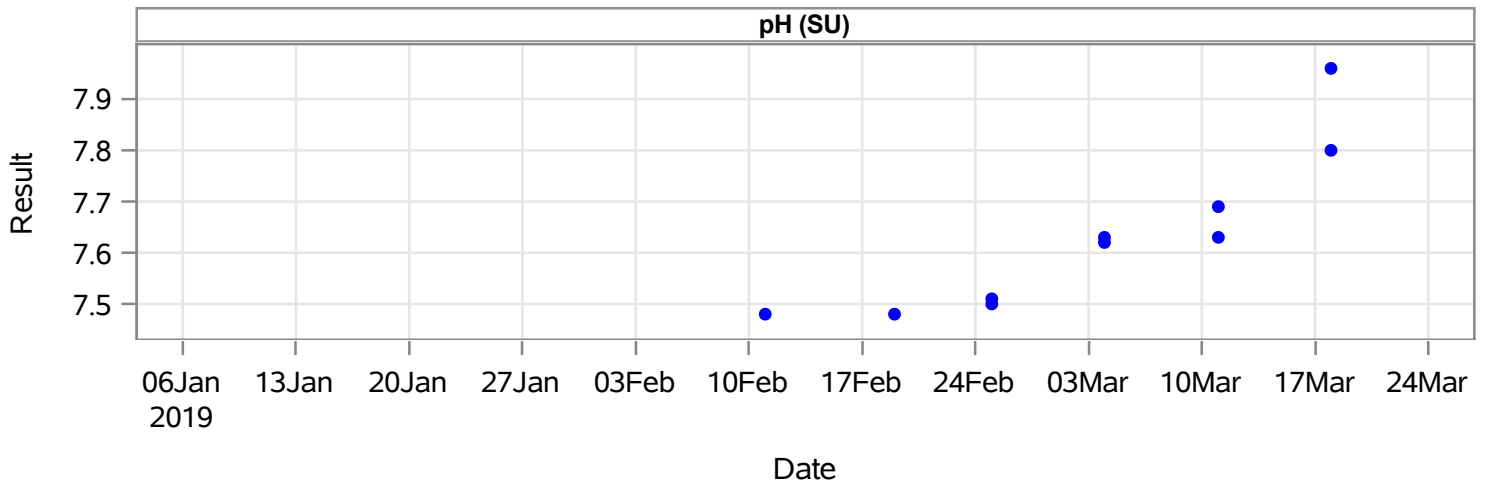
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Pompano(Pace) 7



Pompano(Pace) 7



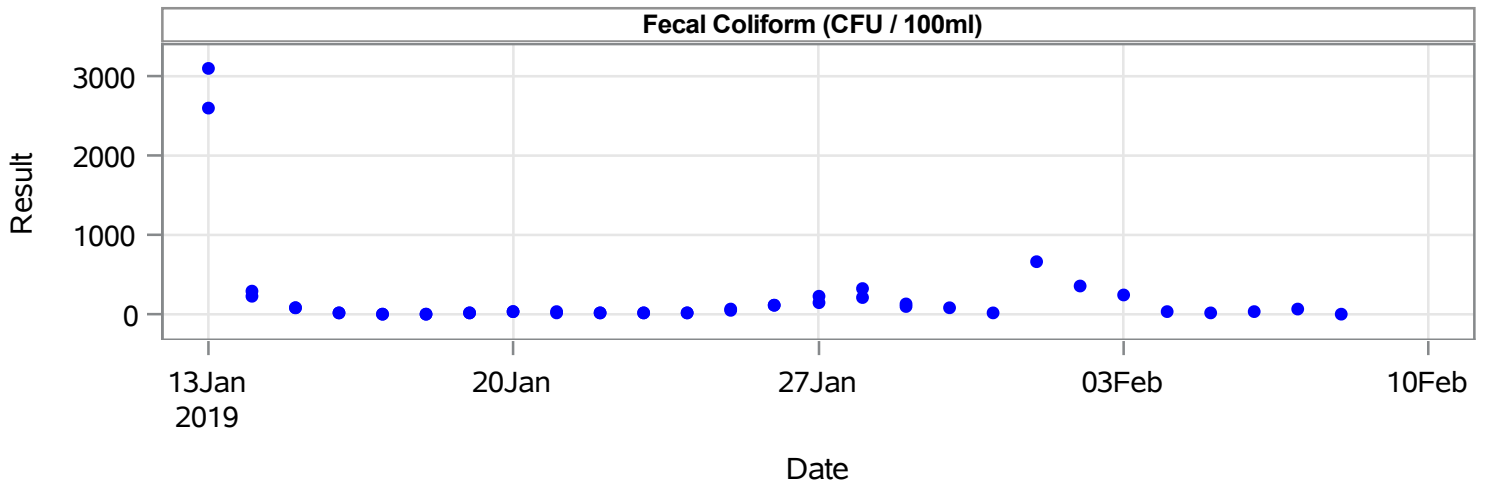
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Pompano(Pace) (8)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Fecal Coliform	CFU / 100ml	01/13/2019	02/08/2019	1	3100	219.364	35	44

Pompano(Pace) 8

Fecal Coliform (CFU / 100ml)



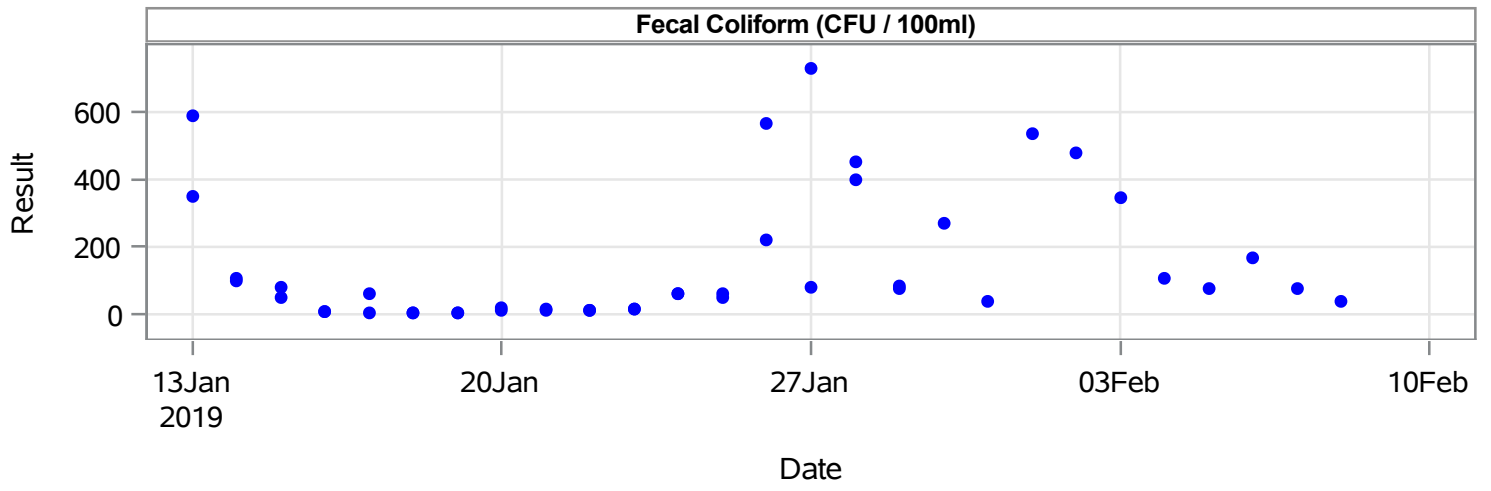
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Pompano(Pace) (9)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Fecal Coliform	CFU / 100ml	01/13/2019	02/08/2019	3	730	146.909	61.5	44

Pompano(Pace) 9

Fecal Coliform (CFU / 100ml)

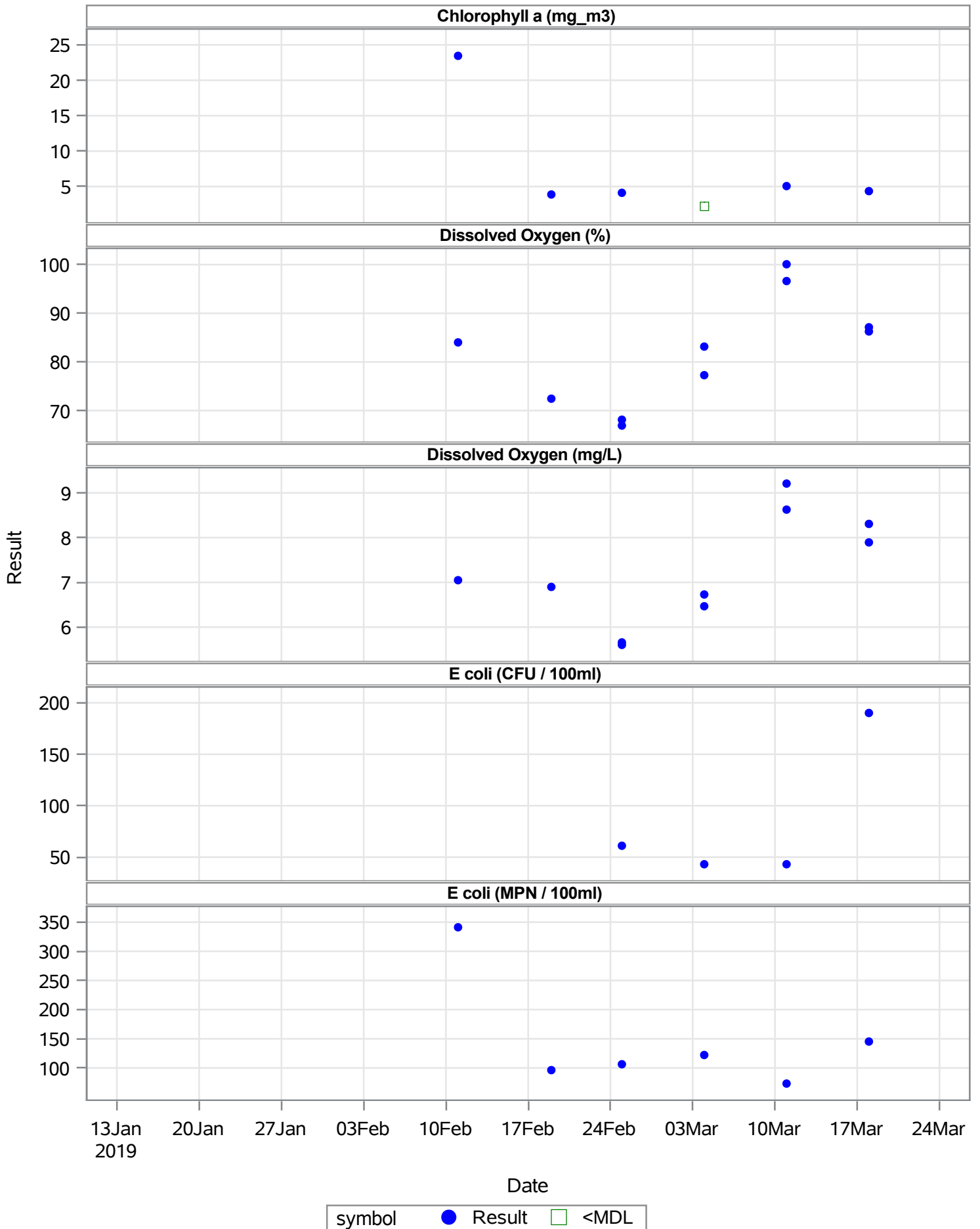


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Pompano(Pace) (10)

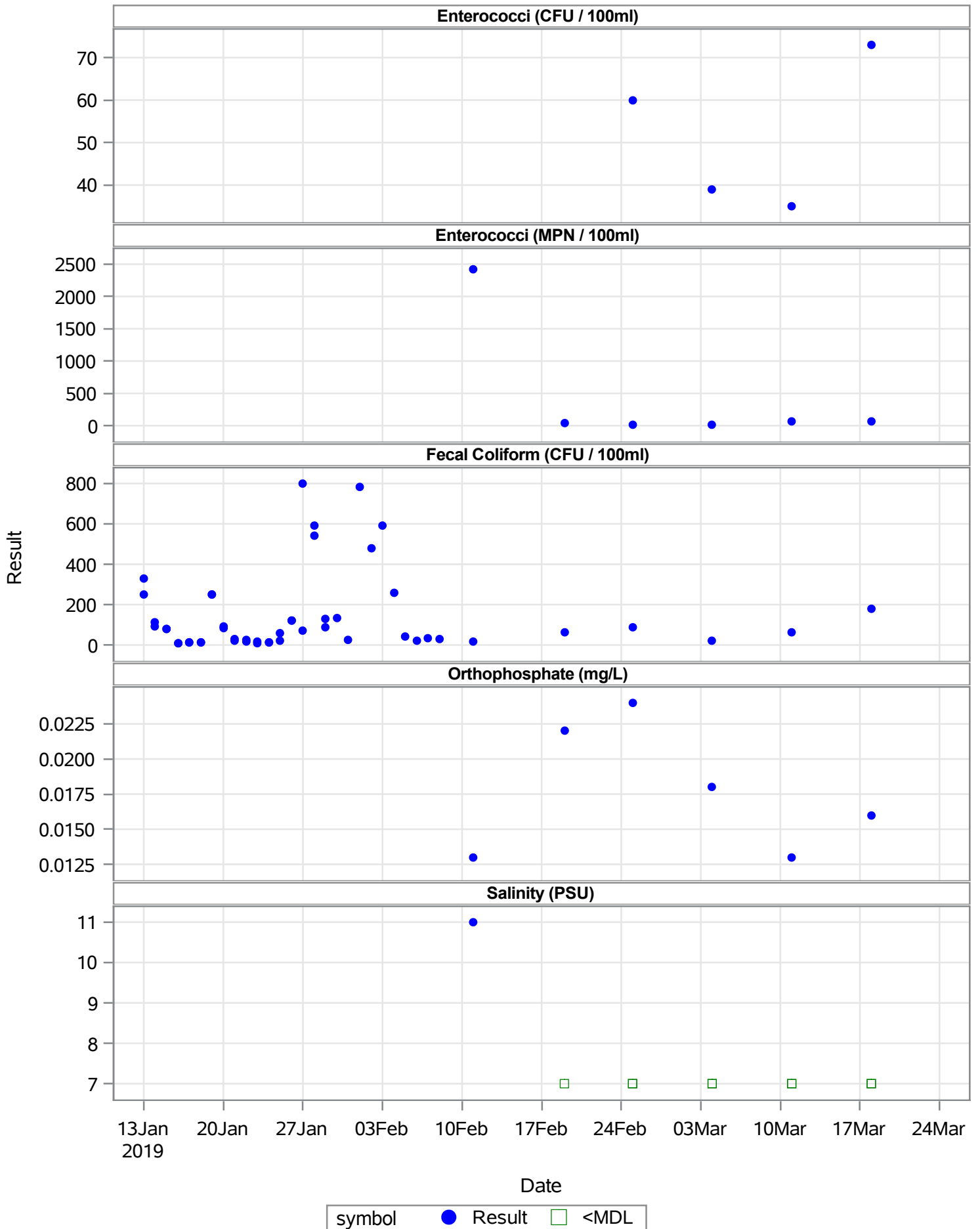
Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Chlorophyll a	mg_m3	02/11/2019	03/18/2019	2.200	23.50	7.183	4.200	6
Dissolved Oxygen	%	02/11/2019	03/18/2019	66.900	100.10	82.250	83.650	10
Dissolved Oxygen	mg/L	02/11/2019	03/18/2019	5.600	9.21	7.242	6.970	10
E coli	CFU / 100ml	02/25/2019	03/18/2019	43.000	190.00	84.250	52.000	4
E coli	MPN / 100ml	02/11/2019	03/18/2019	73.000	341.00	147.167	114.000	6
Enterococci	CFU / 100ml	02/25/2019	03/18/2019	35.000	73.00	51.750	49.500	4
Enterococci	MPN / 100ml	02/11/2019	03/18/2019	20.000	2419.60	437.600	51.500	6
Fecal Coliform	CFU / 100ml	01/13/2019	03/18/2019	7.000	800.00	144.100	66.000	50
Orthophosphate	mg/L	02/11/2019	03/18/2019	0.013	0.02	0.018	0.017	6
Salinity	PSU	02/11/2019	03/18/2019	7.000	11.00	7.400	7.000	10
TKN	mg/L	02/11/2019	03/18/2019	0.530	0.98	0.870	0.930	6
Temperature	C	02/11/2019	03/18/2019	24.300	27.20	25.540	25.500	10
Total Chlorine		02/11/2019	03/18/2019	0.000	0.00	0.000	0.000	10
Total Nitrogen	mg/L	02/11/2019	03/18/2019	0.670	1.00	0.923	0.970	6
Total Phosphorus	mg/L	02/11/2019	03/18/2019	0.050	0.06	0.052	0.050	6
pH	SU	02/11/2019	03/18/2019	7.400	7.81	7.621	7.600	10

Pompano(Pace) 10

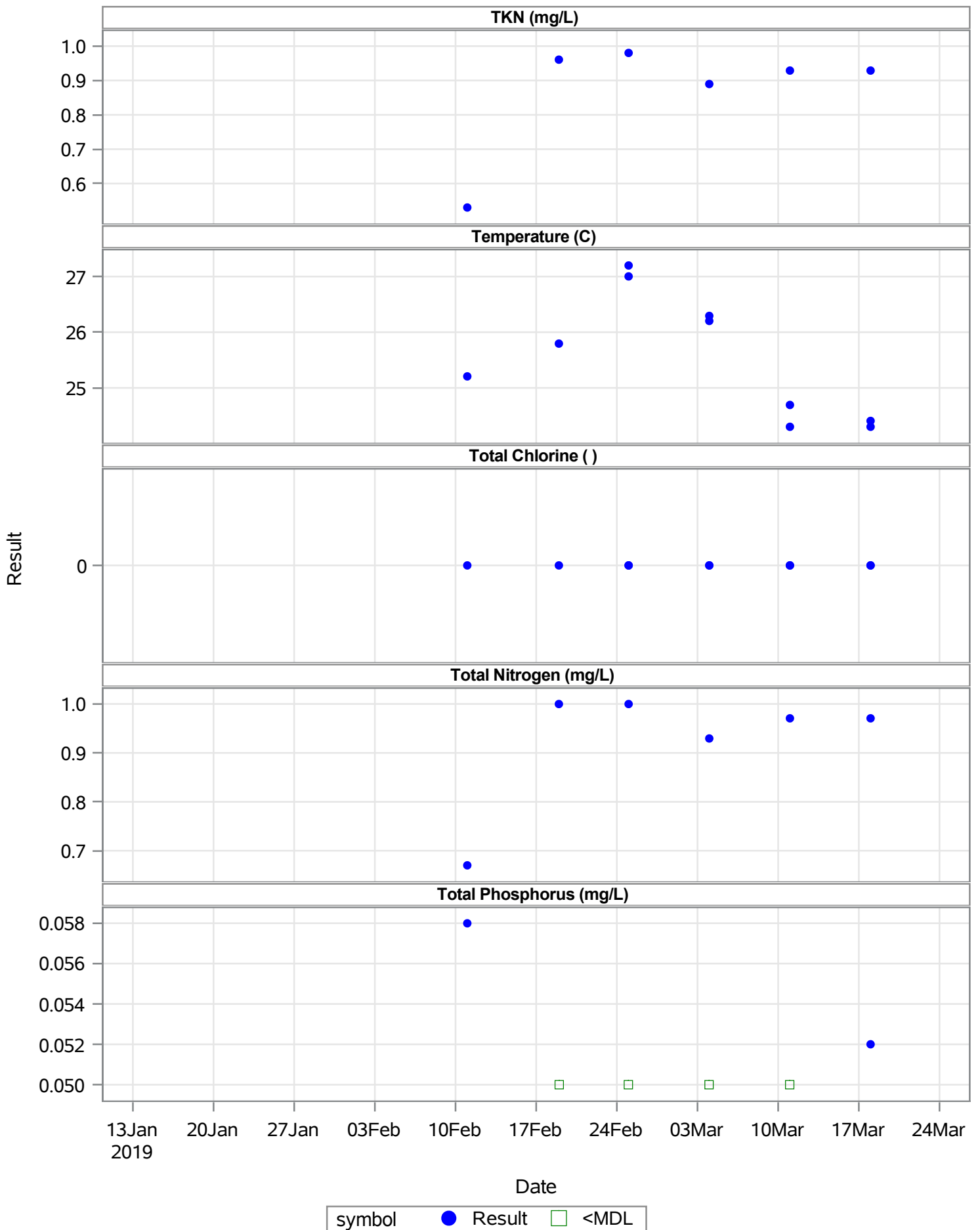


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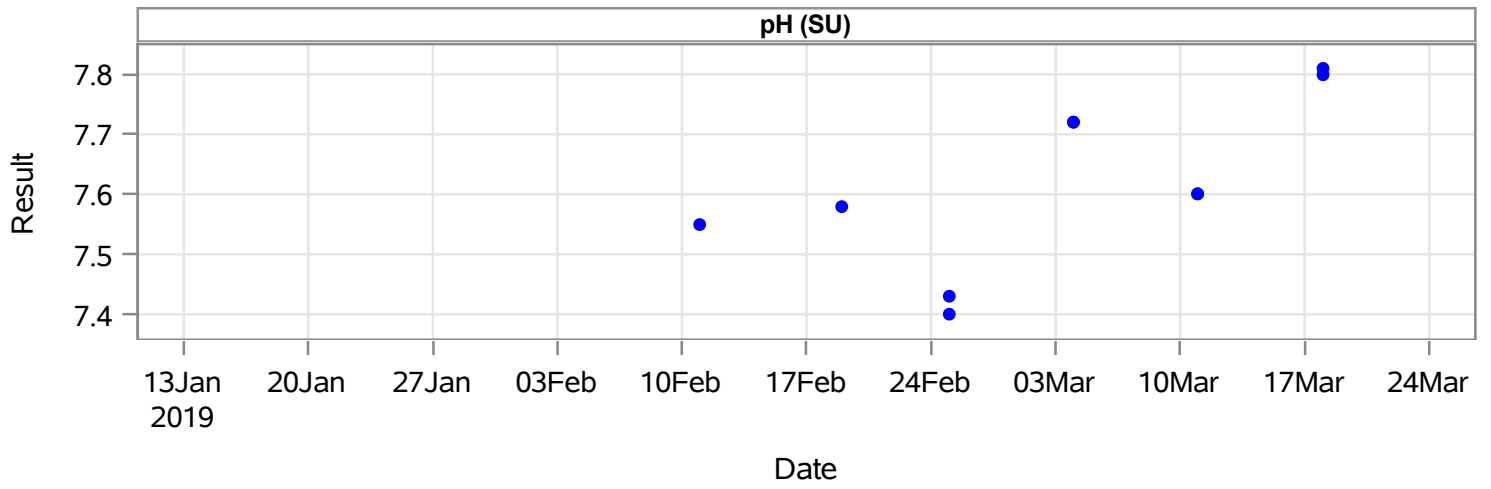
Pompano(Pace) 10



Pompano(Pace) 10



Pompano(Pace) 10

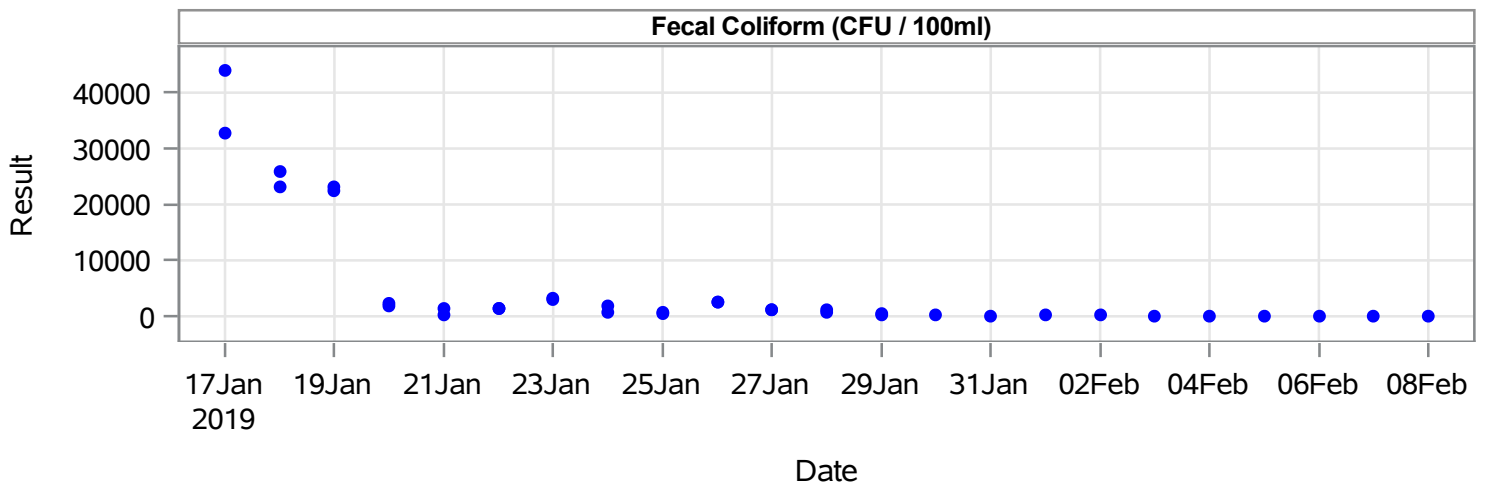


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Pompano(Pace) (11)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Fecal Coliform	CFU / 100ml	01/17/2019	02/08/2019	46	44000	5600.89	1095	36

Pompano(Pace) 11

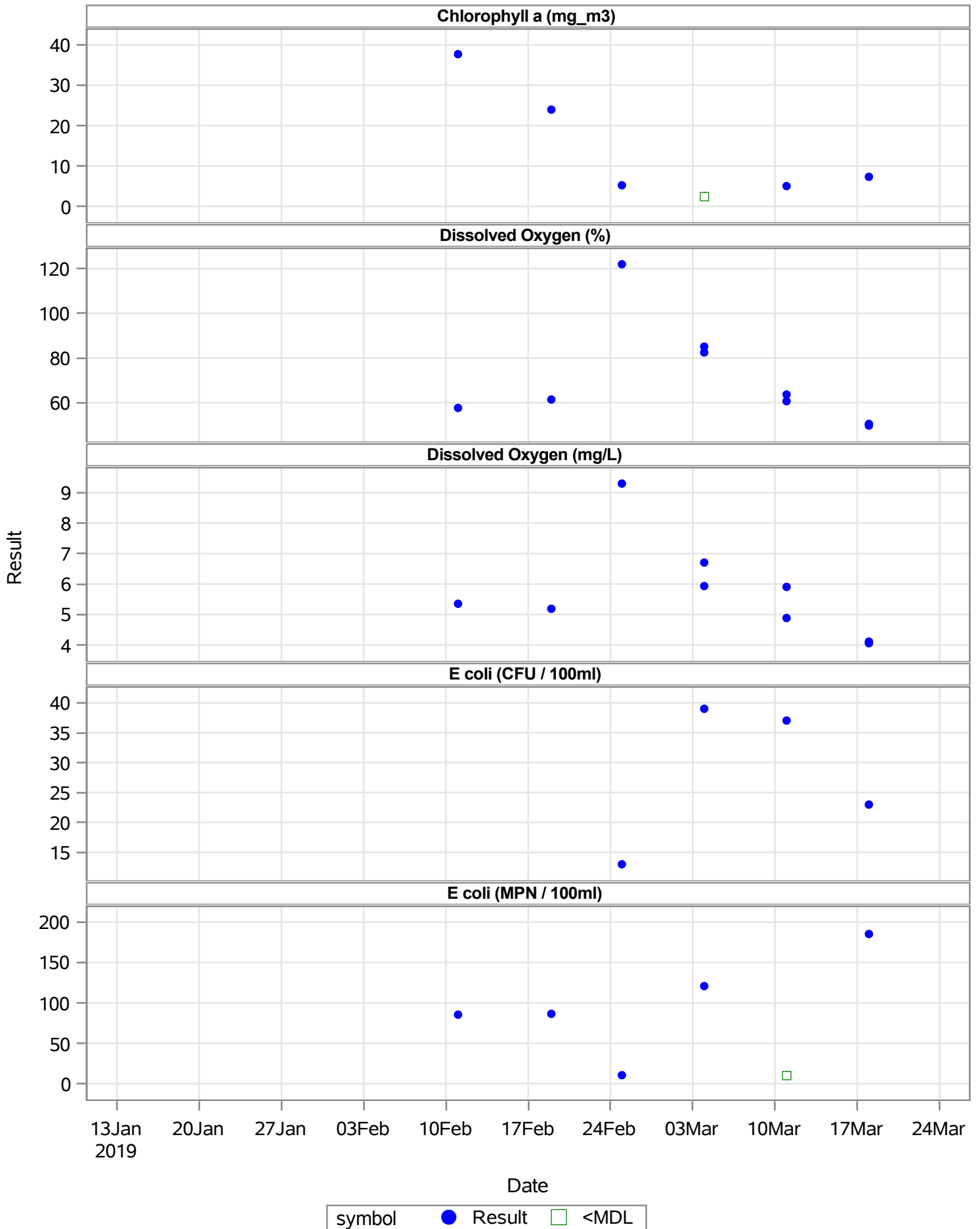


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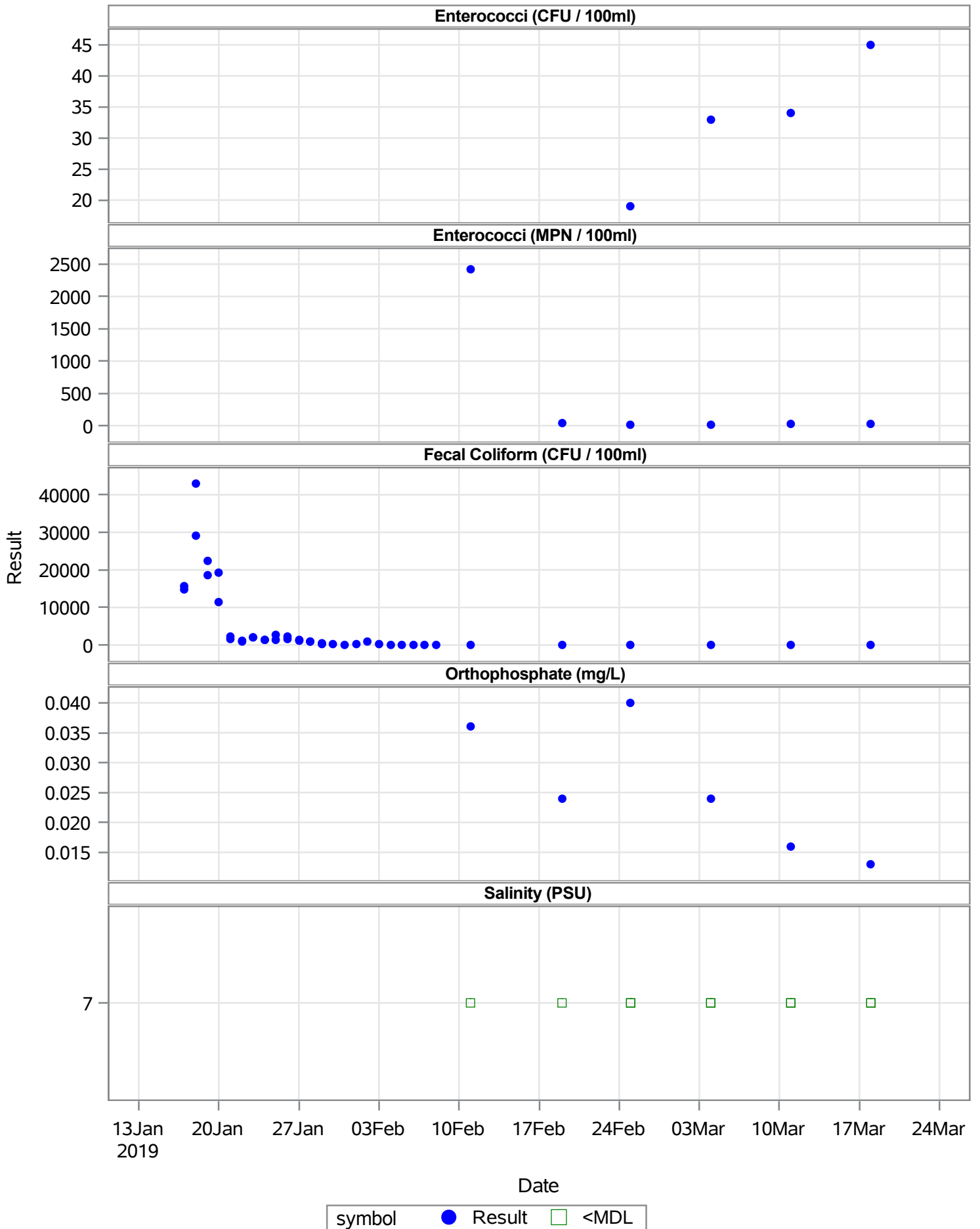
Pompano(Pace) (12)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Chlorophyll a	mg_m3	02/11/2019	03/18/2019	2.400	37.60	13.58	6.25	6
Dissolved Oxygen	%	02/11/2019	03/18/2019	49.700	122.00	70.36	61.30	9
Dissolved Oxygen	mg/L	02/11/2019	03/18/2019	4.060	9.30	5.72	5.35	9
E coli	CFU / 100ml	02/25/2019	03/18/2019	13.000	39.00	28.00	30.00	4
E coli	MPN / 100ml	02/11/2019	03/18/2019	10.000	185.00	82.83	85.50	6
Enterococci	CFU / 100ml	02/25/2019	03/18/2019	19.000	45.00	32.75	33.50	4
Enterococci	MPN / 100ml	02/11/2019	03/18/2019	20.000	2419.60	426.77	30.00	6
Fecal Coliform	CFU / 100ml	01/17/2019	03/18/2019	24.000	43000.00	4817.19	1030.00	42
Orthophosphate	mg/L	02/11/2019	03/18/2019	0.013	0.04	0.03	0.02	6
Salinity	PSU	02/11/2019	03/18/2019	7.000	7.00	7.00	7.00	10
TKN	mg/L	02/11/2019	03/18/2019	0.910	1.80	1.30	1.25	6
Temperature	C	02/11/2019	03/18/2019	25.500	28.40	27.11	27.40	10
Total Chlorine		02/11/2019	03/18/2019	0.000	0.00	0.00	0.00	10
Total Nitrogen	mg/L	02/11/2019	03/18/2019	1.000	1.90	1.38	1.35	6
Total Phosphorus	mg/L	02/11/2019	03/18/2019	0.081	0.17	0.11	0.09	6
pH	SU	02/11/2019	03/18/2019	7.750	7.93	7.84	7.83	10

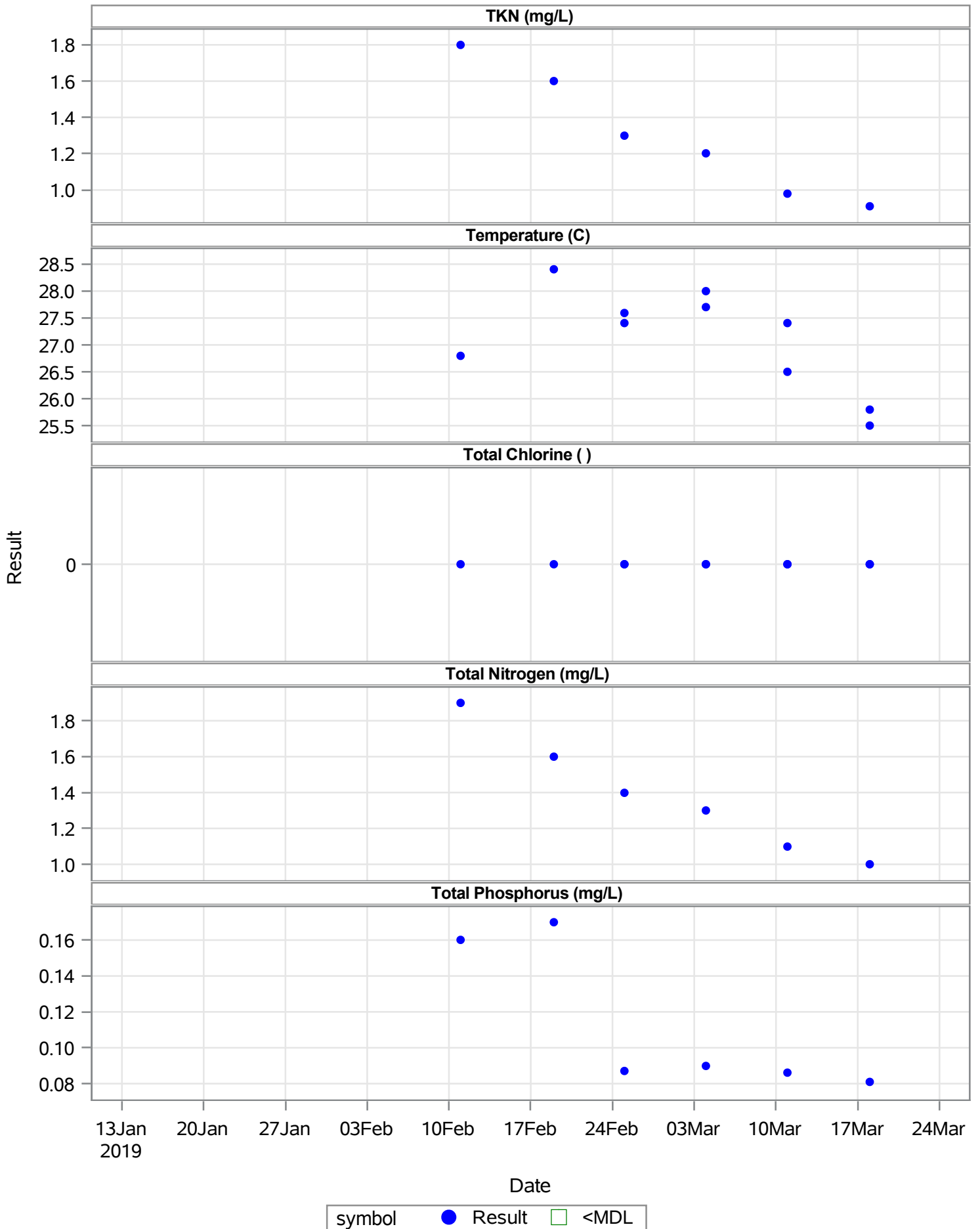
Pompano(Pace) 12



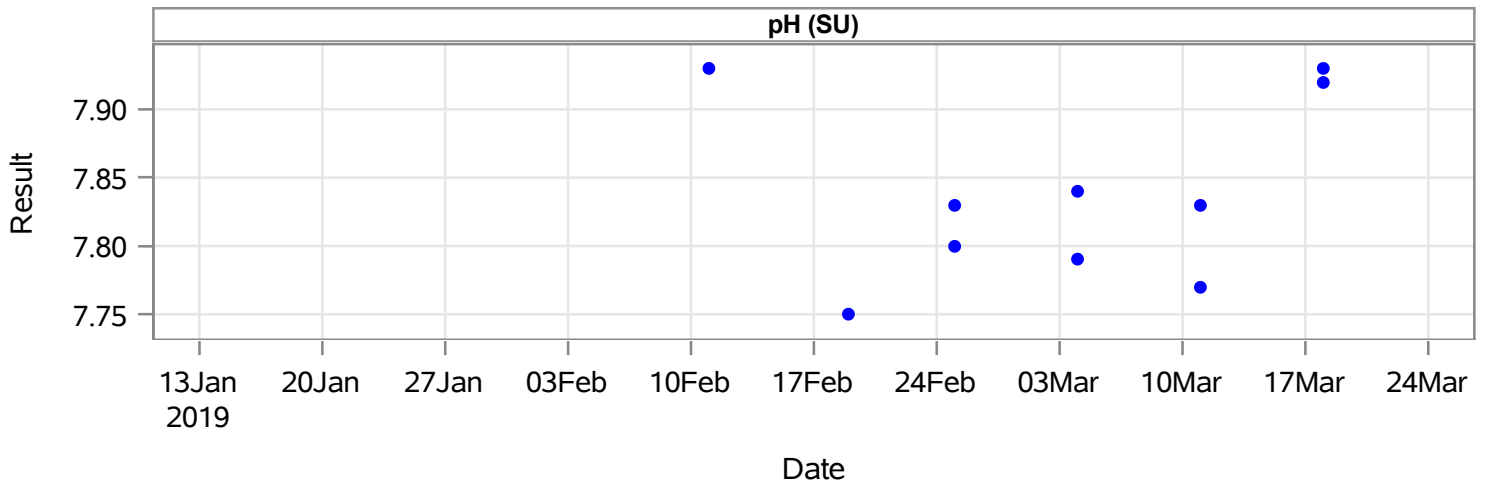
Pompano(Pace) 12



Pompano(Pace) 12



Pompano(Pace) 12

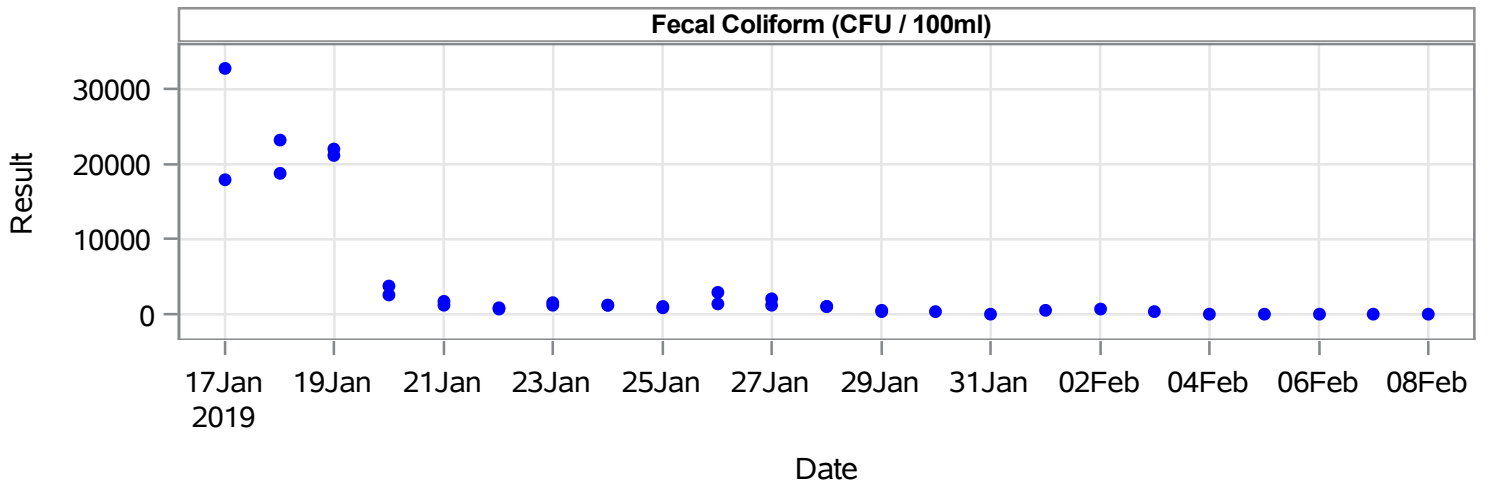


symbol ● Result □ <MDL

Pompano(Pace) (13)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Fecal Coliform	CFU / 100ml	01/17/2019	02/08/2019	64	32800	4632.75	1130	36

Pompano(Pace) 13

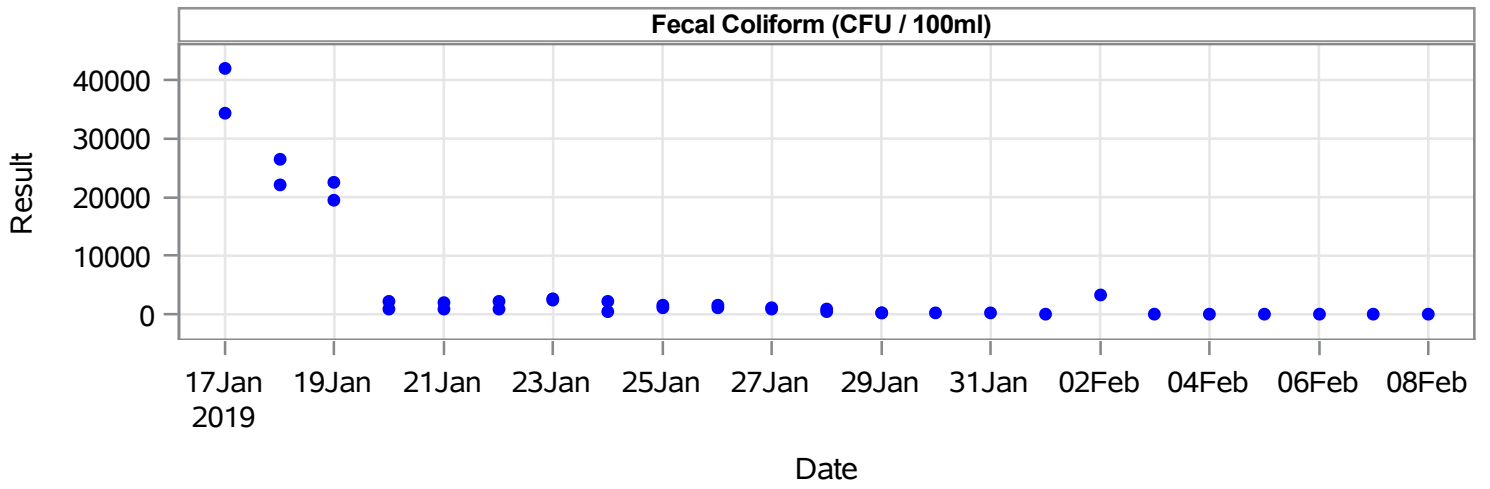


symbol ● Result

Pompano(Pace) (14)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Fecal Coliform	CFU / 100ml	01/17/2019	02/08/2019	37	42000	5475.72	1025	36

Pompano(Pace) 14



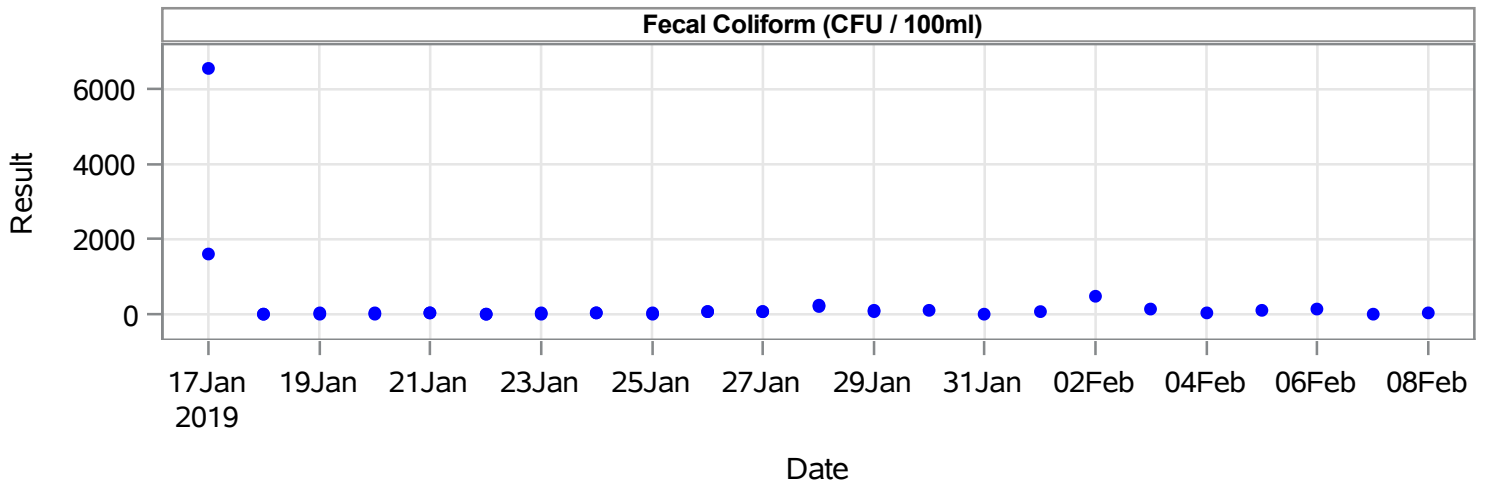
symbol ● Result

Pompano(Pace) (15)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Fecal Coliform	CFU / 100ml	01/17/2019	02/08/2019	4	6560	293.222	42	36

Pompano(Pace) 15

Fecal Coliform (CFU / 100ml)



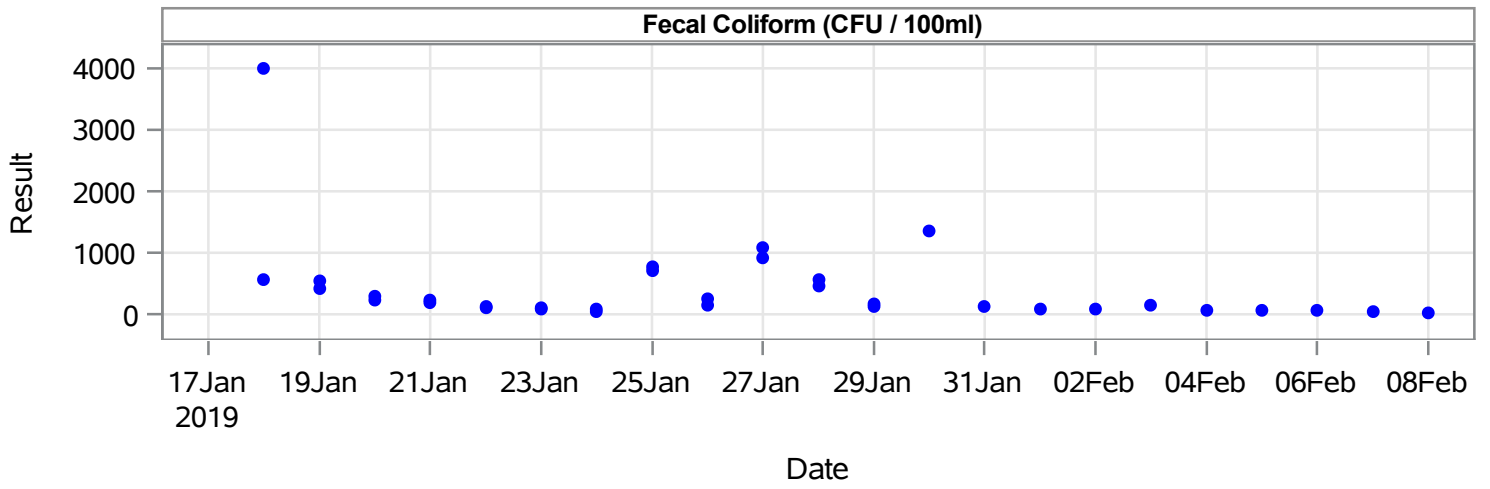
symbol ● Result

Pompano(Pace) (16)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Fecal Coliform	CFU / 100ml	01/18/2019	02/08/2019	31	4000	419.324	157.5	34

Pompano(Pace) 16

Fecal Coliform (CFU / 100ml)

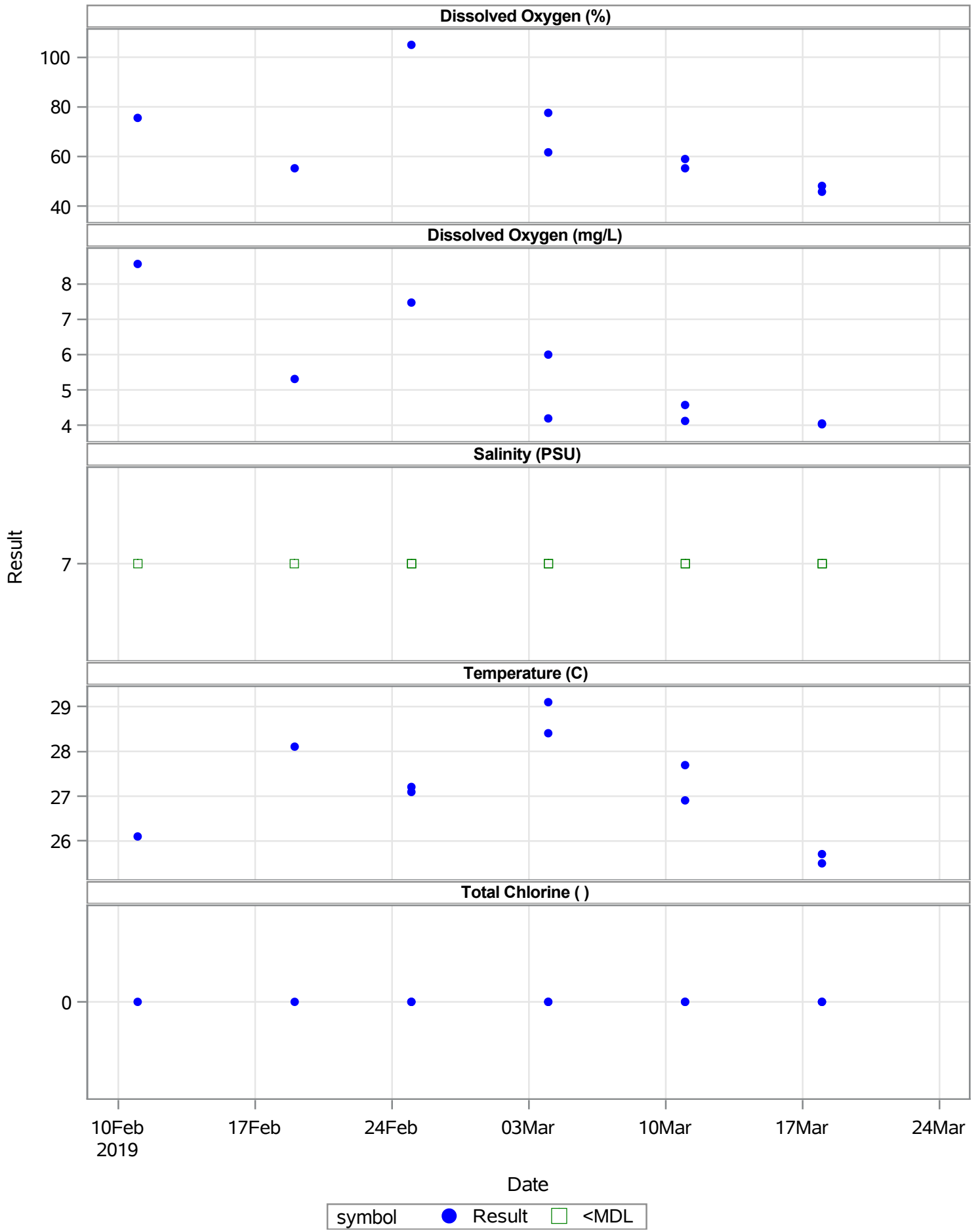


symbol ● Result

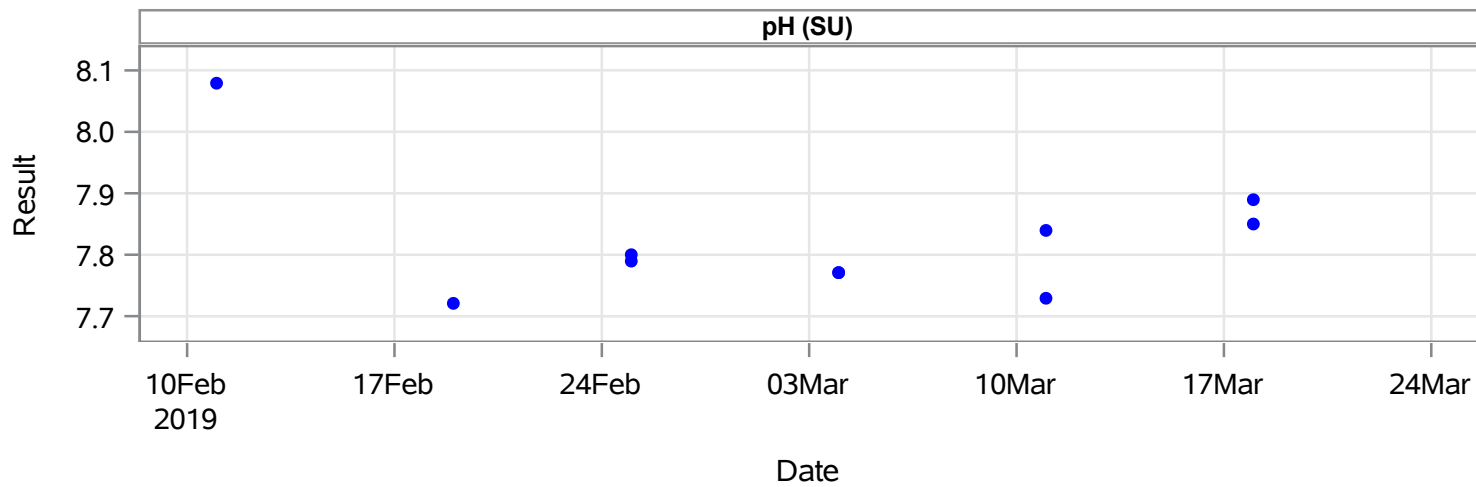
Pompano(Pace) (17)

Analyte	Units	Start Date	End Date	Minimum Value	Maximum Value	Mean	Median	Number of obs
Dissolved Oxygen	%	02/11/2019	03/18/2019	45.70	105.00	64.778	59.000	9
Dissolved Oxygen	mg/L	02/11/2019	03/18/2019	4.02	8.57	5.368	4.570	9
Salinity	PSU	02/11/2019	03/18/2019	7.00	7.00	7.000	7.000	10
Temperature	C	02/11/2019	03/18/2019	25.50	29.10	27.180	27.150	10
Total Chlorine		02/11/2019	03/18/2019	0.00	0.00	0.000	0.000	10
pH	SU	02/11/2019	03/18/2019	7.72	8.08	7.824	7.795	10

Pompano(Pace) 17



Pompano(Pace) 17

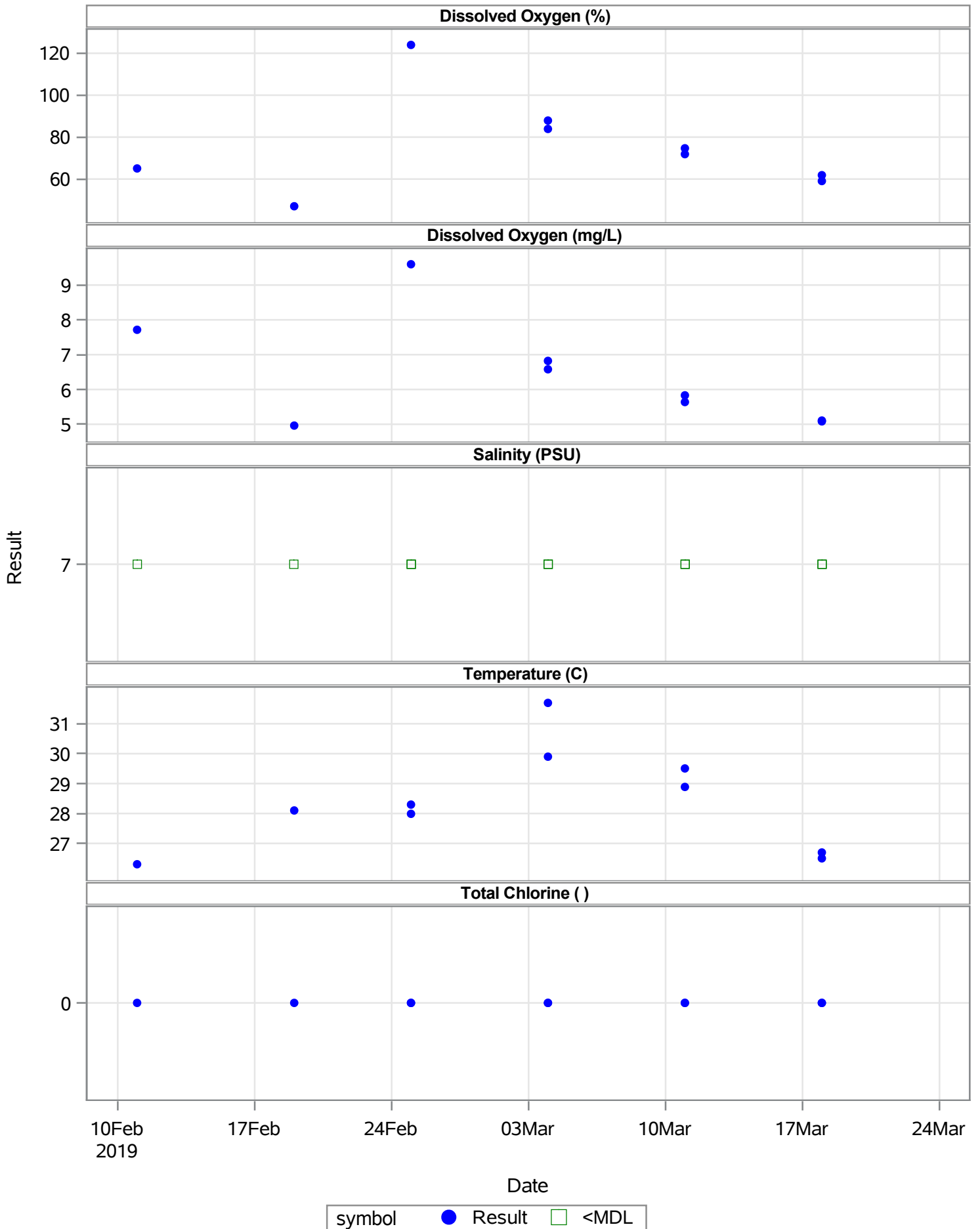


symbol ● Result □ <MDL

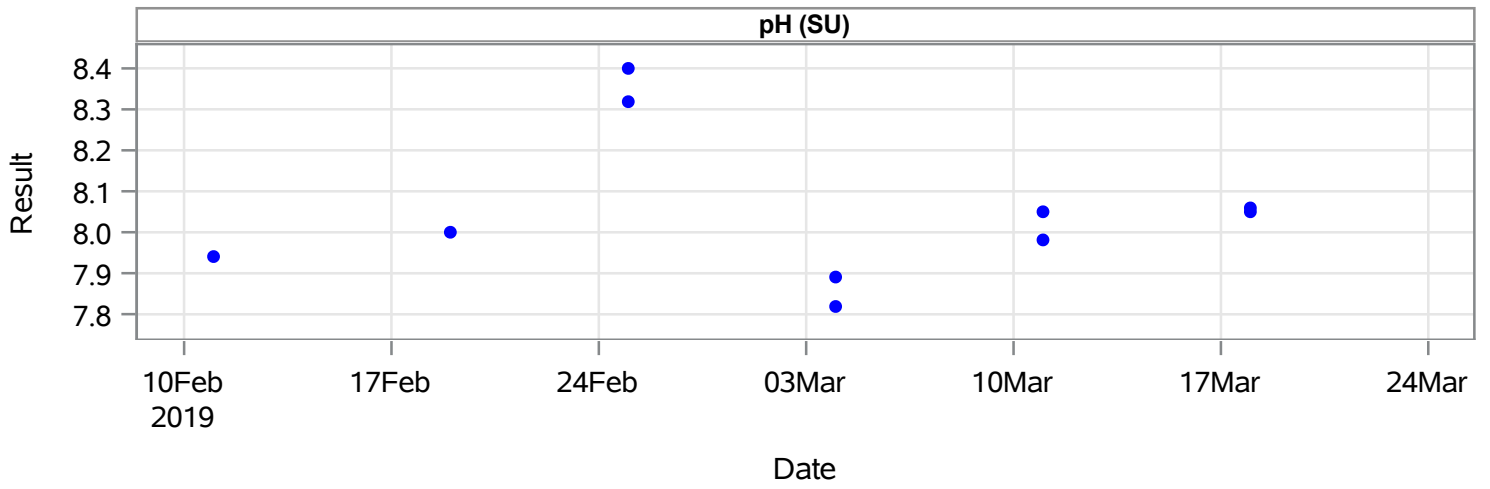
Pompano(Pace) (18)

Analyte	Units	Start Date	End Date	Minimum Value	Maximum Value	Mean	Median	Number of obs
Dissolved Oxygen	%	02/11/2019	03/18/2019	47.00	124.0	75.056	71.800	9
Dissolved Oxygen	mg/L	02/11/2019	03/18/2019	4.96	9.6	6.369	5.830	9
Salinity	PSU	02/11/2019	03/18/2019	7.00	7.0	7.000	7.000	10
Temperature	C	02/11/2019	03/18/2019	26.30	31.7	28.390	28.200	10
Total Chlorine		02/11/2019	03/18/2019	0.00	0.0	0.000	0.000	10
pH	SU	02/11/2019	03/18/2019	7.82	8.4	8.051	8.025	10

Pompano(Pace) 18



Pompano(Pace) 18

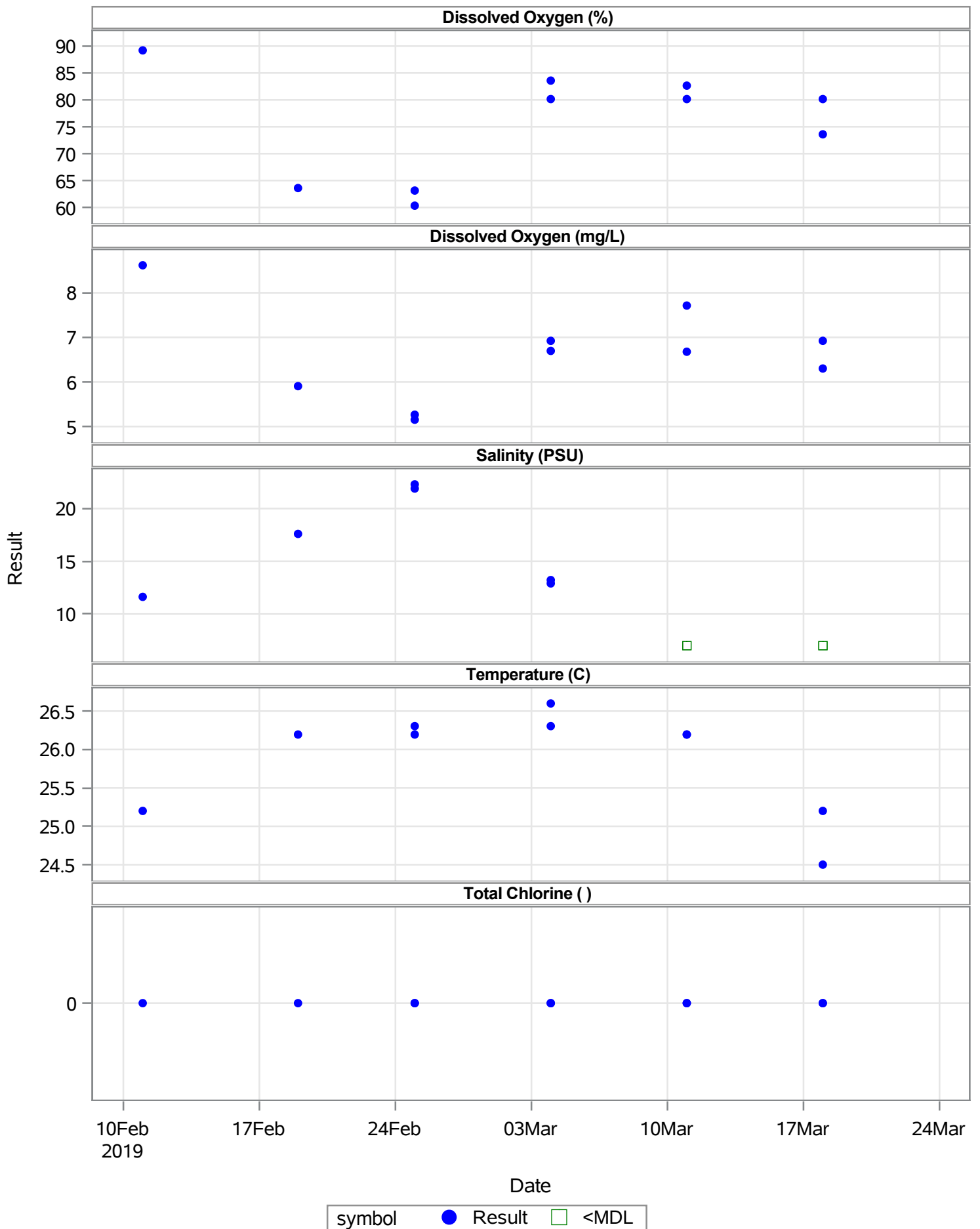


symbol ● Result □ <MDL

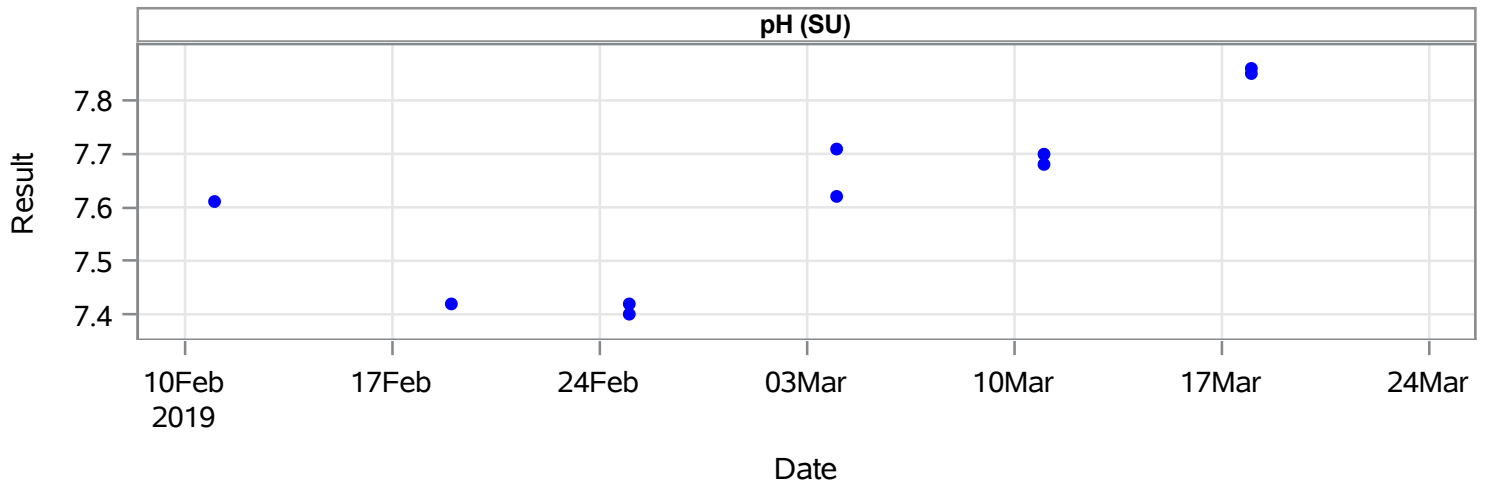
Pompano(Pace) (19)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Dissolved Oxygen	%	02/11/2019	03/18/2019	60.30	89.20	75.670	80.200	10
Dissolved Oxygen	mg/L	02/11/2019	03/18/2019	5.16	8.62	6.617	6.685	10
Salinity	PSU	02/11/2019	03/18/2019	7.00	22.30	12.750	12.250	10
Temperature	C	02/11/2019	03/18/2019	24.50	26.60	25.890	26.200	10
Total Chlorine		02/11/2019	03/18/2019	0.00	0.00	0.000	0.000	10
pH	SU	02/11/2019	03/18/2019	7.40	7.86	7.627	7.650	10

Pompano(Pace) 19



Pompano(Pace) 19

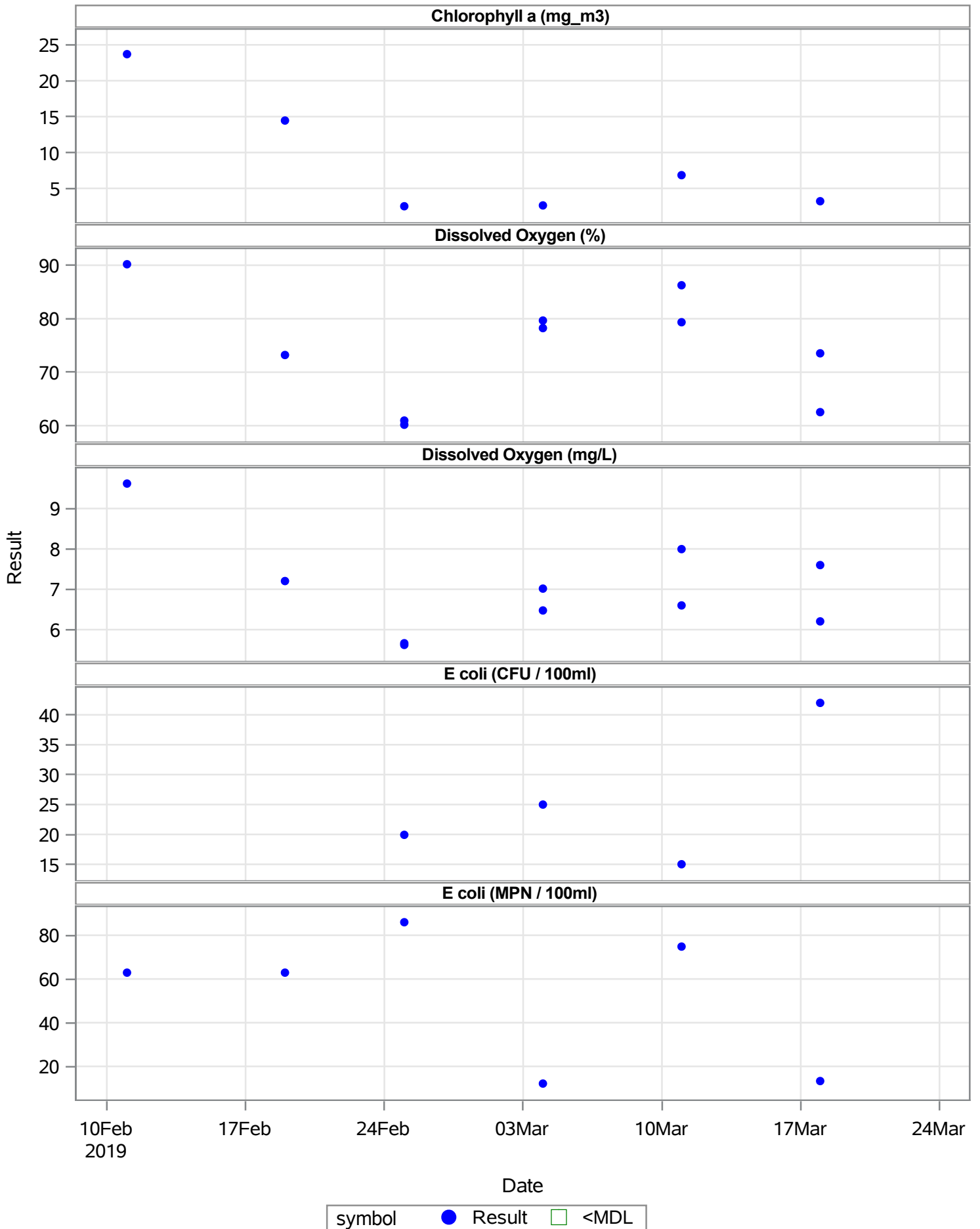


symbol ● Result □ <MDL

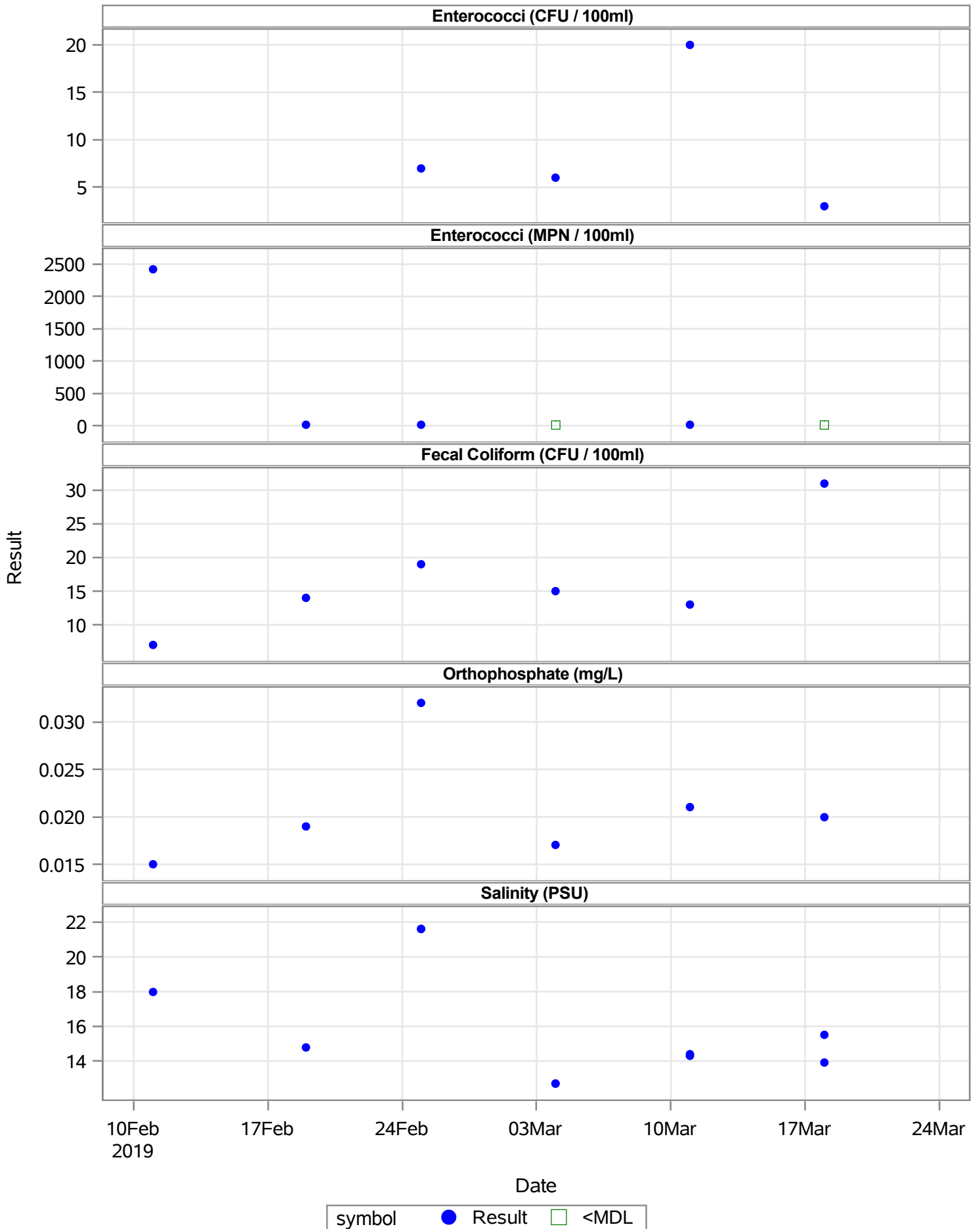
Pompano(Pace) (20)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Chlorophyll a	mg_m3	02/11/2019	03/18/2019	2.500	23.70	8.883	5.000	6
Dissolved Oxygen	%	02/11/2019	03/18/2019	60.100	90.20	74.390	75.900	10
Dissolved Oxygen	mg/L	02/11/2019	03/18/2019	5.620	9.62	6.999	6.805	10
E coli	CFU / 100ml	02/25/2019	03/18/2019	15.000	42.00	25.500	22.500	4
E coli	MPN / 100ml	02/11/2019	03/18/2019	12.100	86.00	52.083	63.000	6
Enterococci	CFU / 100ml	02/25/2019	03/18/2019	3.000	20.00	9.000	6.500	4
Enterococci	MPN / 100ml	02/11/2019	03/18/2019	10.000	2419.60	416.600	20.000	6
Fecal Coliform	CFU / 100ml	02/11/2019	03/18/2019	7.000	31.00	16.500	14.500	6
Orthophosphate	mg/L	02/11/2019	03/18/2019	0.015	0.03	0.021	0.020	6
Salinity	PSU	02/11/2019	03/18/2019	12.700	21.60	15.950	14.600	10
TKN	mg/L	02/11/2019	03/18/2019	0.390	0.57	0.503	0.525	6
Temperature	C	02/11/2019	03/18/2019	24.000	26.70	25.700	26.200	10
Total Chlorine		02/11/2019	03/18/2019	0.000	0.00	0.000	0.000	10
Total Nitrogen	mg/L	02/11/2019	03/18/2019	0.440	0.61	0.538	0.550	6
Total Phosphorus	mg/L	02/11/2019	03/18/2019	0.050	0.05	0.050	0.050	6
pH	SU	02/11/2019	03/18/2019	7.500	7.82	7.648	7.635	10

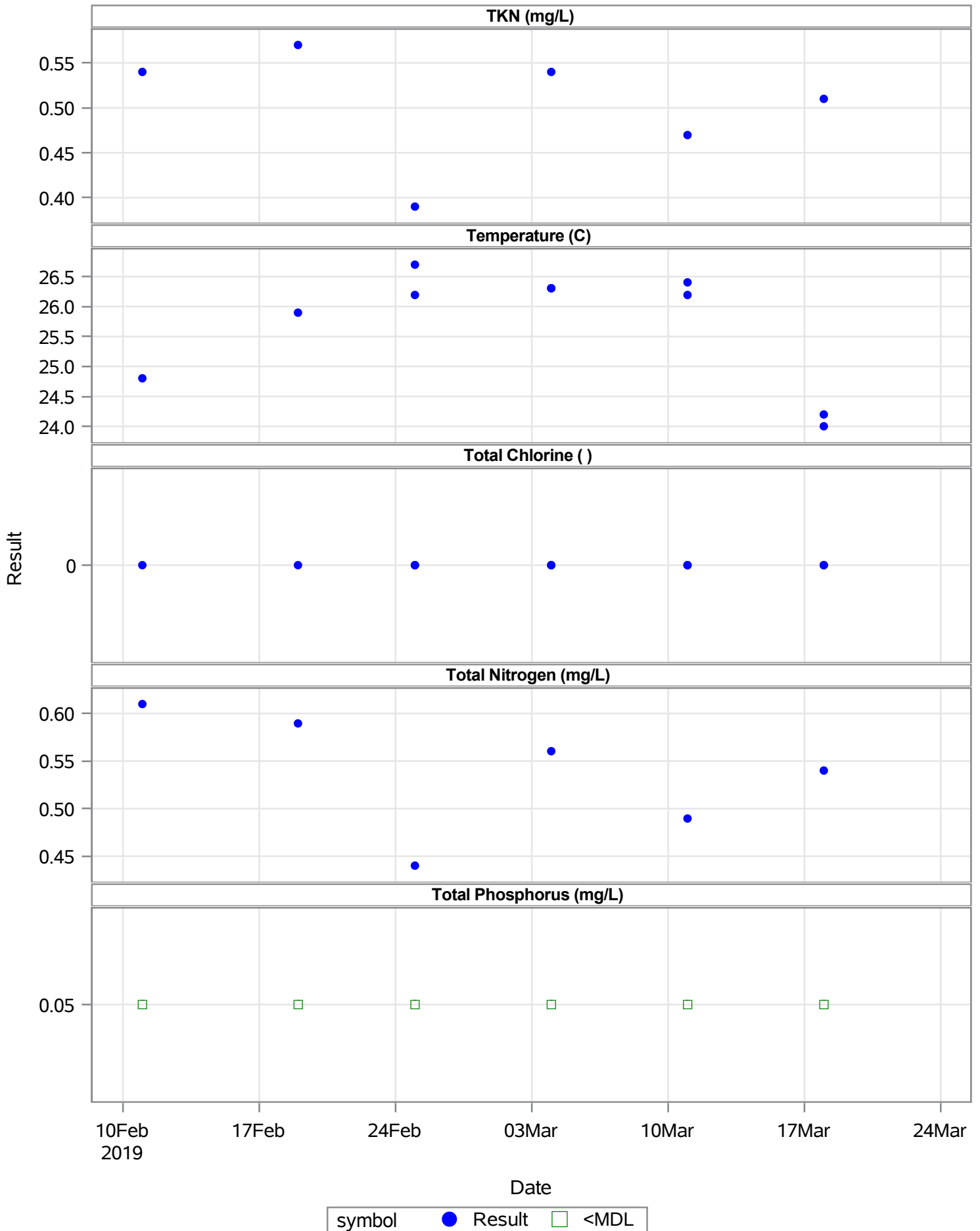
Pompano(Pace) 20



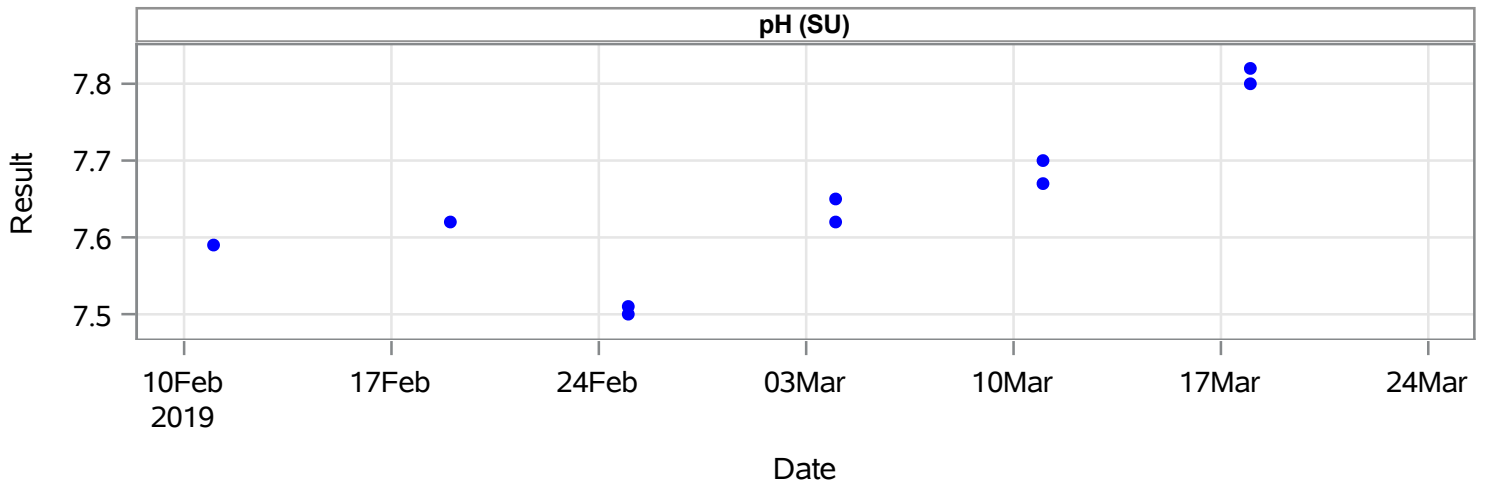
Pompano(Pace) 20



Pompano(Pace) 20



Pompano(Pace) 20



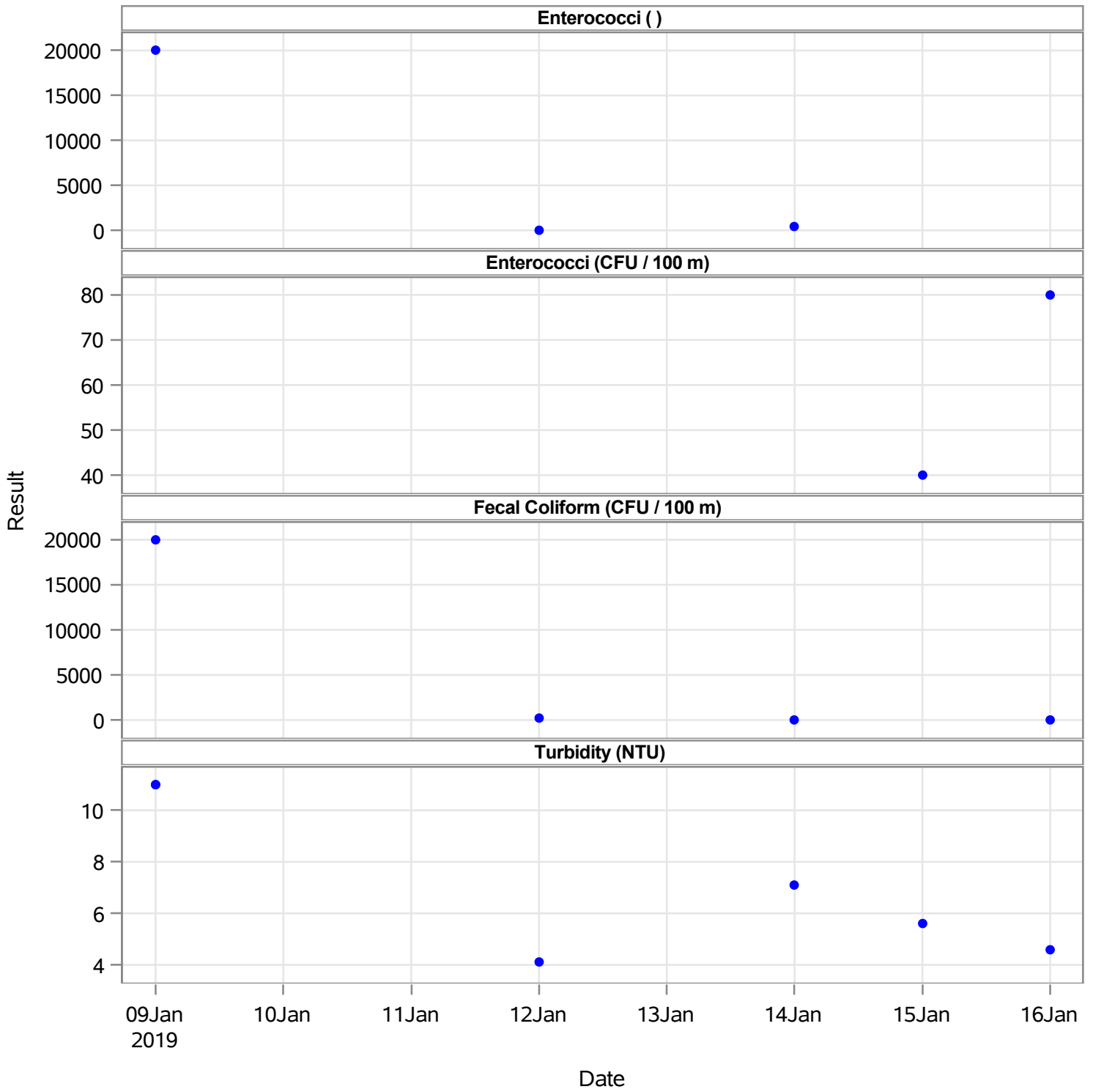
symbol ● Result □ <MDL

Appendix B - Broward County

Broward County (BC 1)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Enterococci		01/09/2019	01/14/2019	50.0	20050	6833.67	401.00	3
Enterococci	CFU / 100 m	01/15/2019	01/16/2019	40.0	80	60.00	60.00	2
Fecal Coliform	CFU / 100 m	01/09/2019	01/16/2019	20.0	20000	5065.00	120.00	4
Turbidity	NTU	01/09/2019	01/16/2019	4.1	11	7.23	6.35	6

Broward County BC 1

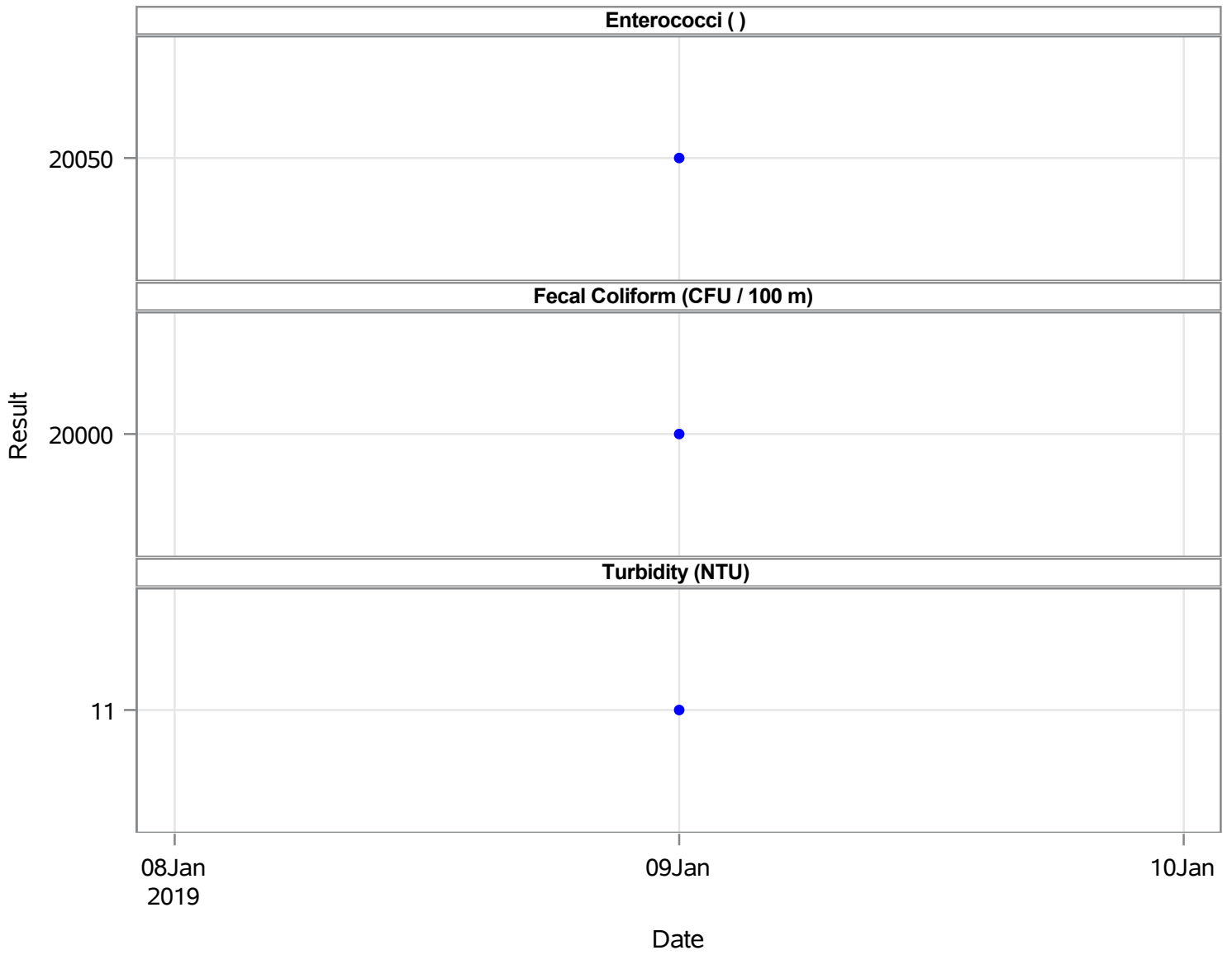


symbol ● Result

Broward County (BC 2)

Analyte	Units	Start Date	End Date	Minimum Value	Maximum Value	Mean	Median	Number of obs
Enterococci		01/09/2019	01/09/2019	20050	20050	20050	20050	1
Fecal Coliform	CFU / 100 m	01/09/2019	01/09/2019	20000	20000	20000	20000	1
Turbidity	NTU	01/09/2019	01/09/2019	11	11	11	11	1

Broward County BC 2

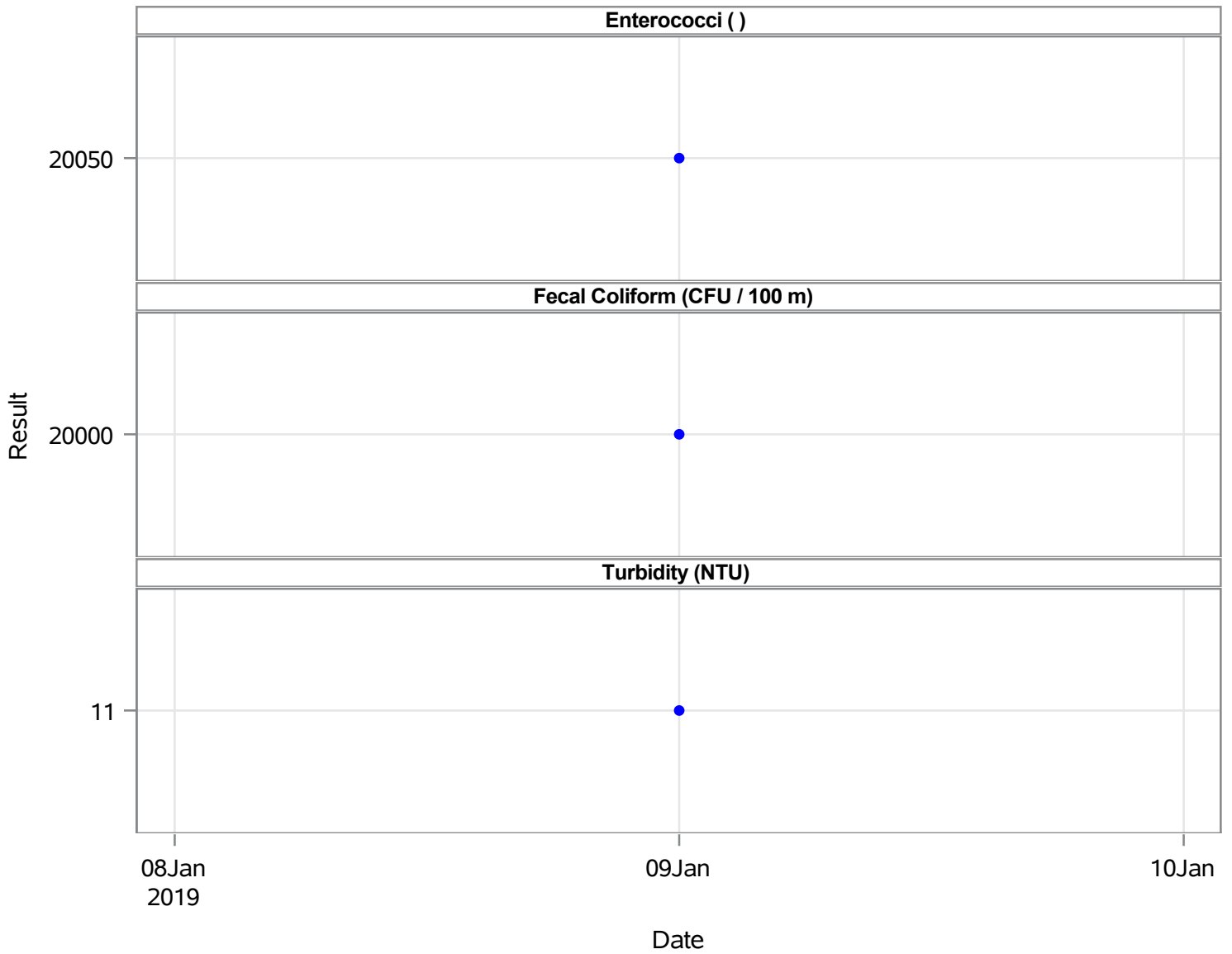


symbol ● Result

Broward County (BC 3)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Enterococci		01/09/2019	01/09/2019	20050	20050	20050	20050	1
Fecal Coliform	CFU / 100 m	01/09/2019	01/09/2019	20000	20000	20000	20000	1
Turbidity	NTU	01/09/2019	01/09/2019	11	11	11	11	1

Broward County BC 3

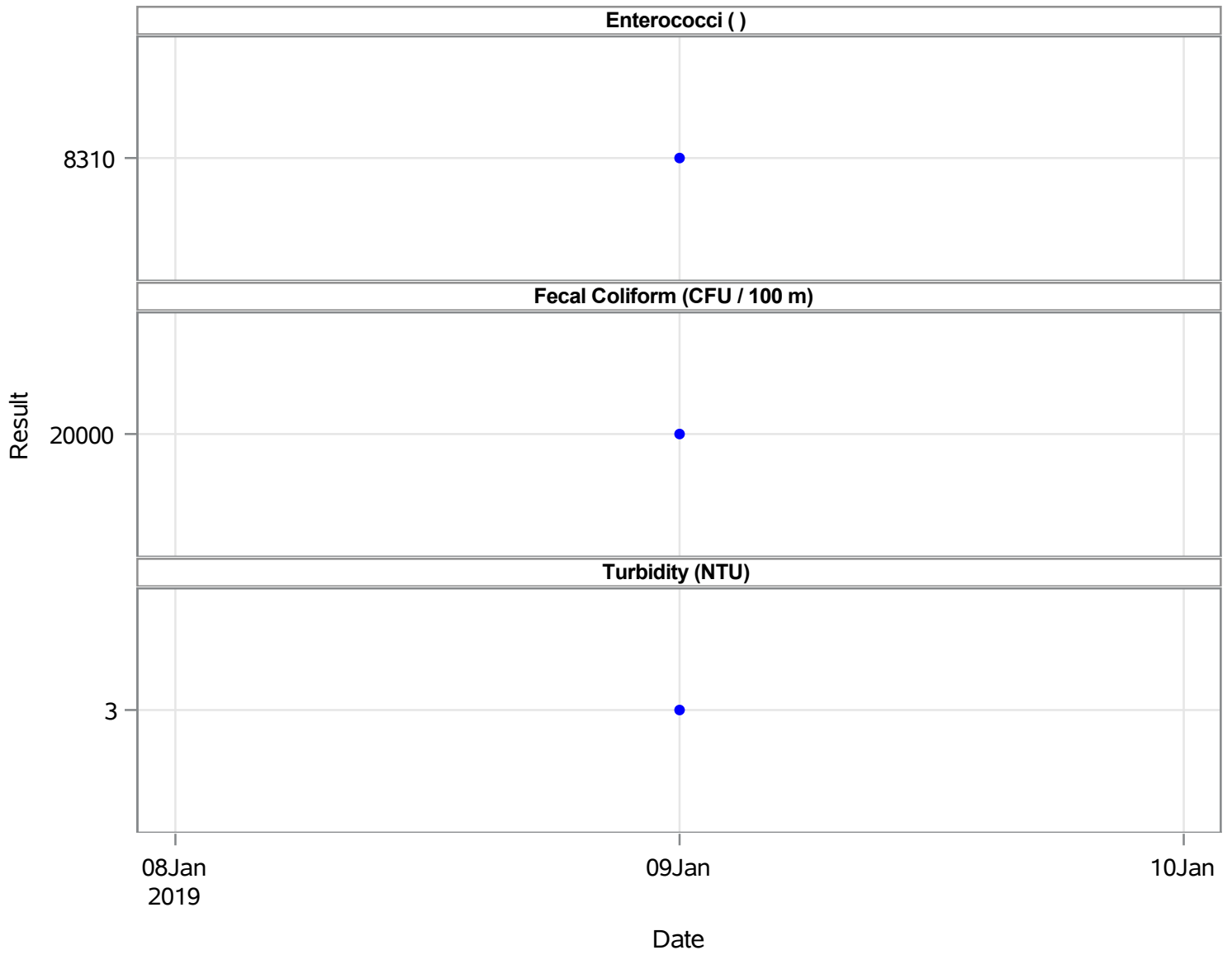


symbol ● Result

Broward County (BC 4)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Enterococci		01/09/2019	01/09/2019	8310	8310	8310	8310	1
Fecal Coliform	CFU / 100 m	01/09/2019	01/09/2019	20000	20000	20000	20000	1
Turbidity	NTU	01/09/2019	01/09/2019	3	3	3	3	1

Broward County BC 4

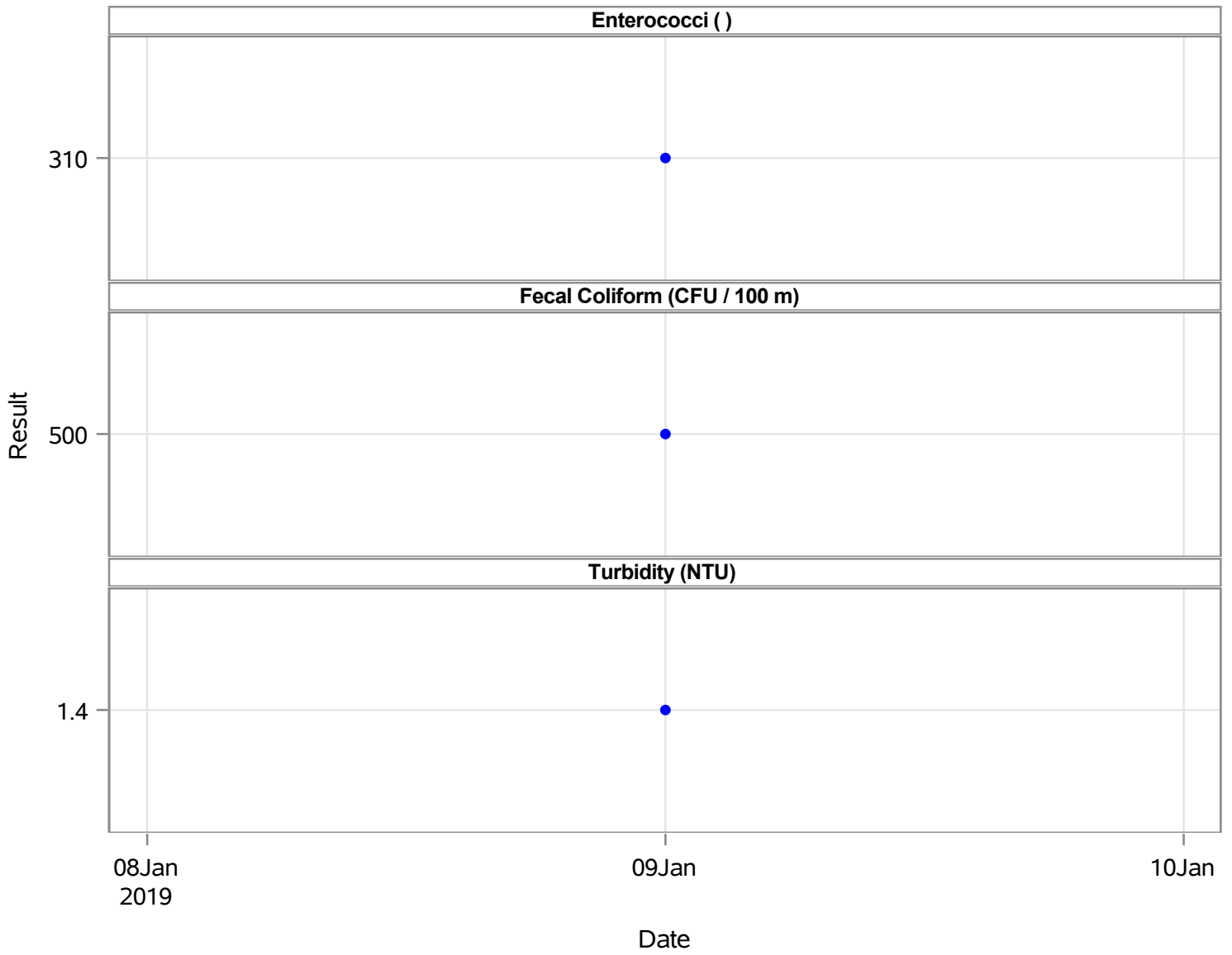


symbol ● Result

Broward County (BC 5)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Enterococci		01/09/2019	01/09/2019	310.0	310.0	310.0	310.0	1
Fecal Coliform	CFU / 100 m	01/09/2019	01/09/2019	500.0	500.0	500.0	500.0	1
Turbidity	NTU	01/09/2019	01/09/2019	1.4	1.4	1.4	1.4	1

Broward County BC 5

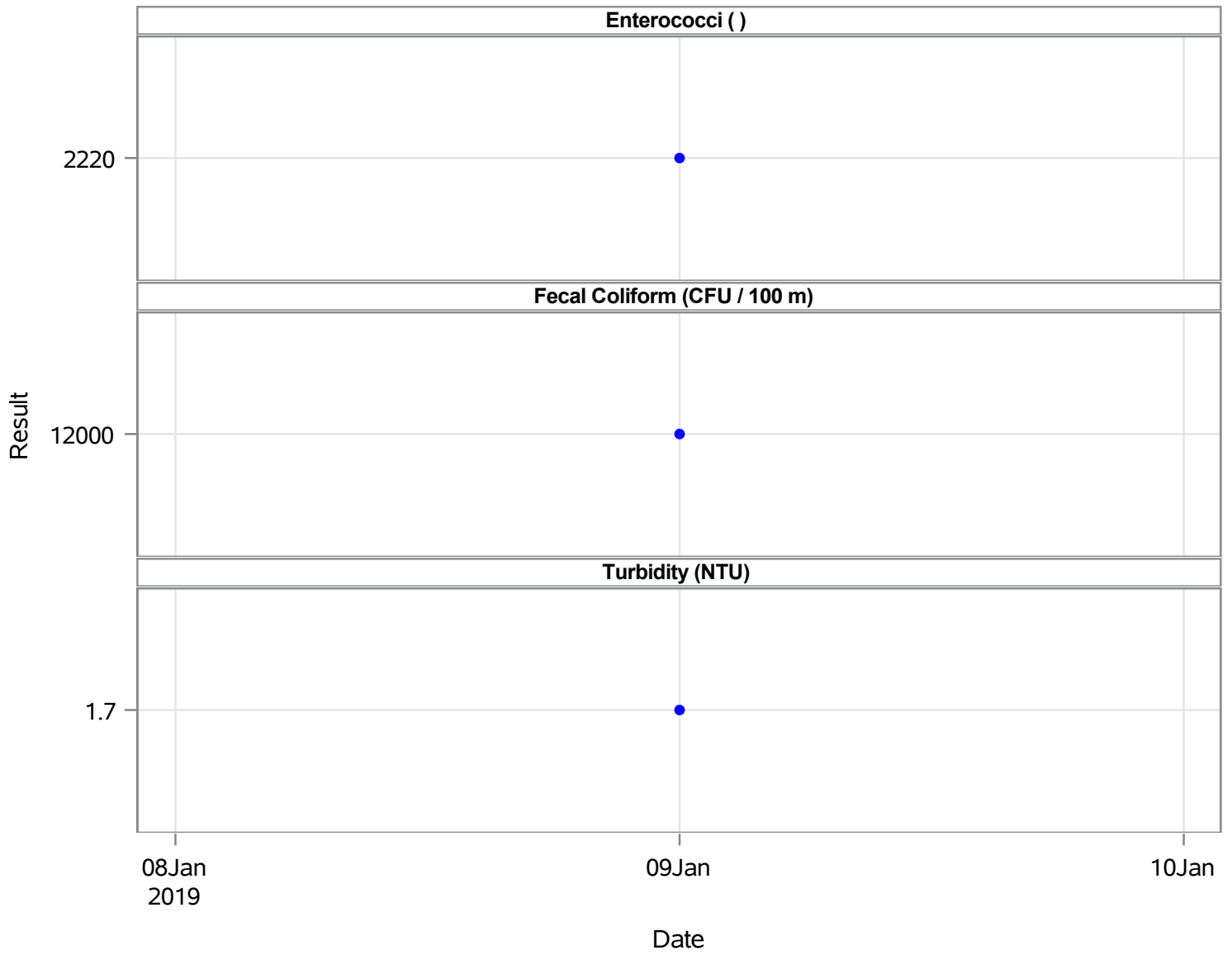


symbol ● Result

Broward County (BC 6)

Analyte	Units	Start Date	End Date	Minimum Value	Maximum Value	Mean	Median	Number of obs
Enterococci		01/09/2019	01/09/2019	2220.0	2220.0	2220.0	2220.0	1
Fecal Coliform	CFU / 100 m	01/09/2019	01/09/2019	12000.0	12000.0	12000.0	12000.0	1
Turbidity	NTU	01/09/2019	01/09/2019	1.7	1.7	1.7	1.7	1

Broward County BC 6

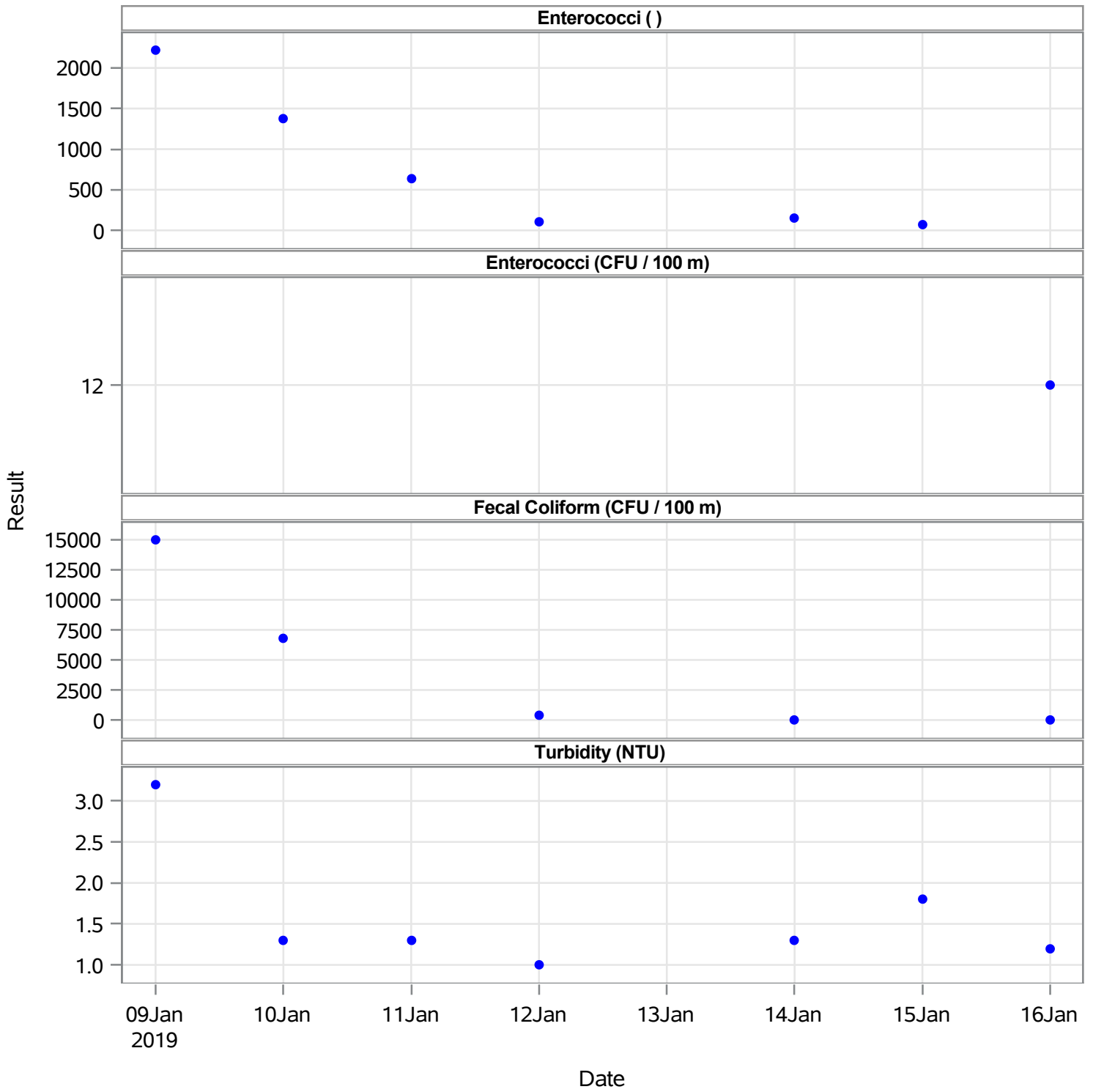


symbol ● Result

Broward County (BC 7)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Enterococci		01/09/2019	01/15/2019	73	2220.0	759.33	396.5	6
Enterococci	CFU / 100 m	01/16/2019	01/16/2019	12	12.0	12.00	12.0	1
Fecal Coliform	CFU / 100 m	01/09/2019	01/16/2019	12	15000.0	4446.40	400.0	5
Turbidity	NTU	01/09/2019	01/16/2019	1	3.2	1.59	1.3	7

Broward County BC 7

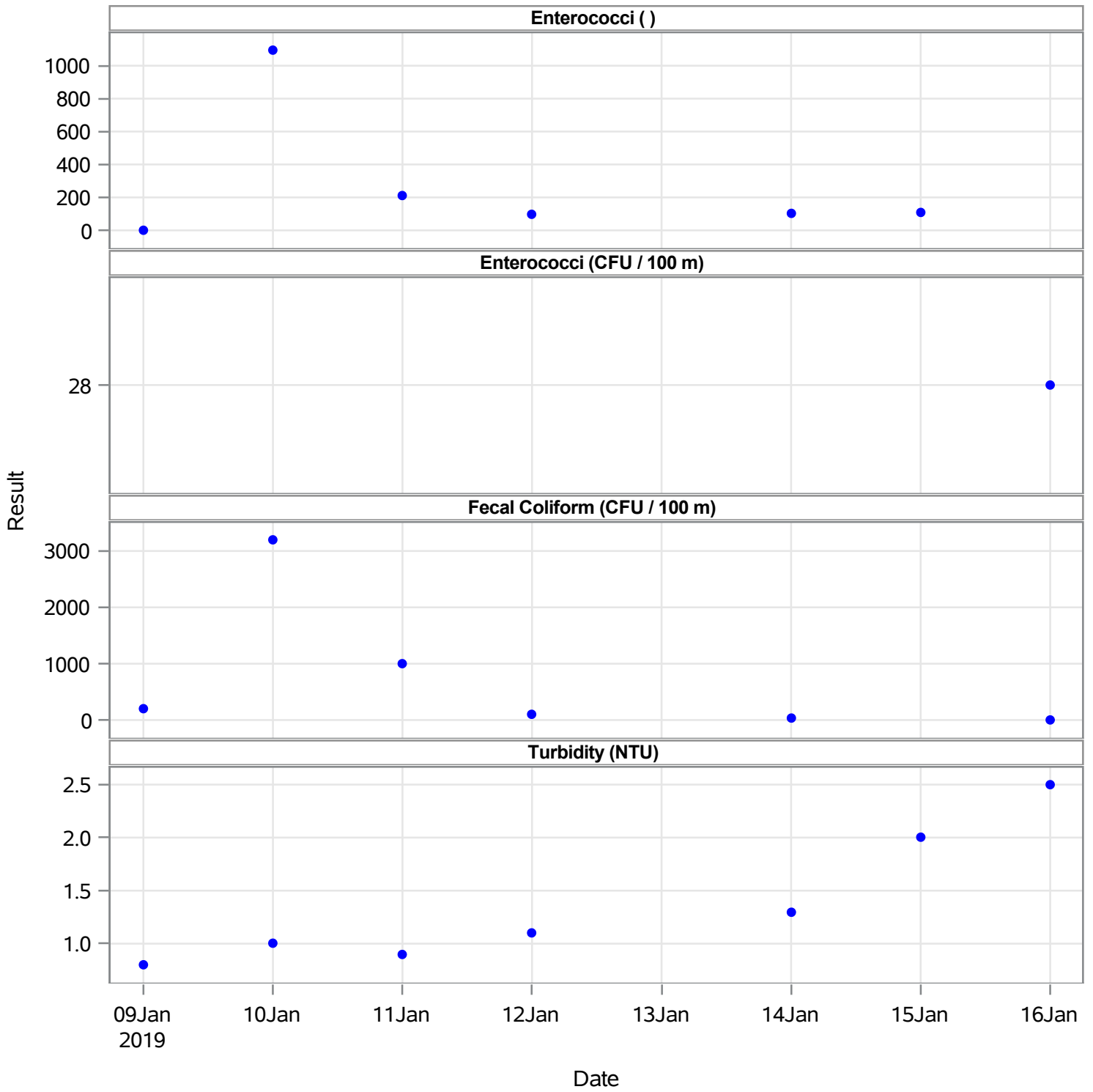


symbol ● Result

Broward County (BC 8)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Enterococci		01/09/2019	01/15/2019	1.0	1095.0	269.167	105.0	6
Enterococci	CFU / 100 m	01/16/2019	01/16/2019	28.0	28.0	28.000	28.0	1
Fecal Coliform	CFU / 100 m	01/09/2019	01/16/2019	8.0	3200.0	757.333	150.0	6
Turbidity	NTU	01/09/2019	01/16/2019	0.8	2.5	1.371	1.1	7

Broward County BC 8

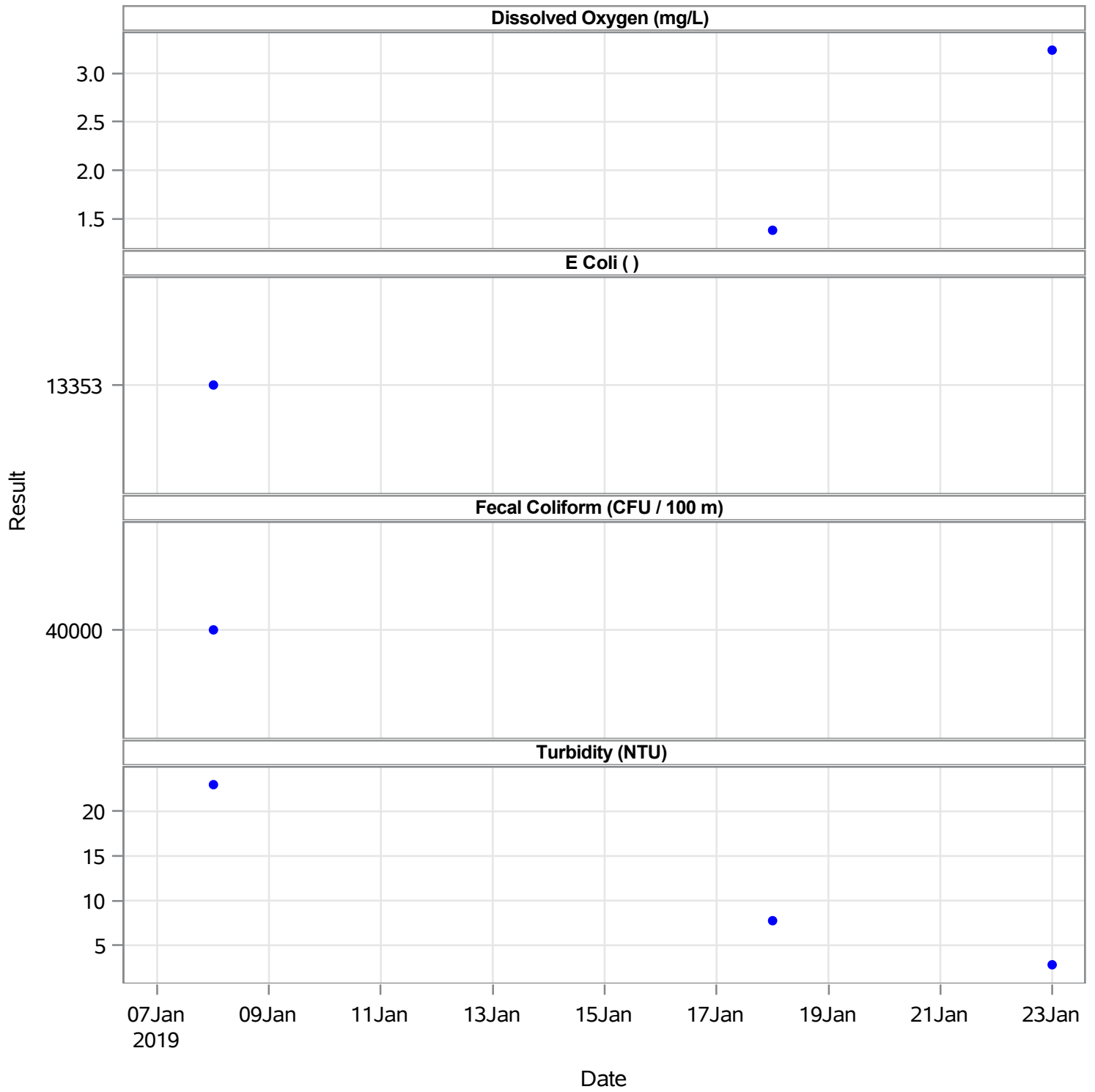


symbol ● Result

Broward County (BC 9)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Dissolved Oxygen	mg/L	01/18/2019	01/23/2019	1.38	3.24	2.31	2.31	2
E Coli		01/08/2019	01/08/2019	13353.00	13353.00	13353.00	13353.00	1
Fecal Coliform	CFU / 100 m	01/08/2019	01/08/2019	40000.00	40000.00	40000.00	40000.00	1
Turbidity	NTU	01/08/2019	01/23/2019	2.80	23.00	11.17	7.70	3

Broward County BC 9

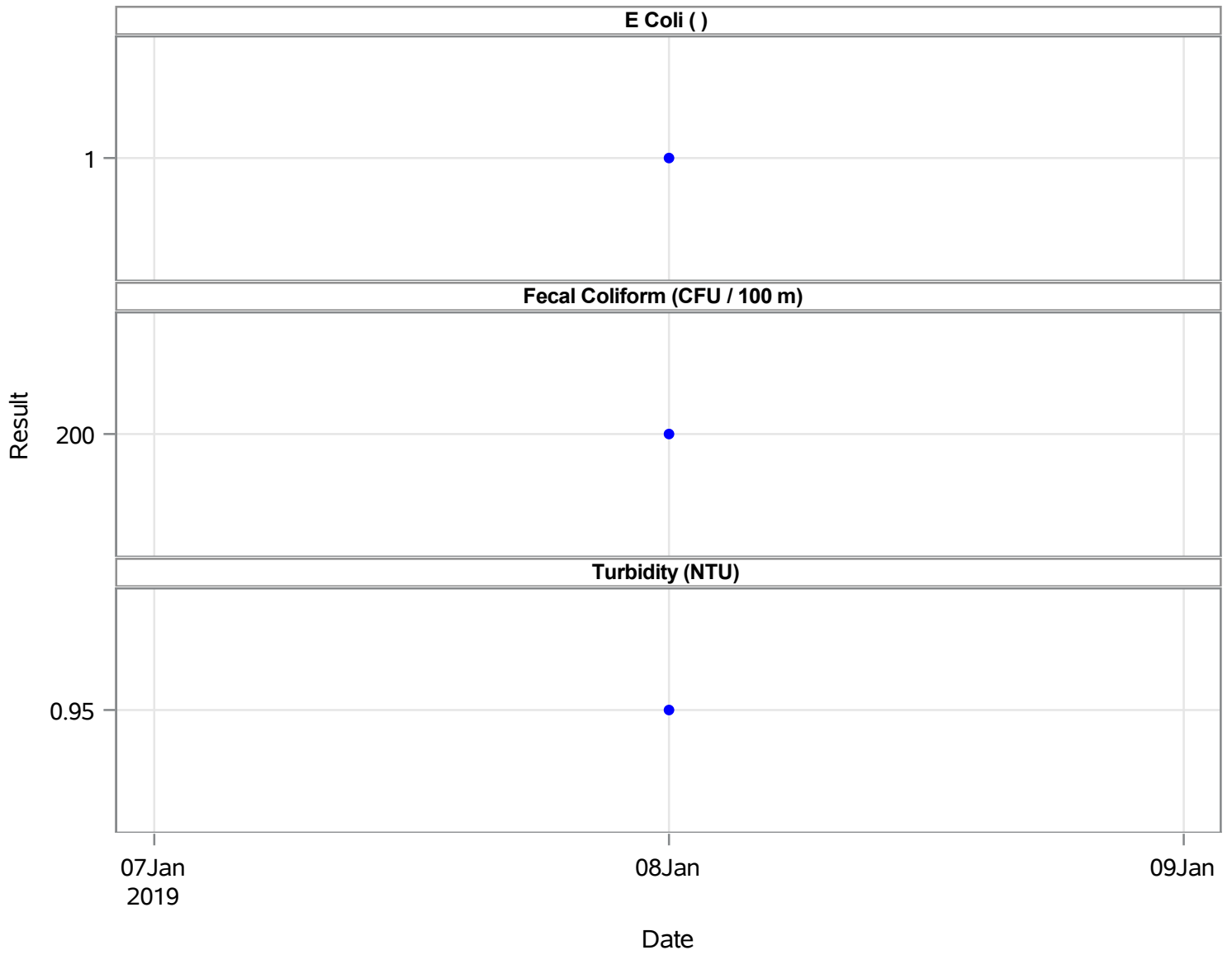


symbol ● Result

Broward County (BC 10)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
E Coli		01/08/2019	01/08/2019	1.00	1.00	1.00	1.00	1
Fecal Coliform	CFU / 100 m	01/08/2019	01/08/2019	200.00	200.00	200.00	200.00	1
Turbidity	NTU	01/08/2019	01/08/2019	0.95	0.95	0.95	0.95	1

Broward County BC 10

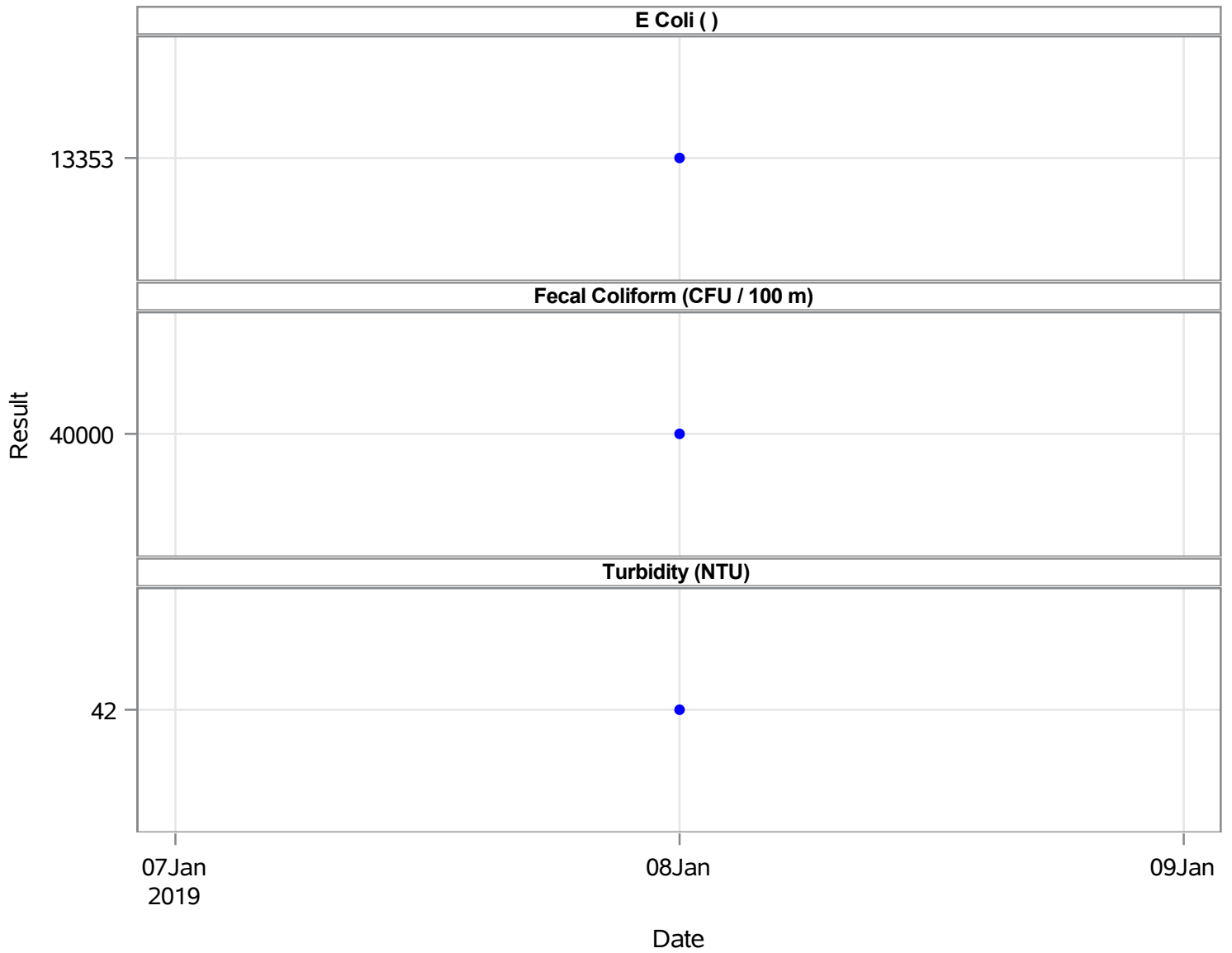


symbol ● Result

Broward County (BC 11)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
E Coli		01/08/2019	01/08/2019	13353	13353	13353	13353	1
Fecal Coliform	CFU / 100 m	01/08/2019	01/08/2019	40000	40000	40000	40000	1
Turbidity	NTU	01/08/2019	01/08/2019	42	42	42	42	1

Broward County BC 11

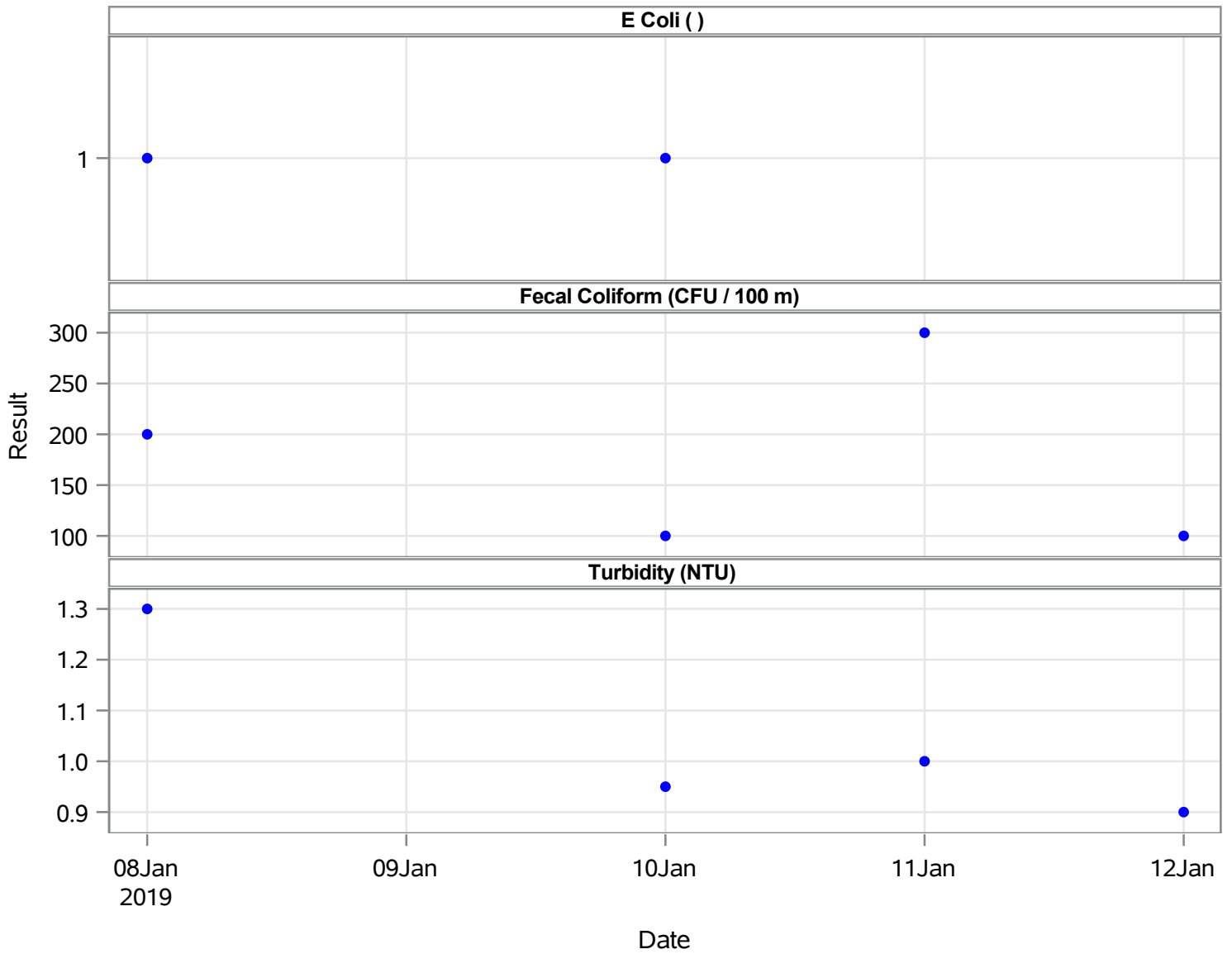


symbol ● Result

Broward County (BC 12)

Analyte	Units	Start Date	End Date	Minimum Value	Maximum Value	Mean	Median	Number of obs
E Coli		01/08/2019	01/10/2019	1.0	1.0	1.000	1.000	2
Fecal Coliform	CFU / 100 m	01/08/2019	01/12/2019	100.0	300.0	175.000	150.000	4
Turbidity	NTU	01/08/2019	01/12/2019	0.9	1.3	1.038	0.975	4

Broward County BC 12

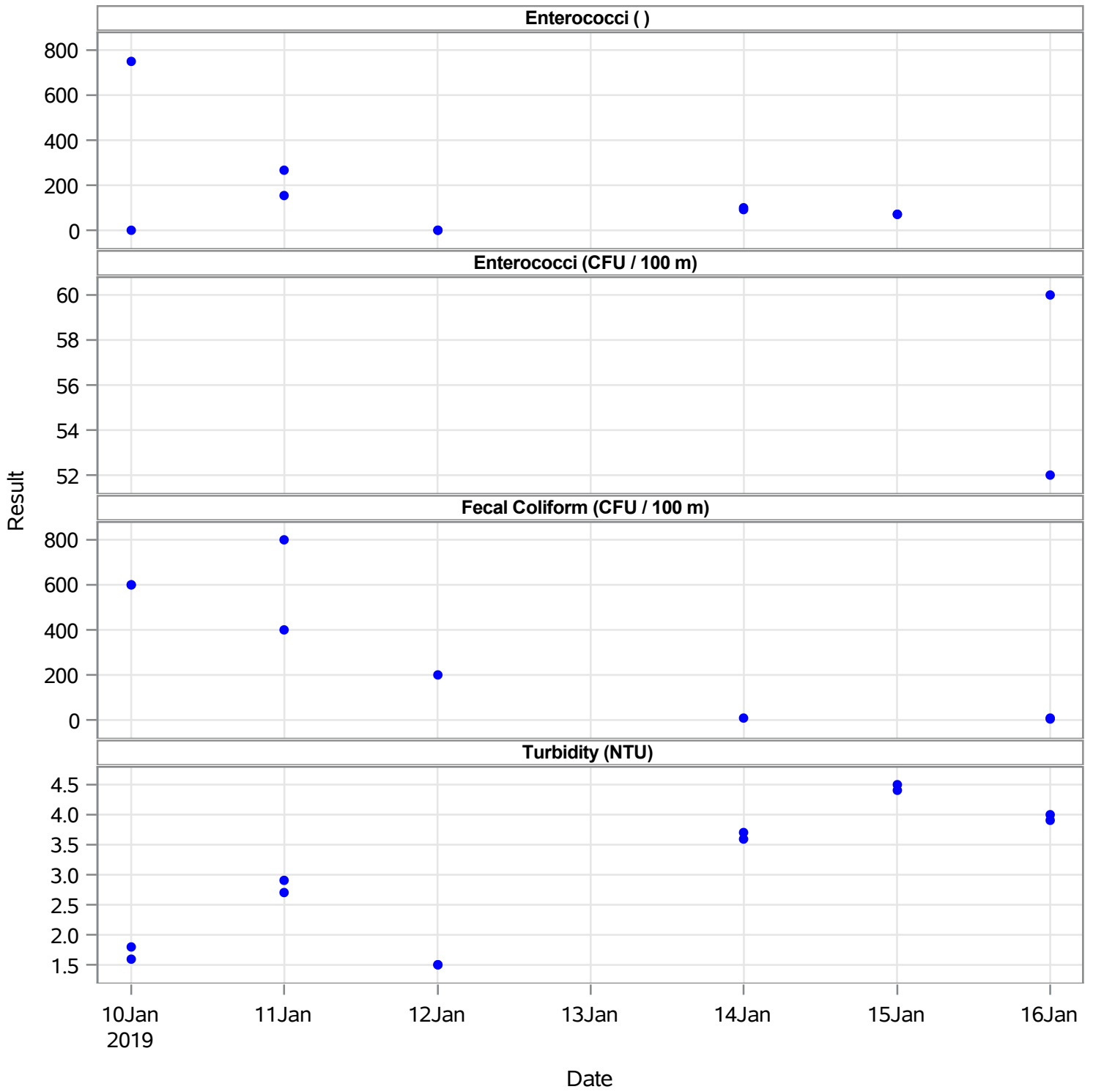


symbol ● Result

Broward County (BC 13)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Enterococci		01/10/2019	01/15/2019	1.0	750.0	151.100	82.00	10
Enterococci	CFU / 100 m	01/16/2019	01/16/2019	52.0	60.0	56.000	56.00	2
Fecal Coliform	CFU / 100 m	01/10/2019	01/16/2019	4.0	800.0	327.500	300.00	8
Turbidity	NTU	01/10/2019	01/16/2019	1.5	4.5	3.008	3.25	12

Broward County BC 13

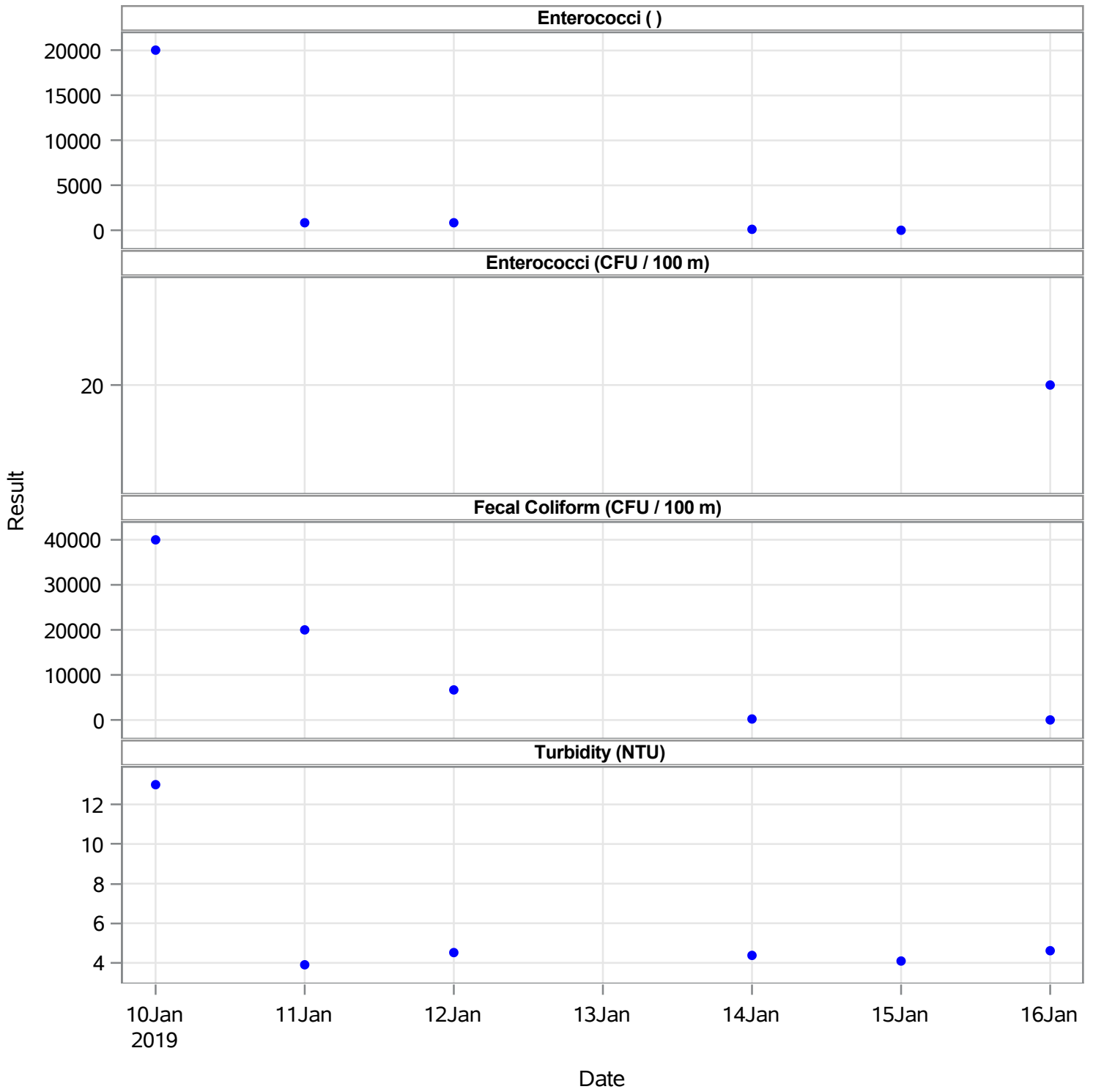


symbol ● Result

Broward County (BC 14)

Analyte	Units	Start Date	End Date	Minimum Value	Maximum Value	Mean	Median	Number of obs
Enterococci		01/10/2019	01/15/2019	10.0	20050	4345.40	802.00	5
Enterococci	CFU / 100 m	01/16/2019	01/16/2019	20.0	20	20.00	20.00	1
Fecal Coliform	CFU / 100 m	01/10/2019	01/16/2019	20.0	40000	13364.00	6600.00	5
Turbidity	NTU	01/10/2019	01/16/2019	3.9	13	5.75	4.45	6

Broward County BC 14

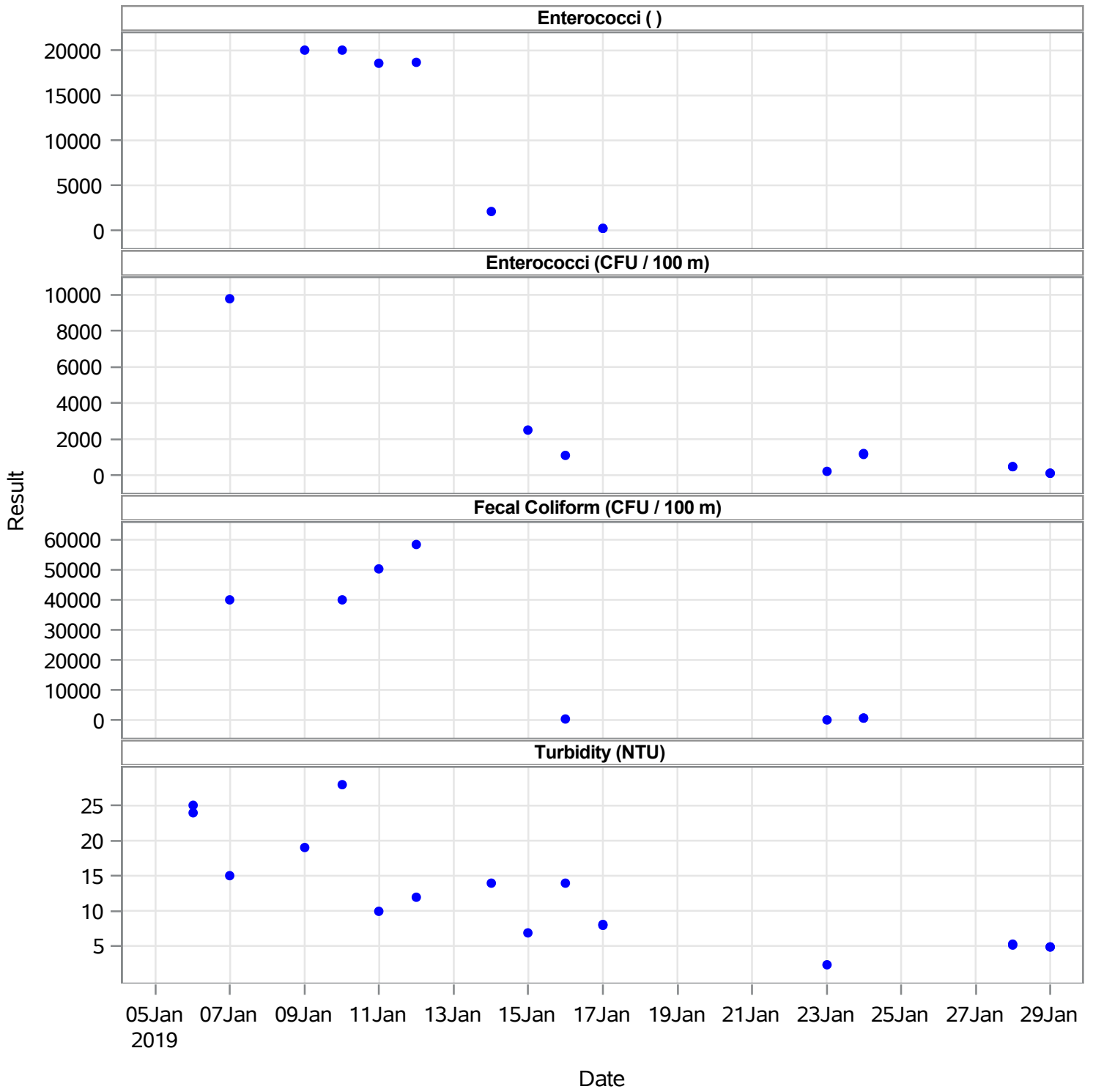


symbol ● Result

Broward County (BC 15)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Enterococci		01/09/2019	01/17/2019	200.0	20050	11419.29	18600	7
Enterococci	CFU / 100 m	01/07/2019	01/29/2019	96.0	9800	1710.70	795	10
Fecal Coliform	CFU / 100 m	01/07/2019	01/24/2019	138.0	58400	23849.75	20380	8
Turbidity	NTU	01/06/2019	01/29/2019	2.3	28	12.12	10	17

Broward County BC 15

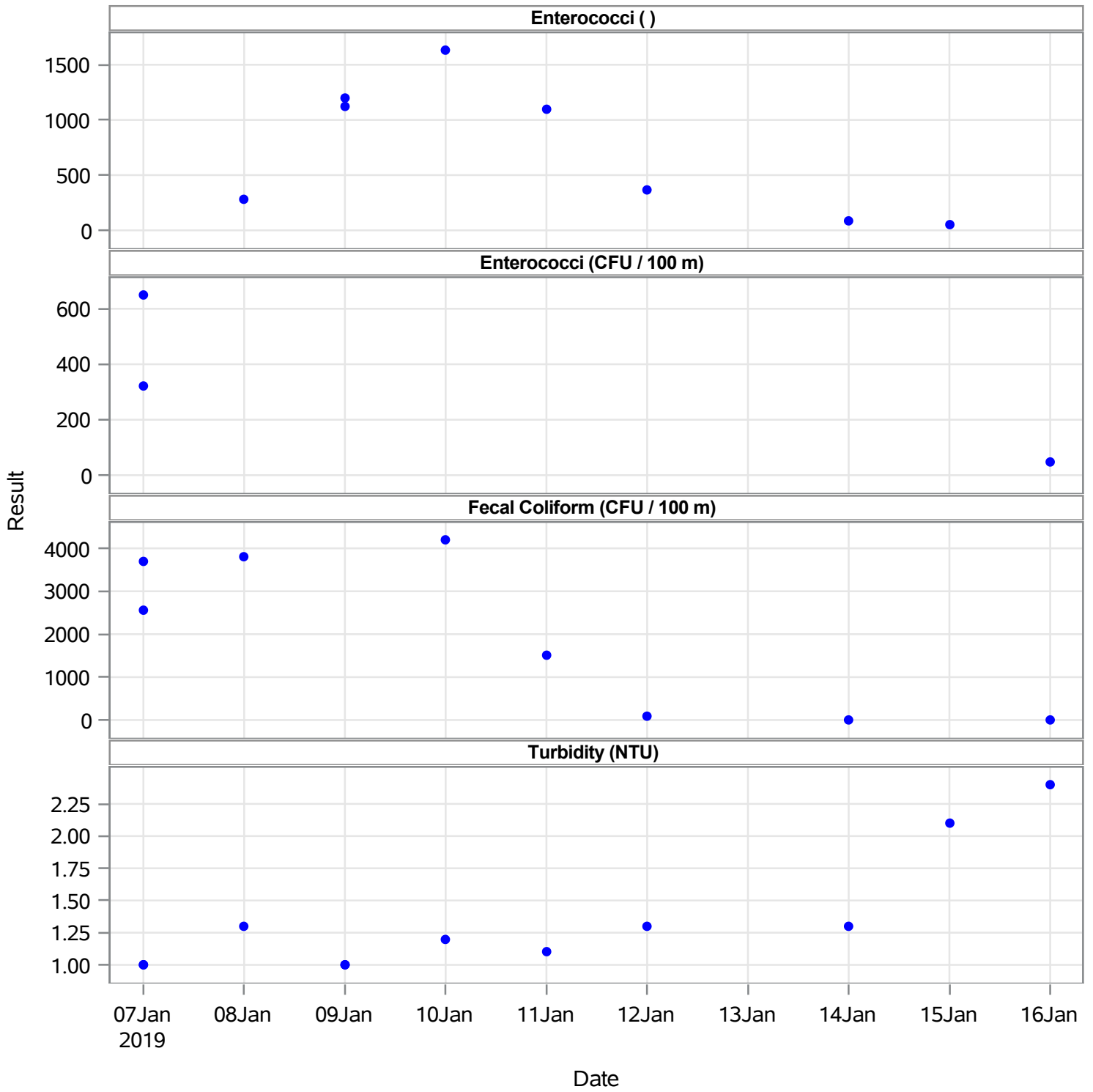


symbol ● Result

Broward County (BC 16)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Enterococci		01/08/2019	01/15/2019	54	1633.0	730.00	731.0	8
Enterococci	CFU / 100 m	01/07/2019	01/16/2019	48	650.0	339.33	320.0	3
Fecal Coliform	CFU / 100 m	01/07/2019	01/16/2019	4	4200.0	1983.00	2025.0	8
Turbidity	NTU	01/07/2019	01/16/2019	1	2.4	1.34	1.2	11

Broward County BC 16

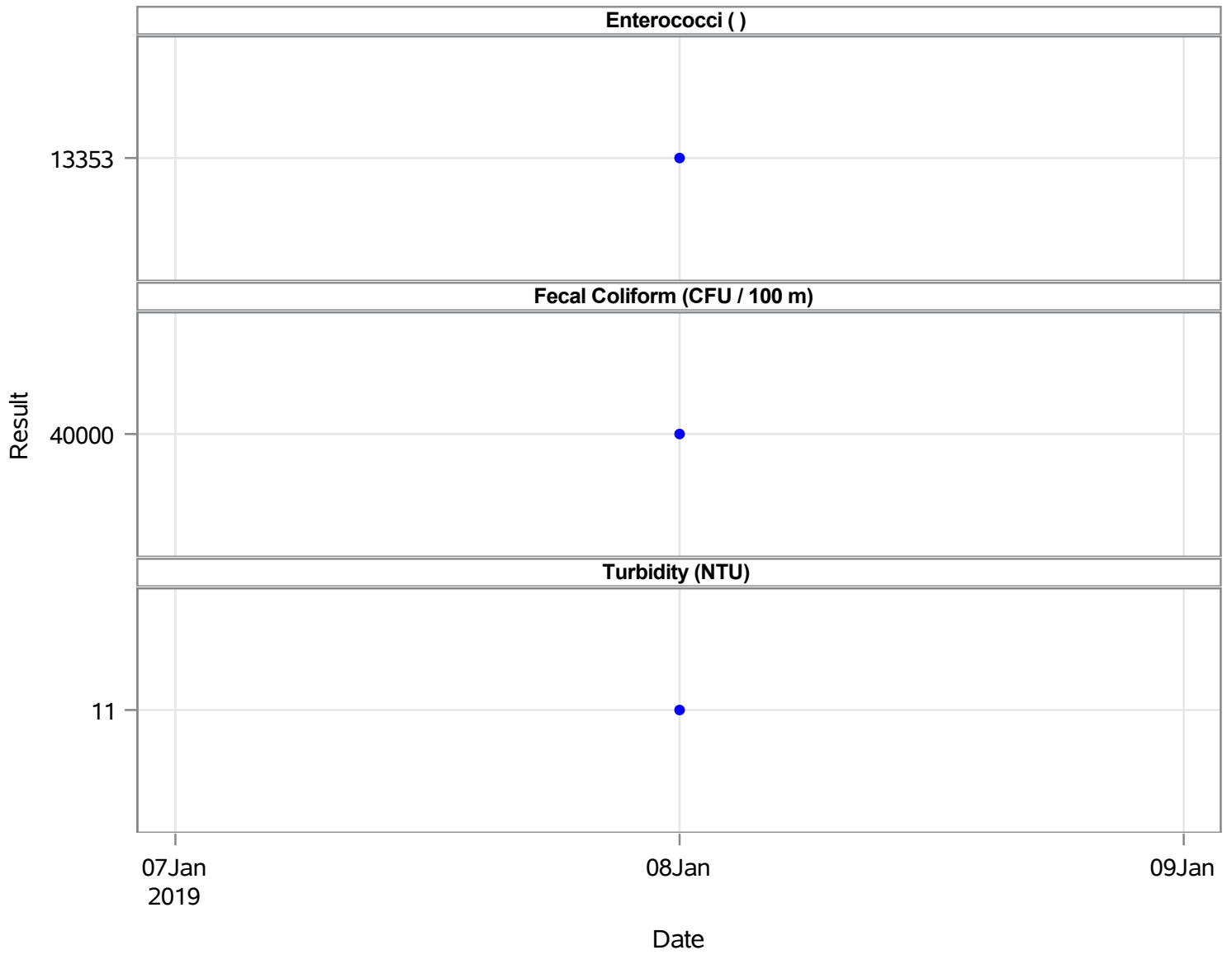


symbol ● Result

Broward County (BC 17)

Analyte	Units	Start Date	End Date	Minimum Value	Maximum Value	Mean	Median	Number of obs
Enterococci		01/08/2019	01/08/2019	13353	13353	13353	13353	1
Fecal Coliform	CFU / 100 m	01/08/2019	01/08/2019	40000	40000	40000	40000	1
Turbidity	NTU	01/08/2019	01/08/2019	11	11	11	11	1

Broward County BC 17

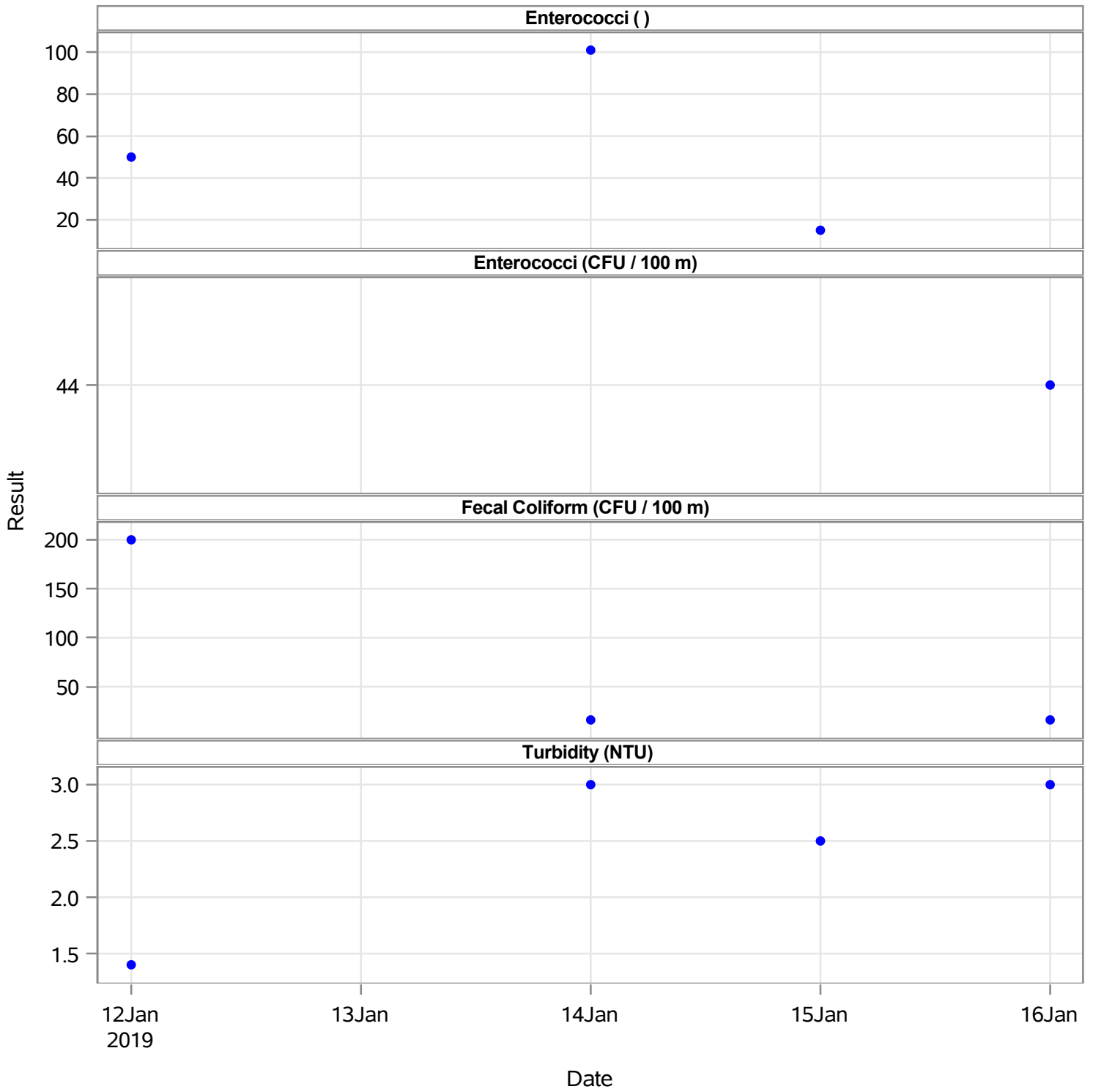


symbol ● Result

Broward County (BC 18)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Enterococci		01/12/2019	01/15/2019	15.0	101	55.333	50.00	3
Enterococci	CFU / 100 m	01/16/2019	01/16/2019	44.0	44	44.000	44.00	1
Fecal Coliform	CFU / 100 m	01/12/2019	01/16/2019	16.0	200	77.333	16.00	3
Turbidity	NTU	01/12/2019	01/16/2019	1.4	3	2.475	2.75	4

Broward County BC 18

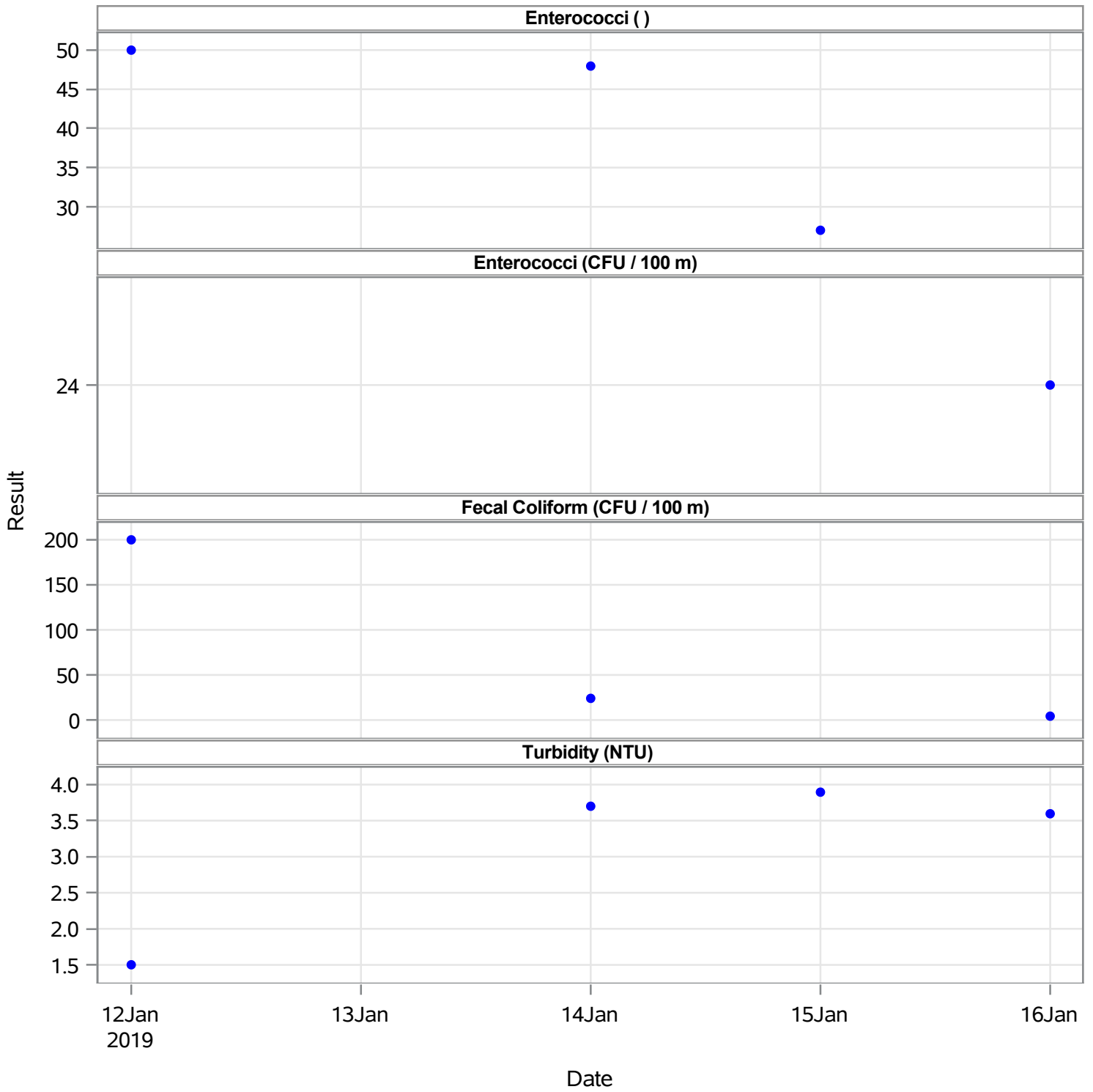


symbol ● Result

Broward County (BC 19)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Enterococci		01/12/2019	01/15/2019	27.0	50.0	41.667	48.00	3
Enterococci	CFU / 100 m	01/16/2019	01/16/2019	24.0	24.0	24.000	24.00	1
Fecal Coliform	CFU / 100 m	01/12/2019	01/16/2019	4.0	200.0	76.000	24.00	3
Turbidity	NTU	01/12/2019	01/16/2019	1.5	3.9	3.175	3.65	4

Broward County BC 19

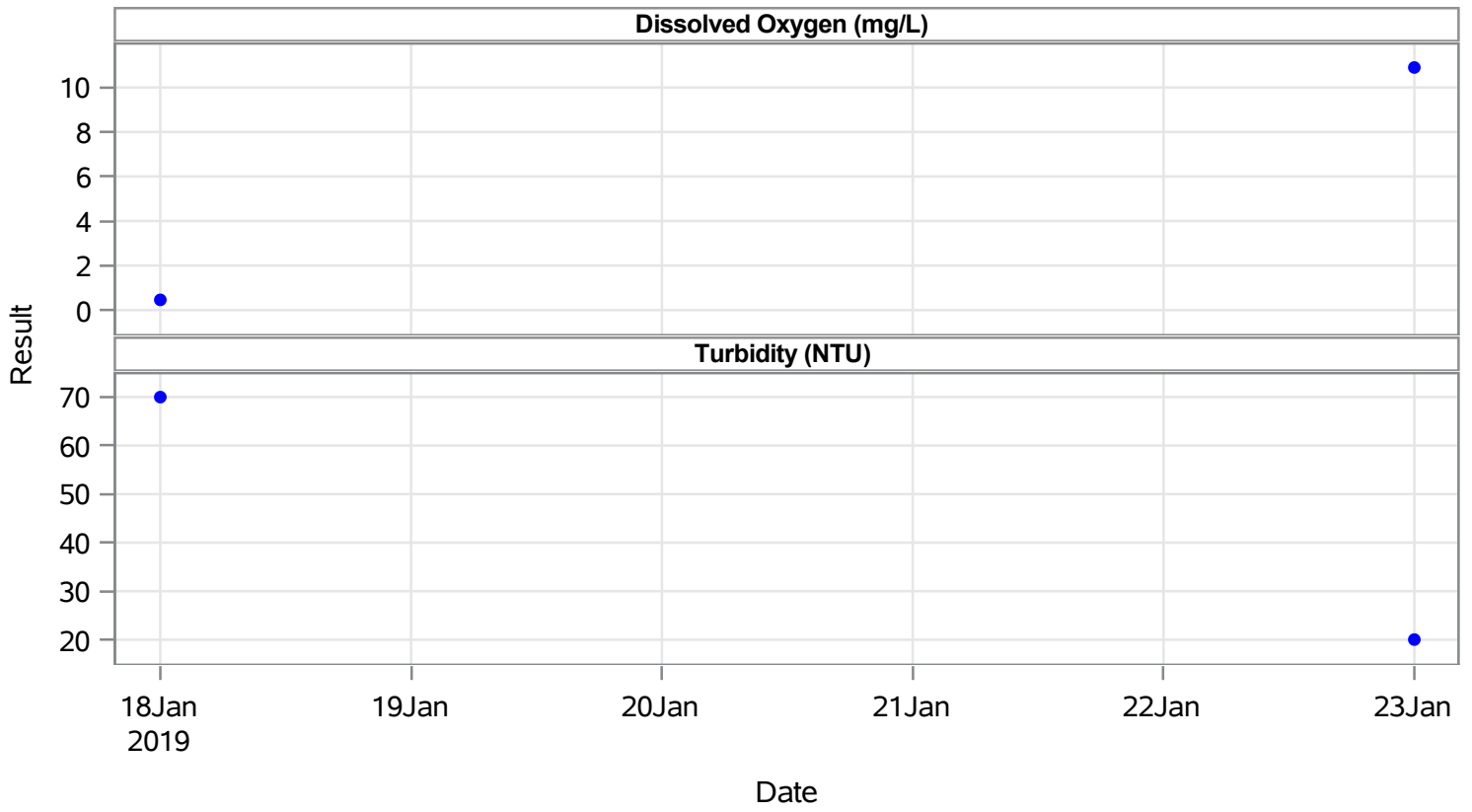


symbol ● Result

Broward County (BC 20)

Analyte	Units	Start Date	End Date	Minimum Value	Maximum Value	Mean	Median	Number of obs
Dissolved Oxygen	mg/L	01/18/2019	01/23/2019	0.45	10.9	5.675	5.675	2
Turbidity	NTU	01/18/2019	01/23/2019	20.00	70.0	45.000	45.000	2

Broward County BC 20

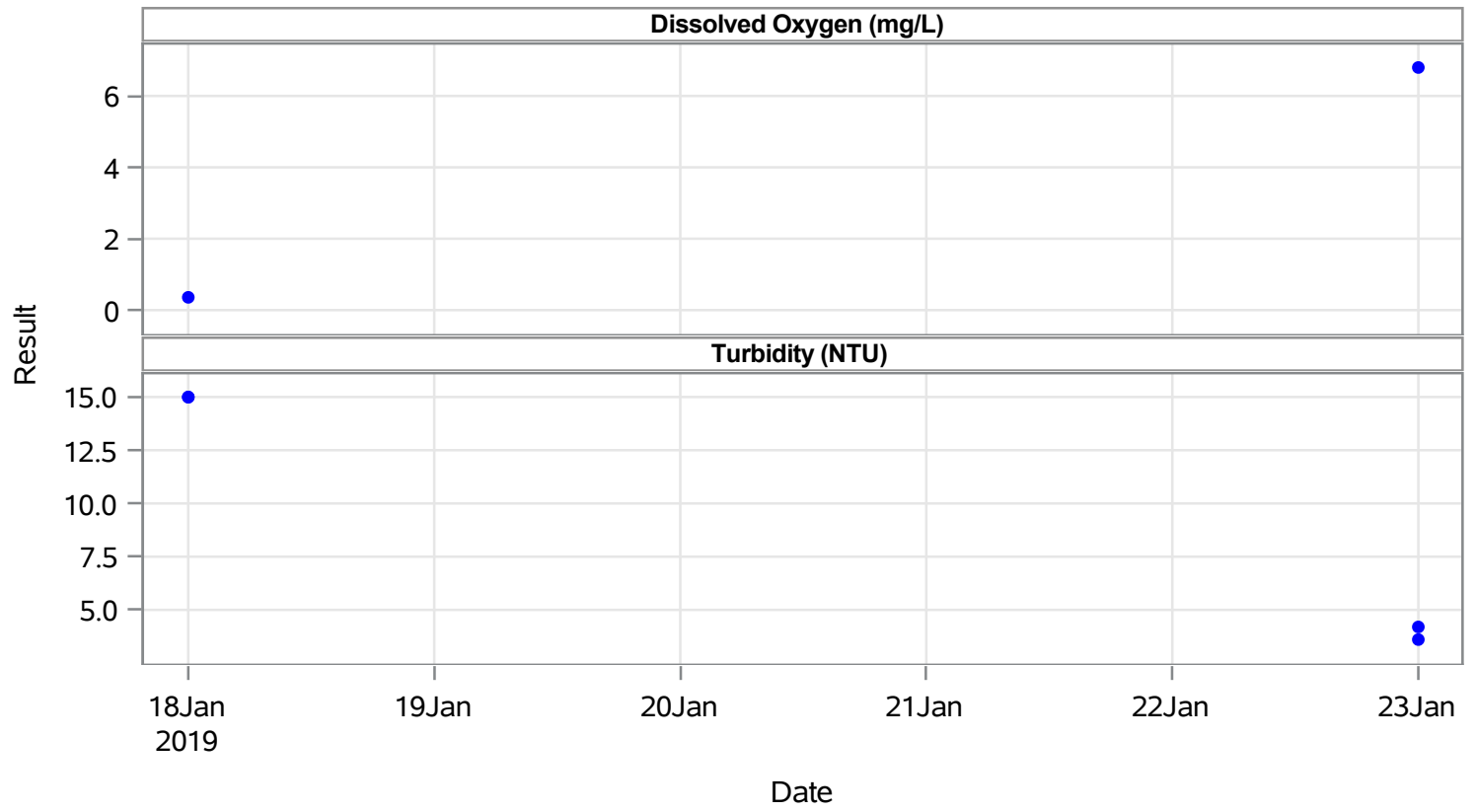


symbol ● Result

Broward County (BC 21)

Analyte	Units	Start Date	End Date	Minimum Value	Maximum Value	Mean	Median	Number of obs
Dissolved Oxygen	mg/L	01/18/2019	01/23/2019	0.34	6.8	3.57	3.57	2
Turbidity	NTU	01/18/2019	01/23/2019	3.60	15.0	9.45	9.60	4

Broward County BC 21

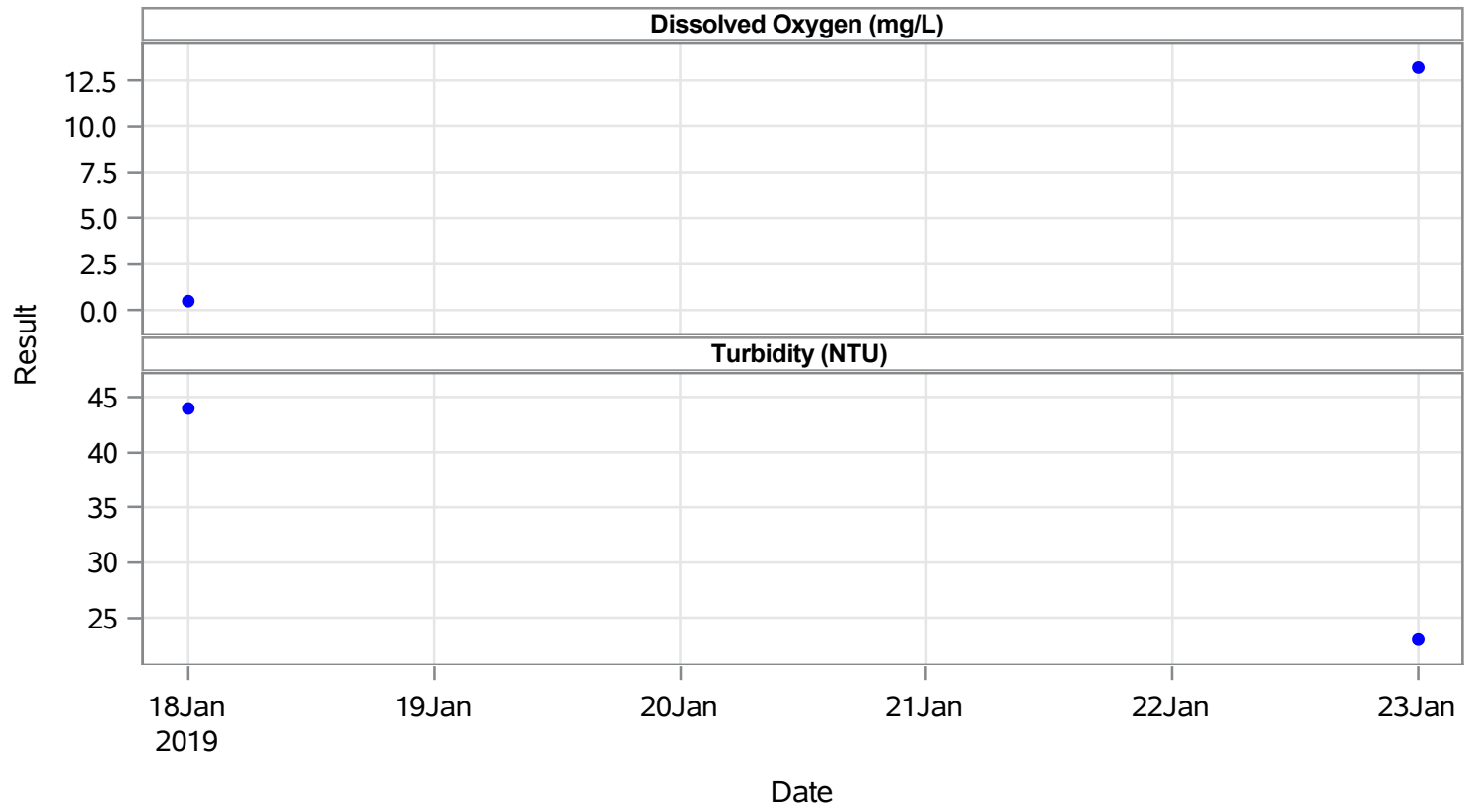


symbol ● Result

Broward County (BC 22)

Analyte	Units	Start Date	End Date	Minumum Value	Maximum Value	Mean	Median	Number of obs
Dissolved Oxygen	mg/L	01/18/2019	01/23/2019	0.5	13.2	6.85	6.85	2
Turbidity	NTU	01/18/2019	01/23/2019	23.0	44.0	33.50	33.50	2

Broward County BC 22

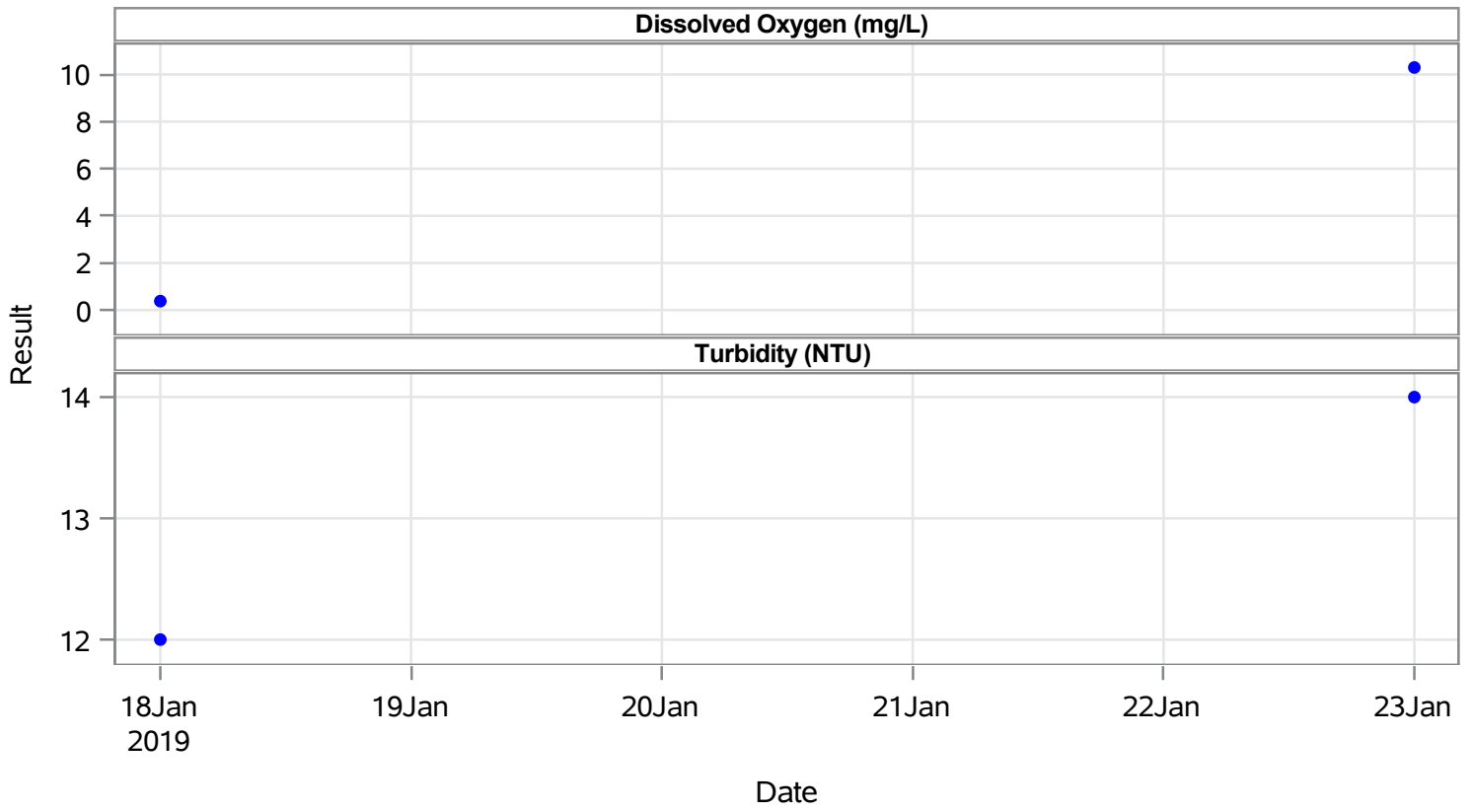


symbol ● Result

Broward County (BC 23)

Analyte	Units	Start Date	End Date	Minimum Value	Maximum Value	Mean	Median	Number of obs
Dissolved Oxygen	mg/L	01/18/2019	01/23/2019	0.37	10.3	5.335	5.335	2
Turbidity	NTU	01/18/2019	01/23/2019	12.00	14.0	13.000	13.000	2

Broward County BC 23

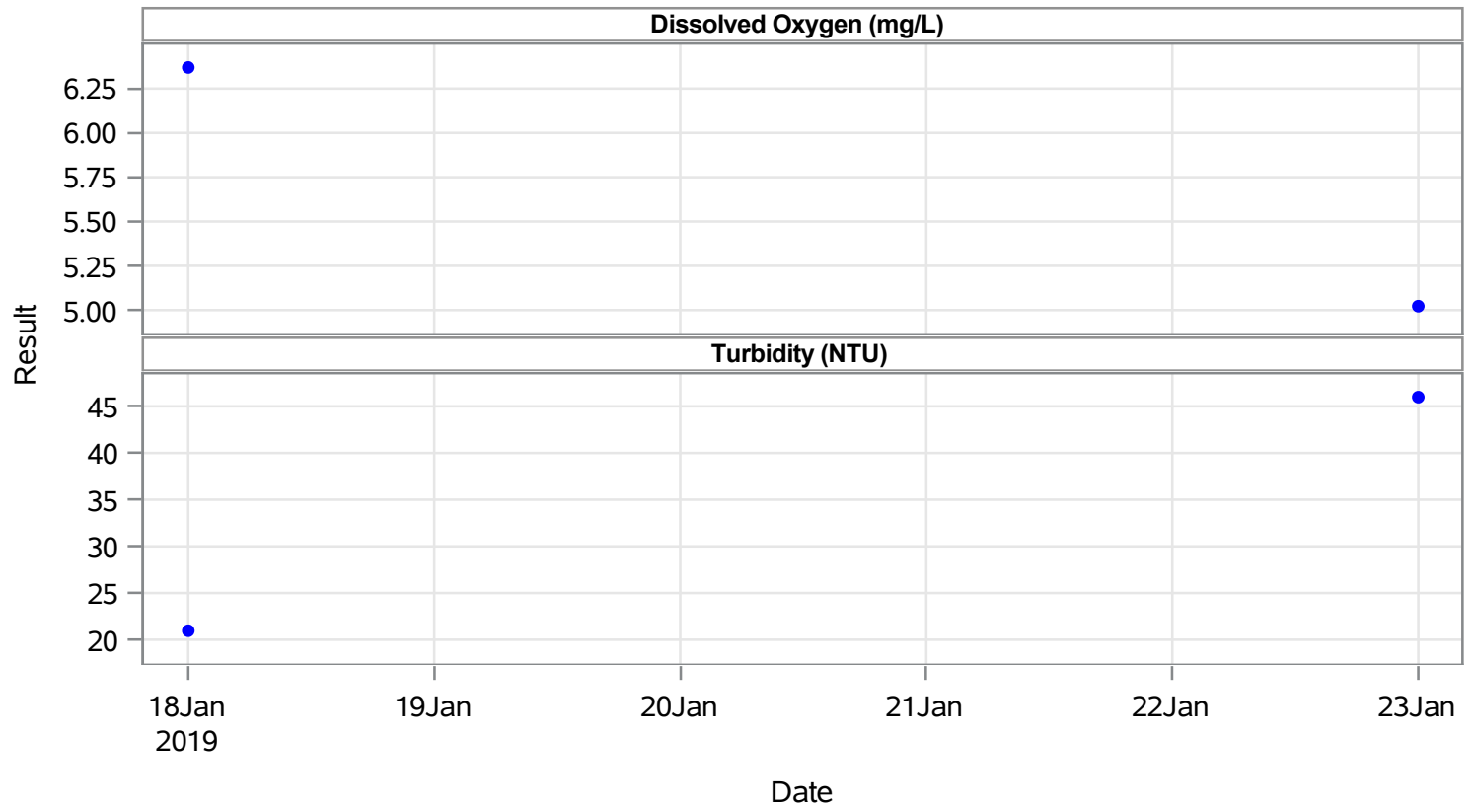


symbol ● Result

Broward County (BC 24)

Analyte	Units	Start Date	End Date	Minimum Value	Maximum Value	Mean	Median	Number of obs
Dissolved Oxygen	mg/L	01/18/2019	01/23/2019	5.02	6.37	5.695	5.695	2
Turbidity	NTU	01/18/2019	01/23/2019	21.00	46.00	33.500	33.500	2

Broward County BC 24



symbol ● Result