Guana River Marsh Aquatic Preserve

SEACAR Water Quality Analysis

Last compiled on 30 September, 2025

Contents

Indicators

Nutrients

Total Nitrogen - Discrete

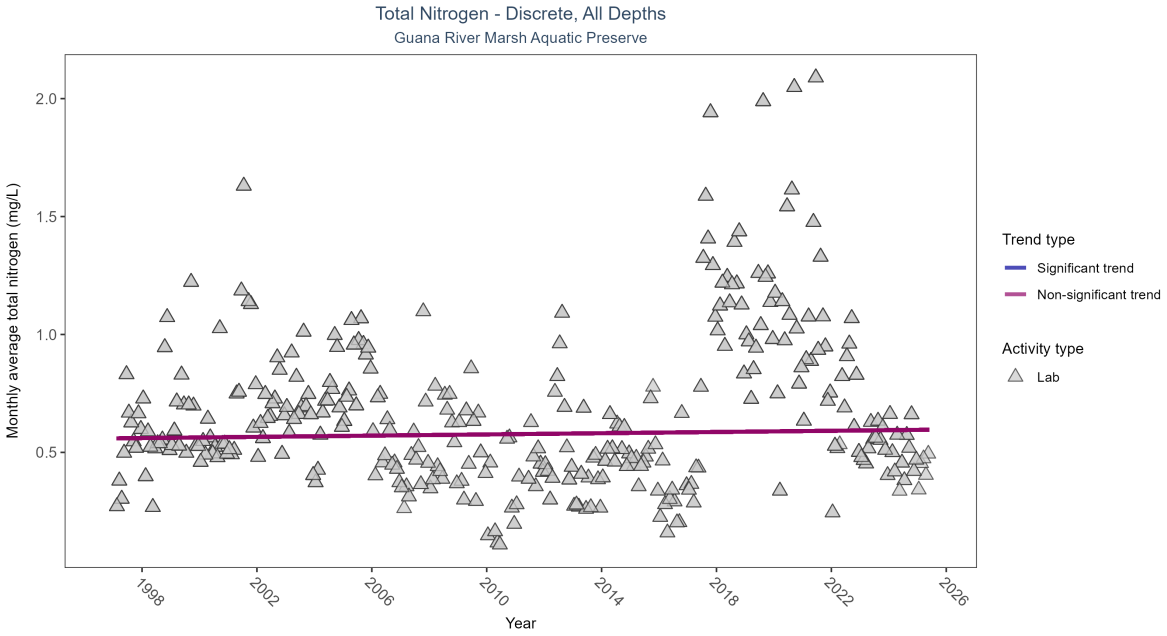

Figure 1: Scatter plot of monthly average total nitrogen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only nitrogen values obtained from laboratory analyses (triangles) are included in the plot.

Table 1: Seasonal Kendall-Tau Results for - Total Nitrogen

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
Lab	No significant trend	2045	29	1997 - 2025	0.61	0.02439	0.55936	0.00129	0.5273

Total nitrogen showed no detectable trend between 1997 and 2025.

Figure 2: Map showing location of discrete water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Total Phosphorus - Discrete

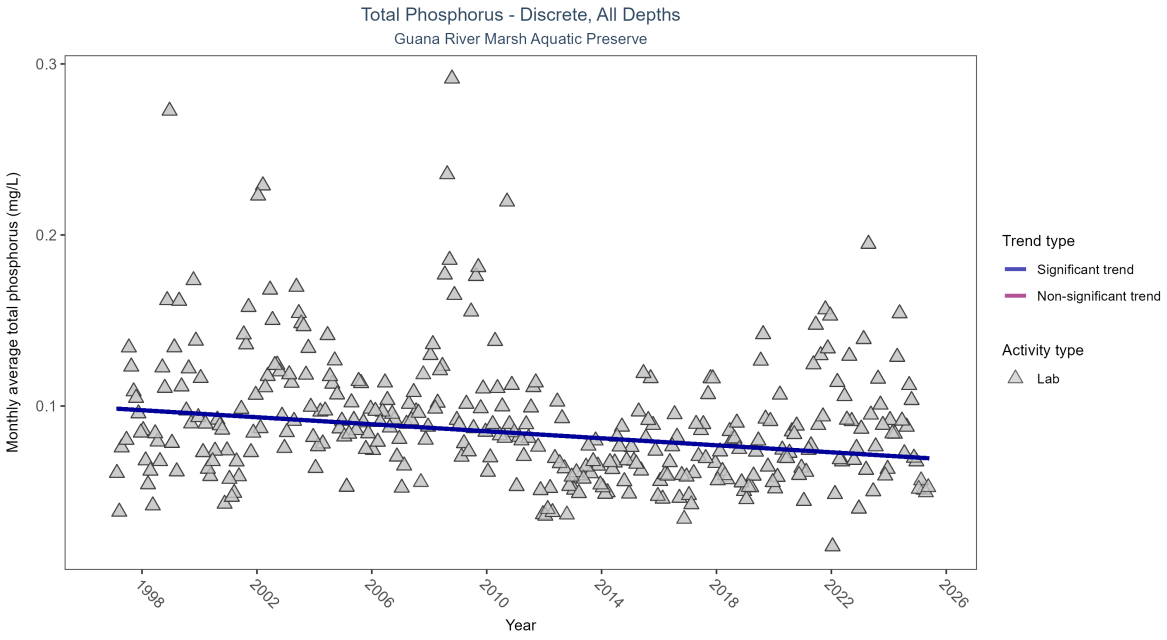

Figure 3: Scatter plot of monthly average total phosphorus over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only phosphorus values obtained from laboratory analyses (triangles) are included in the plot.

Table 2: Seasonal Kendall-Tau Results for - Total Phosphorus

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
Lab	Significantly decreasing trend	2959	29	1997 - 2025	0.0751	-0.21044	0.09857	-0.00103	0

Monthly average total phosphorus decreased by less than 0.01 mg/L per year.

Figure 4: Map showing location of discrete water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Water Quality

Dissolved Oxygen - Discrete

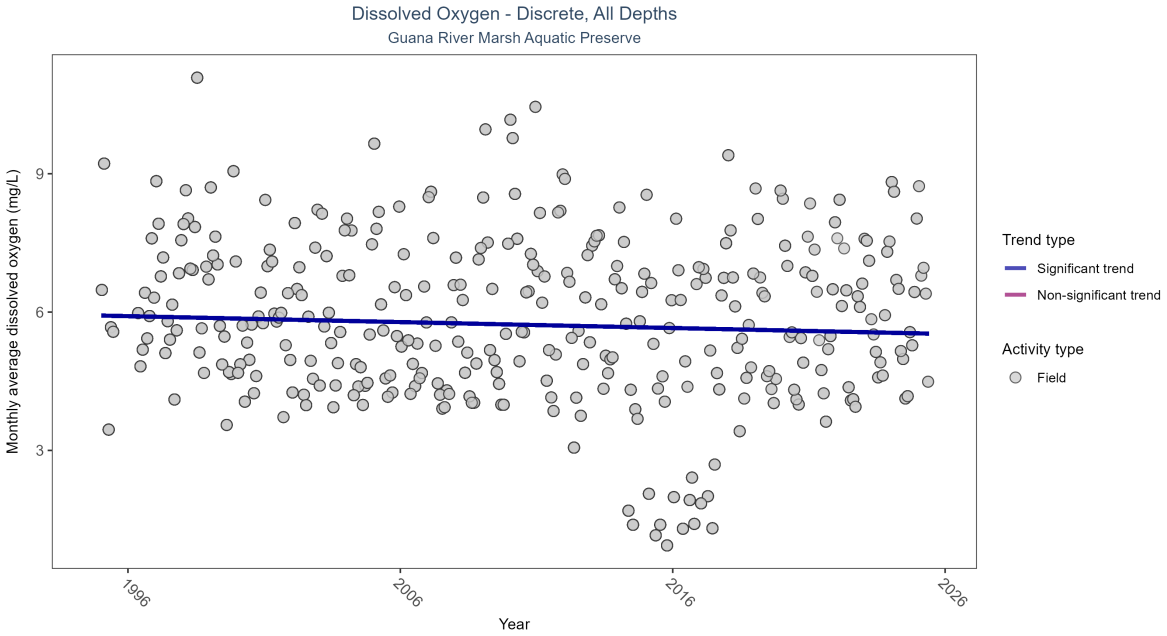

Figure 5: Scatter plot of monthly average dissolved oxygen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen values measured in the field (circles) are included in the plot.

Table 3: Seasonal Kendall-Tau Results for - Dissolved Oxygen

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
Field	Significantly decreasing trend	7664	31	1995 - 2025	5.7	-0.07932	5.92426	-0.01286	0.0355

Monthly average dissolved oxygen decreased by 0.01 mg/L per year.

Figure 6: Map showing location of discrete water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Dissolved Oxygen - Continuous

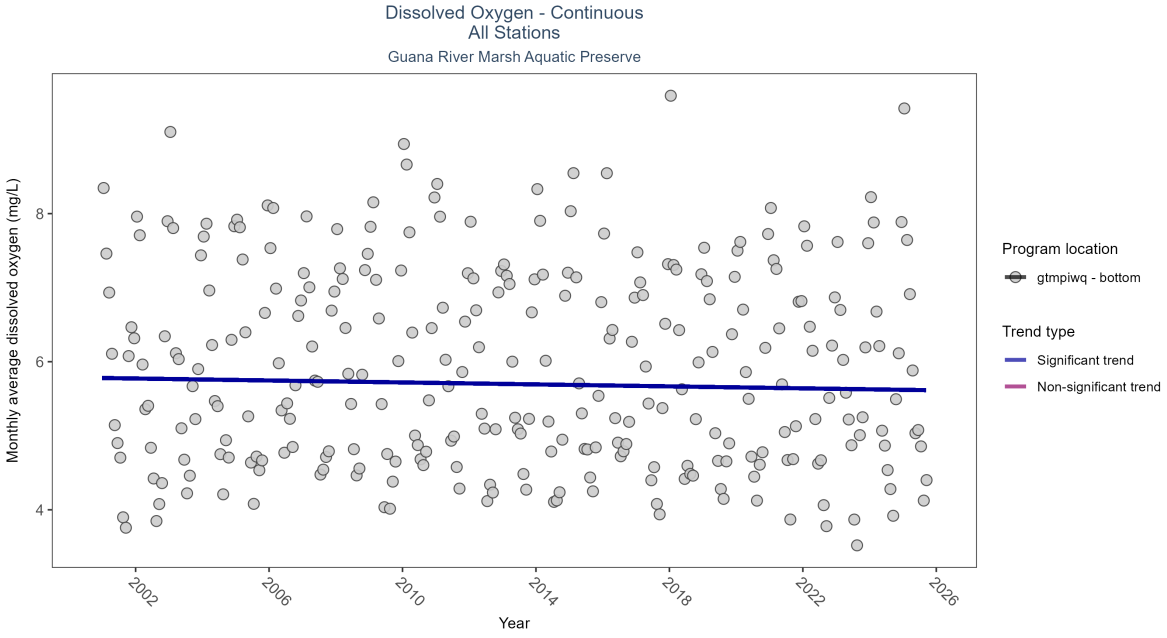

Figure 7: Scatter plot of monthly average dissolved oxygen over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 4: Seasonal Kendall-Tau Results - Dissolved Oxygen

Program Location	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
gtmpiwq	Significantly decreasing trend	685087	25	2001 - 2025	5.8	-0.09	5.78	-0.01	0.037

At one program location, monthly average dissolved oxygen decreased by 0.01 mg/L per year.

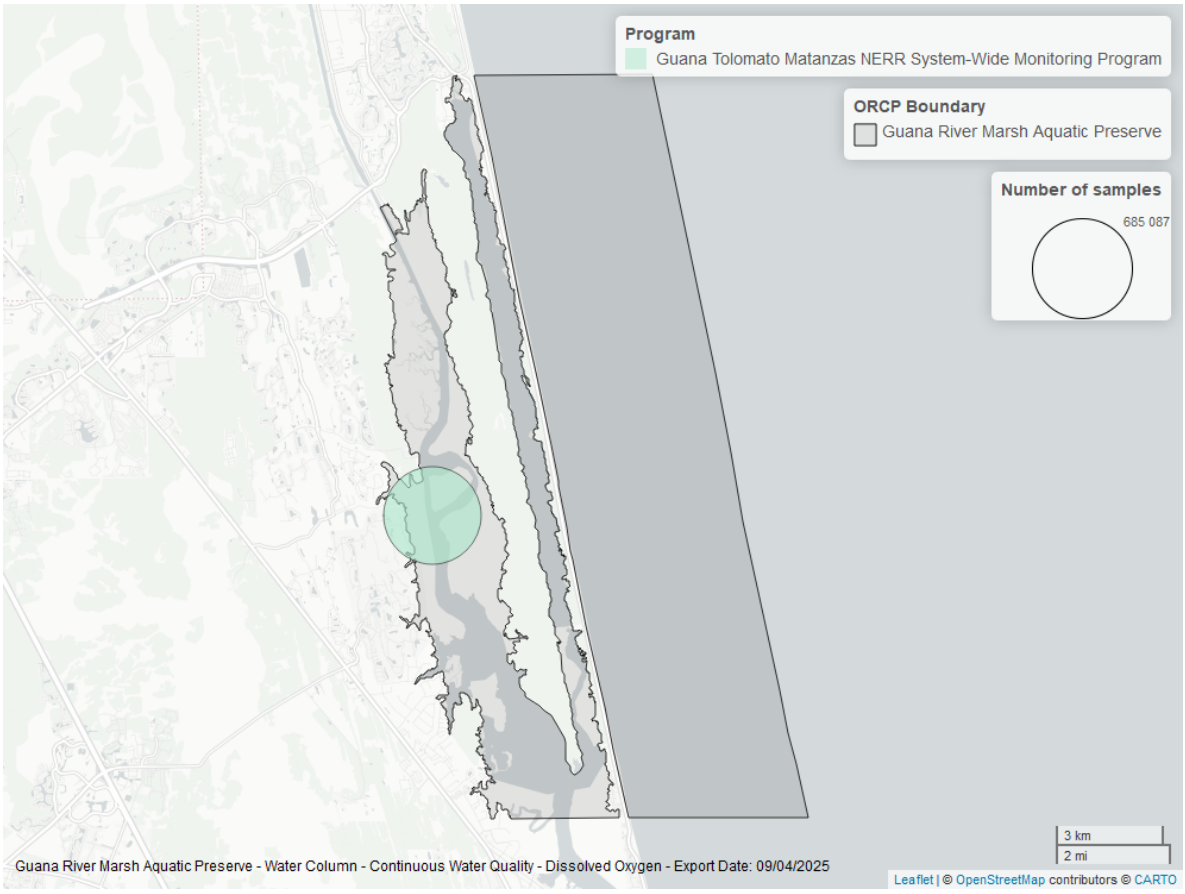

Figure 8: Map showing location of dissolved oxygen continuous water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Dissolved Oxygen Saturation - Discrete

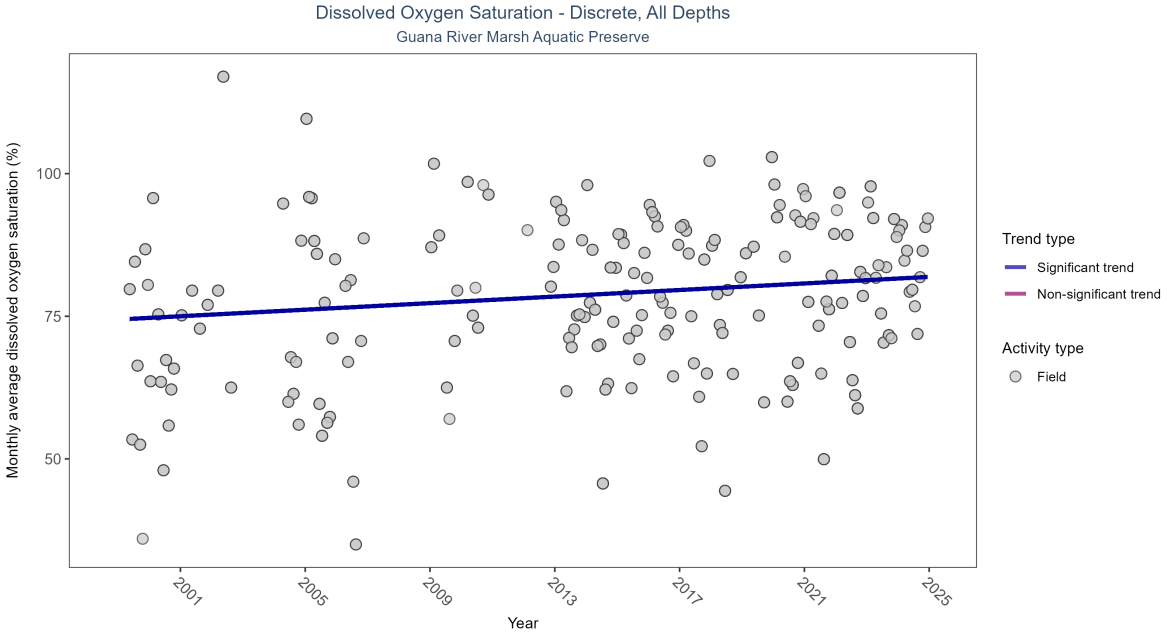

Figure 9: Scatter plot of monthly average dissolved oxygen saturation over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen saturation values measured in the field (circles) are included in the plot.

Table 5: Seasonal Kendall-Tau Results for - Dissolved Oxygen Saturation

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
Field	Significantly increasing trend	1207	22	1999 - 2024	78.9	0.14396	74.42822	0.2875	0.0057

Monthly average dissolved oxygen saturation increased by 0.29% per year.

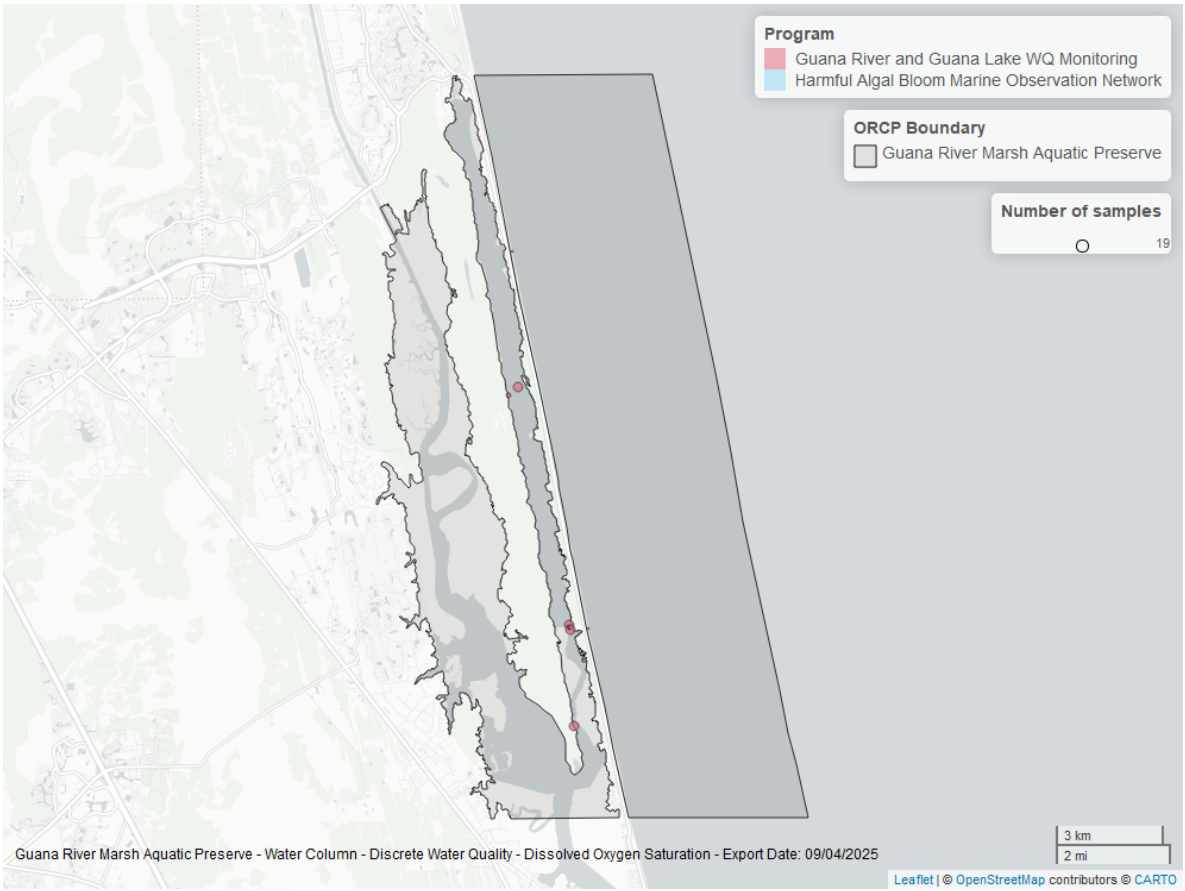

Figure 10: Map showing location of discrete water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Dissolved Oxygen Saturation - Continuous

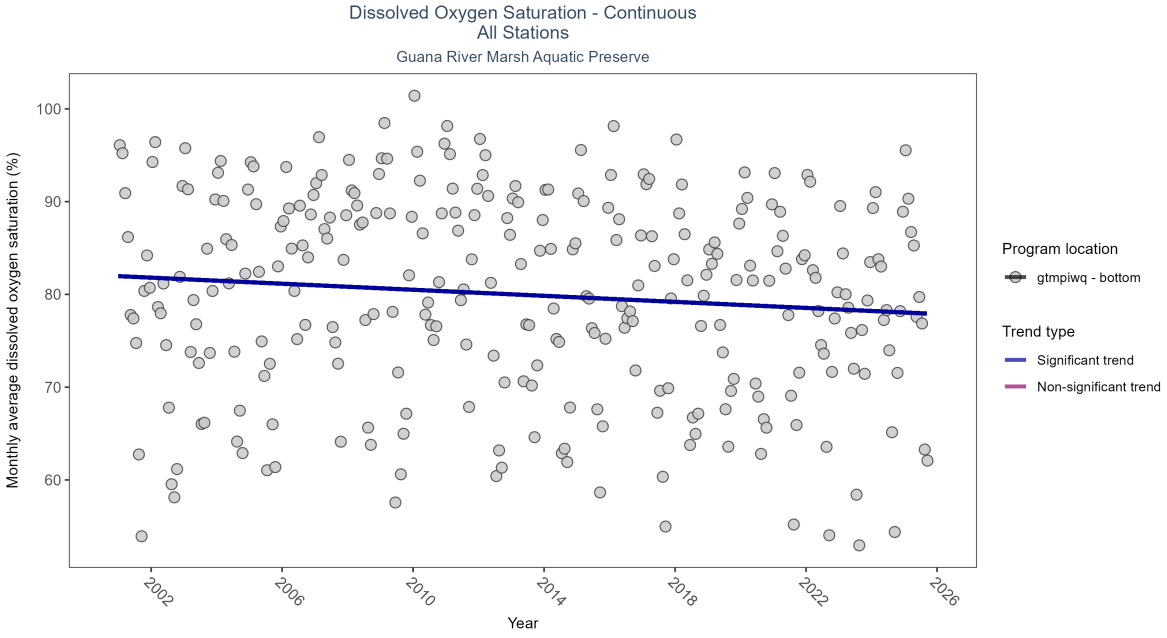

Figure 11: Scatter plot of monthly average dissolved oxygen saturation over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 6: Seasonal Kendall-Tau Results - Dissolved Oxygen Saturation

Program Location	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
gtmpiwq	Significantly decreasing trend	690905	25	2001 - 2025	82.2	-0.17	81.97	-0.16	0

At one program location, monthly average dissolved oxygen saturation decreased by 0.16% per year.

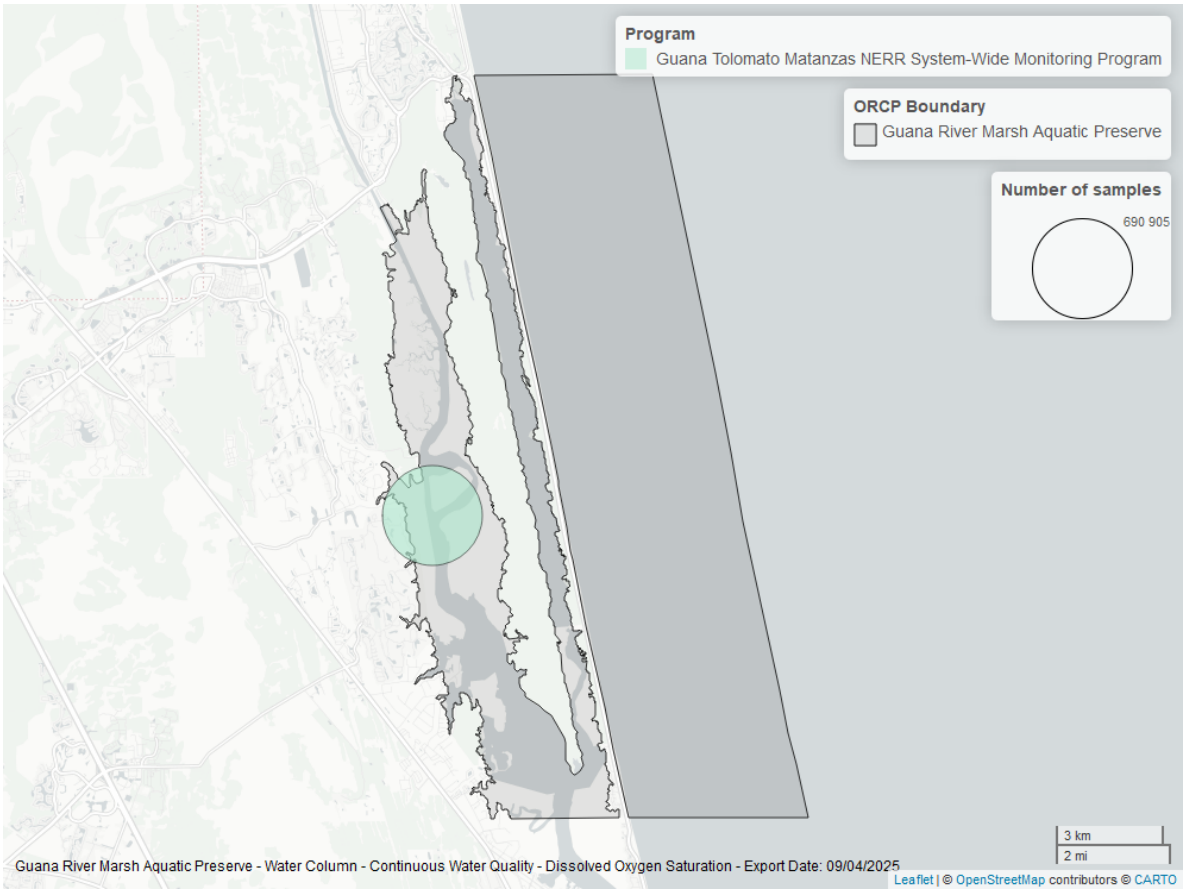

Figure 12: Map showing location of dissolved oxygen saturation continuous water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Salinity - Discrete

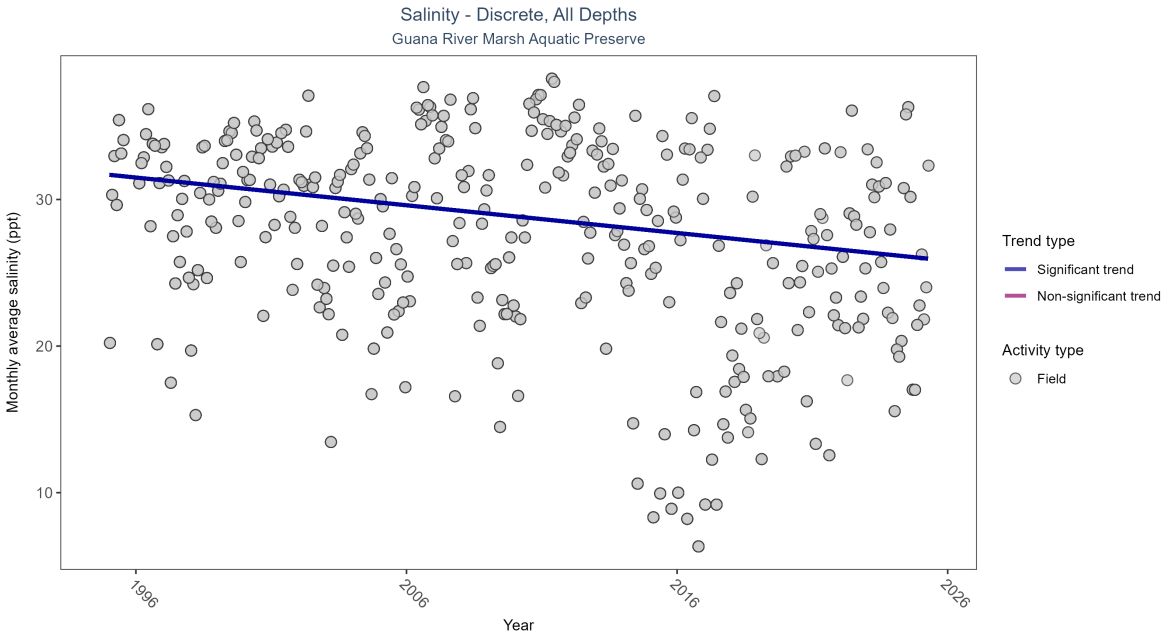

Figure 13: Scatter plot of monthly average salinity over time. If the time series included ten or more years of discrete observations, significant (blue) or non-significant (magenta) trend lines are also shown. Discrete salinity values derived from grab samples analyzed in the field (circles) or the laboratory (triangles) are both included in the plot.

Table 7: Seasonal Kendall-Tau Results for - Salinity

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
All	Significantly decreasing trend	8469	31	1995 - 2025	30.9	-0.19209	31.68666	-0.18908	0

Monthly average salinity decreased by 0.19 ppt per year.

Figure 14: Map showing location of discrete water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Salinity - Continuous

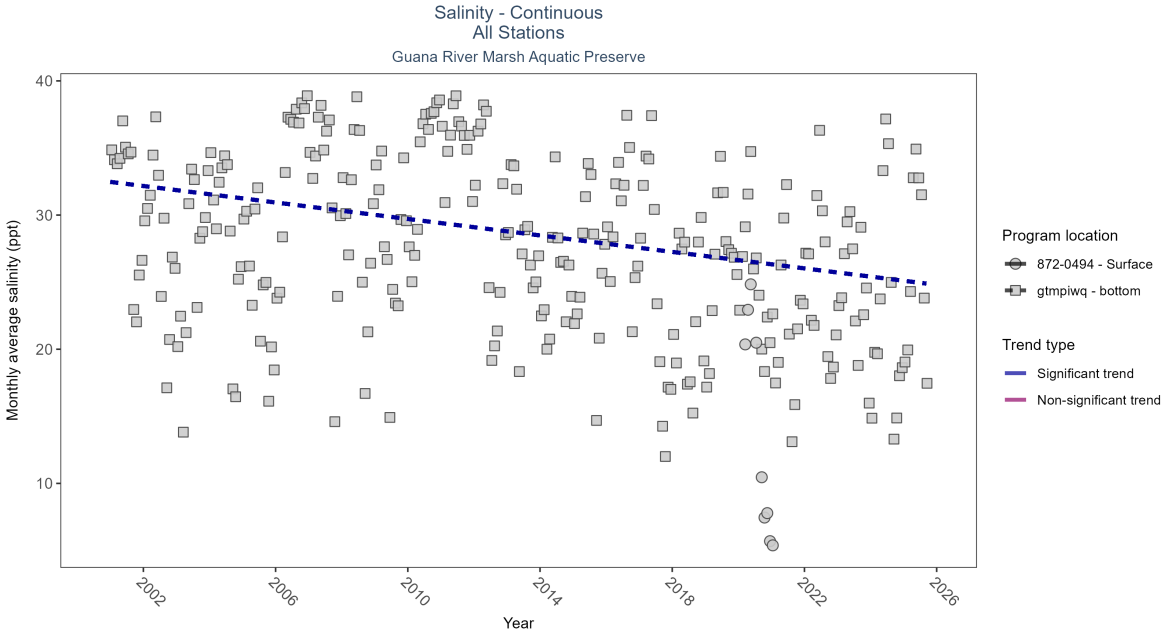

Figure 15: Scatter plot of monthly average salinity over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 8: Seasonal Kendall-Tau Results - Salinity

Program Location	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
gtmpiwq	Significantly decreasing trend	689204	25	2001 - 2025	27.90	-0.26	32.47	-0.31	0
872-0494	Insufficient data to calculate trend	34918	2	2020 - 2021	8.99	-	-	-	-

At one program location, monthly average salinity decreased by 0.31 ppt per year. There was insufficient data to fit a model for one location.

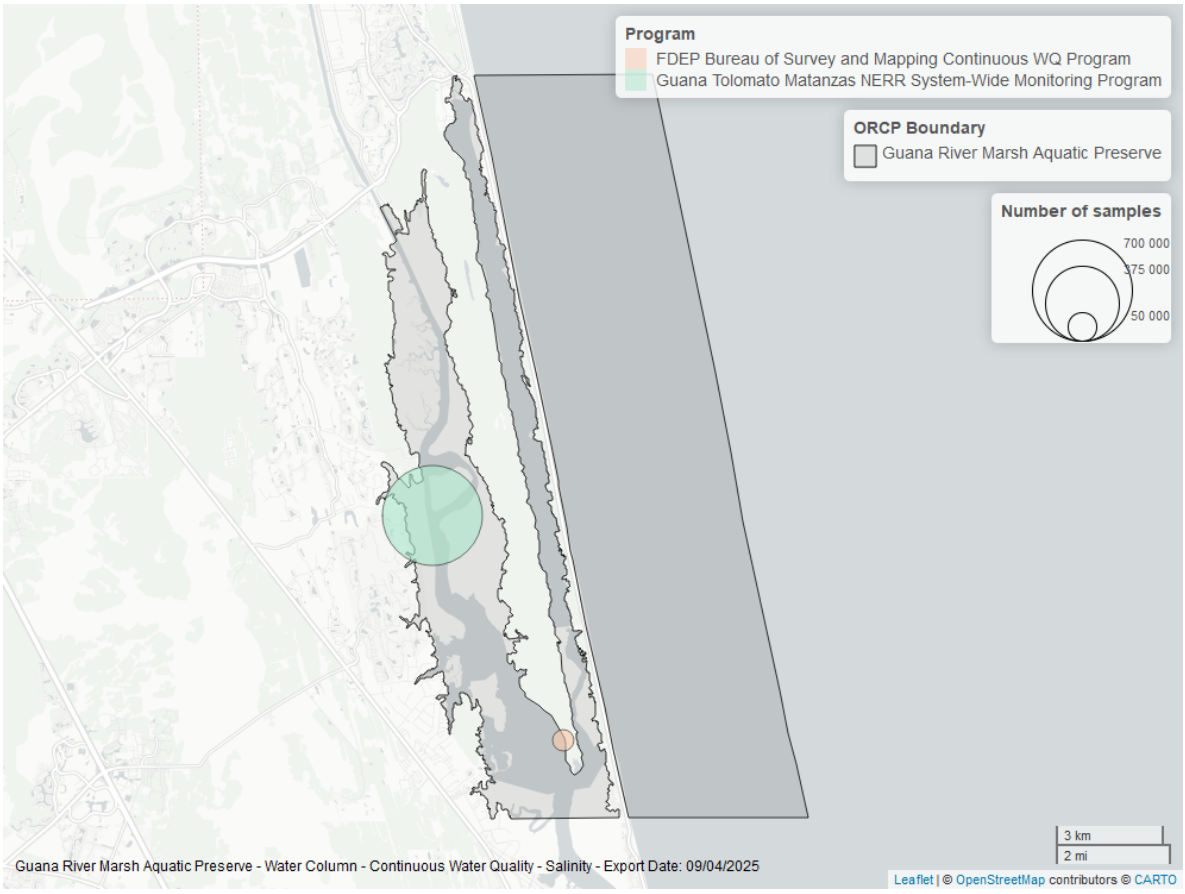

Figure 16: Map showing location of salinity continuous water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Water Temperature - Discrete

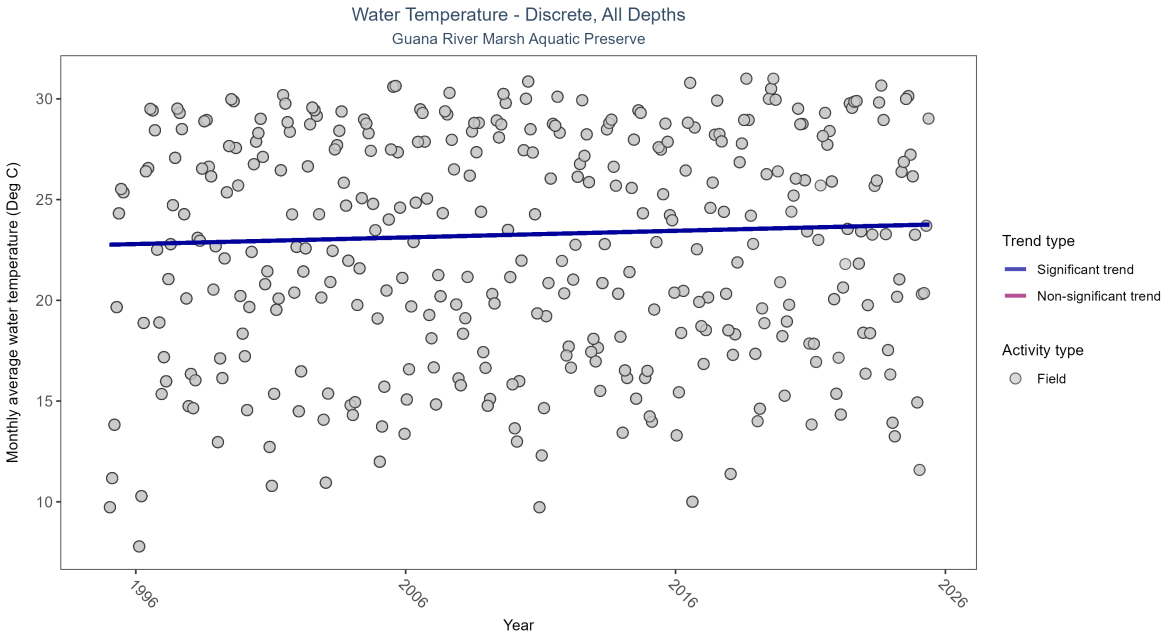

Figure 17: Scatter plot of monthly average water temperature over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only water temperature measurements taken in the field (circles) are included in the plot.

Table 9: Seasonal Kendall-Tau Results for - Water Temperature

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
Field	Significantly increasing trend	8376	31	1995 - 2025	23.1	0.1249	22.7604	0.03286	7e-04

Monthly average water temperature increased by 0.03°C per year.

Figure 18: Map showing location of discrete water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Water Temperature - Continuous

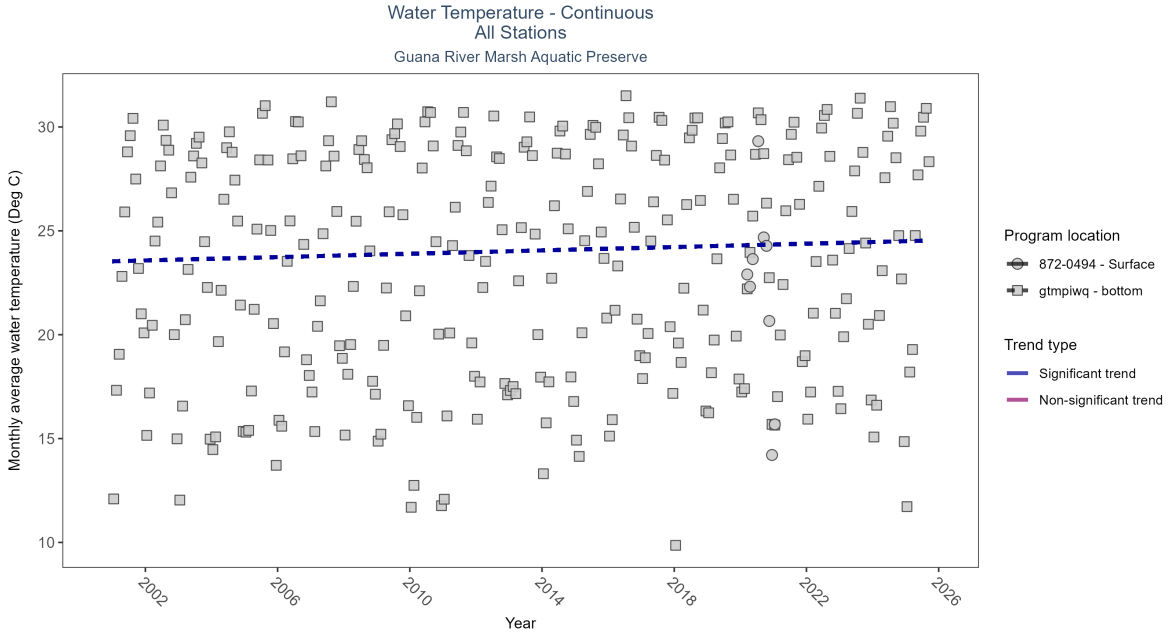

Figure 19: Scatter plot of monthly average water temperature over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 10: Seasonal Kendall-Tau Results - Water Temperature

Program Location	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
gtmpiwq	Significantly increasing trend	739497	25	2001 - 2025	24.30	0.2	23.53	0.04	0
872-0494	Insufficient data to calculate trend	35473	2	2020 - 2021	22.34	-	-	-	-

At one program location, monthly average water temperature increased by 0.04°C per year. There was insufficient data to fit a model for one location.

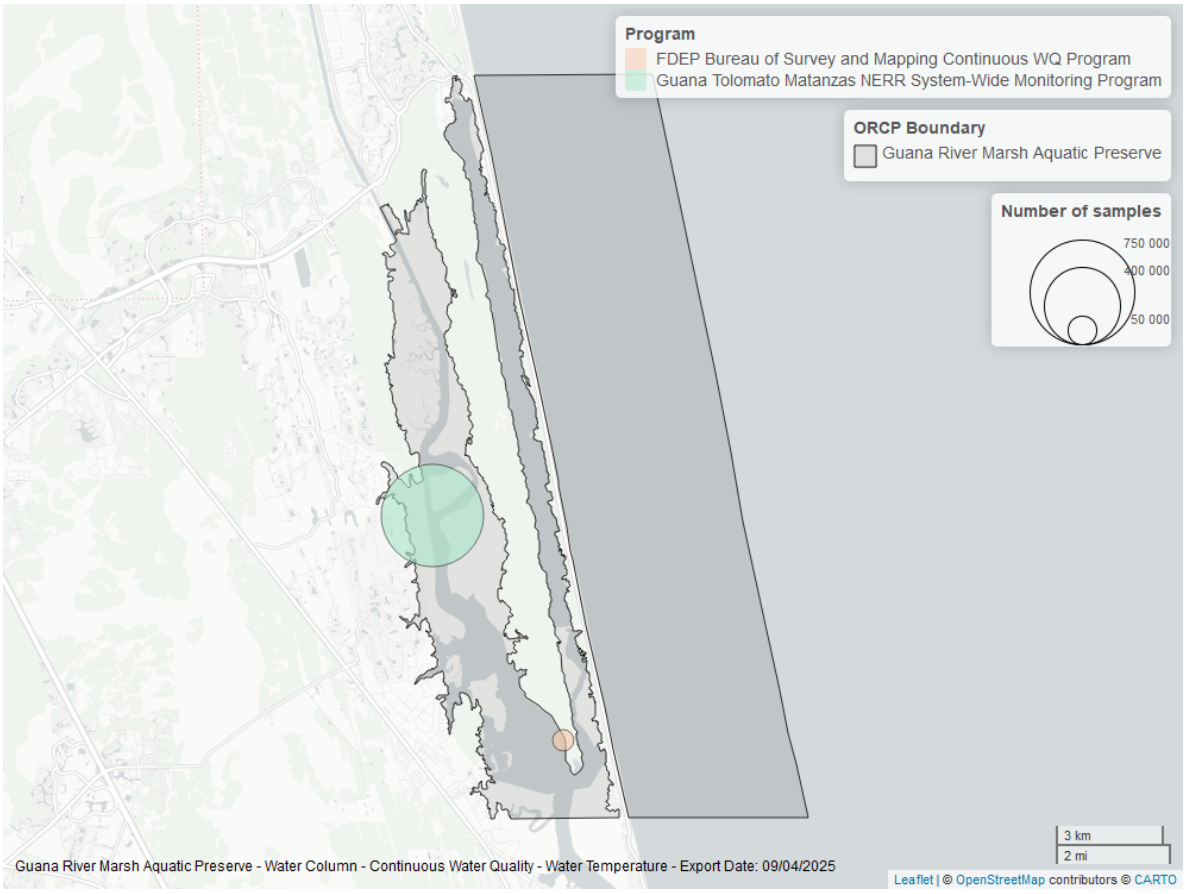

Figure 20: Map showing location of water temperature continuous water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

pH - Discrete

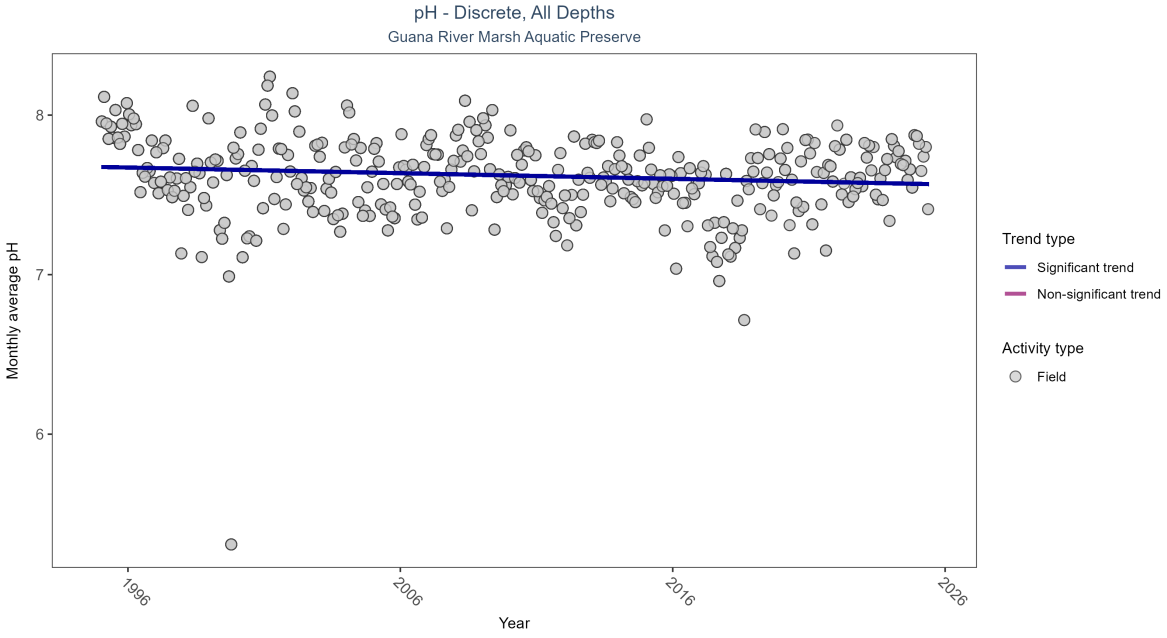

Figure 21: Scatter plot of monthly average pH over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only pH values measured in the field (circles) are included in the plot.

Table 11: Seasonal Kendall-Tau Results for - pH

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
Field	Significantly decreasing trend	6239	31	1995 - 2025	7.7	-0.11036	7.67493	-0.00353	0.0027

Monthly average pH decreased by less than 0.01 pH units per year.

Figure 22: Map showing location of discrete water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

pH - Continuous

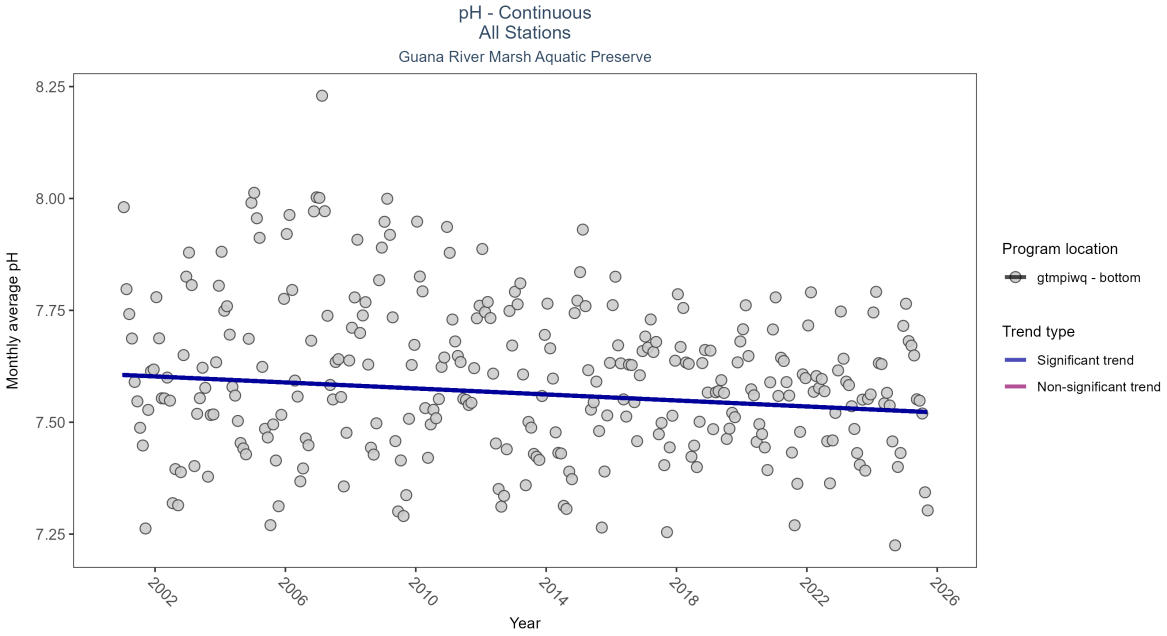

Figure 23: Scatter plot of monthly average pH over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 12: Seasonal Kendall-Tau Results - pH

Program Location	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
gtmpiwq	Significantly decreasing trend	682135	25	2001 - 2025	7.6	-0.17	7.61	0	0

At one program location, monthly average pH decreased by less than 0.01 pH units per year.

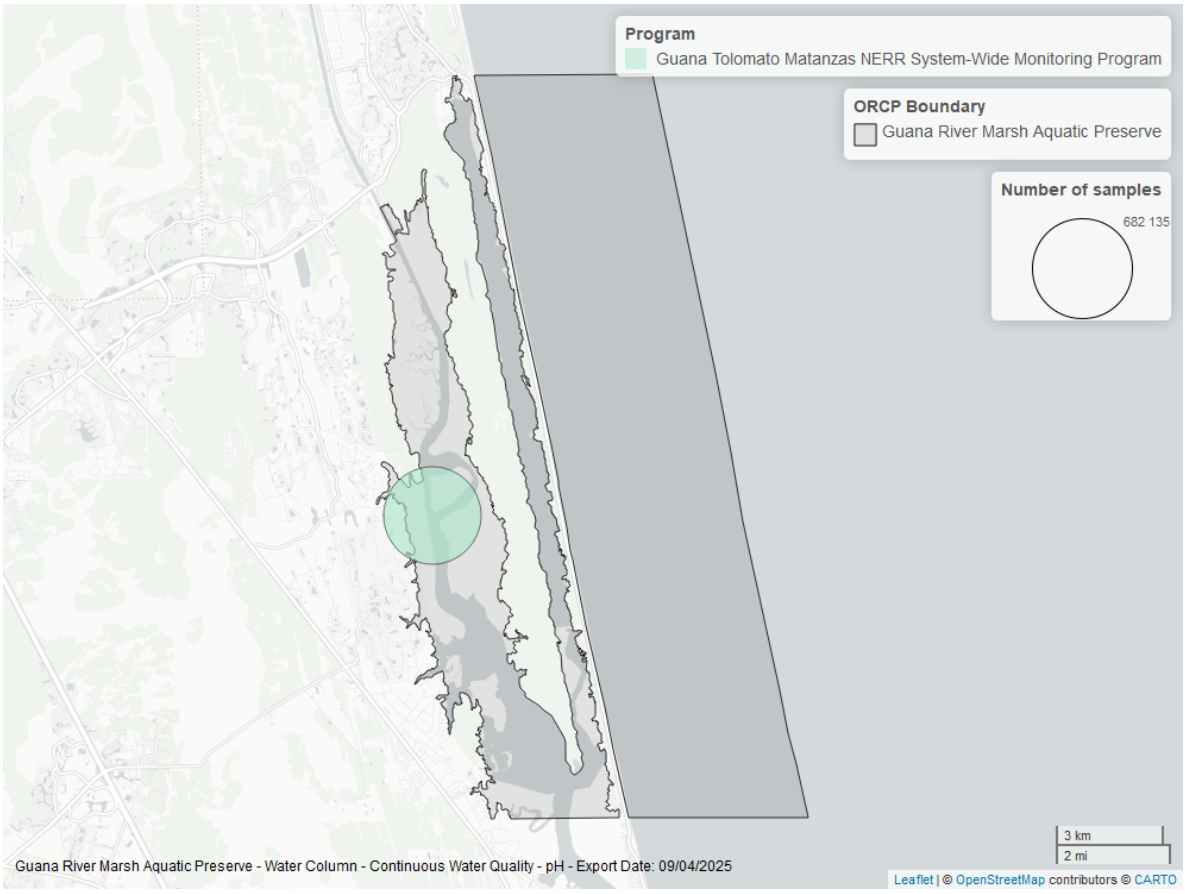

Figure 24: Map showing location of ph continuous water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Water Clarity

Turbidity - Discrete

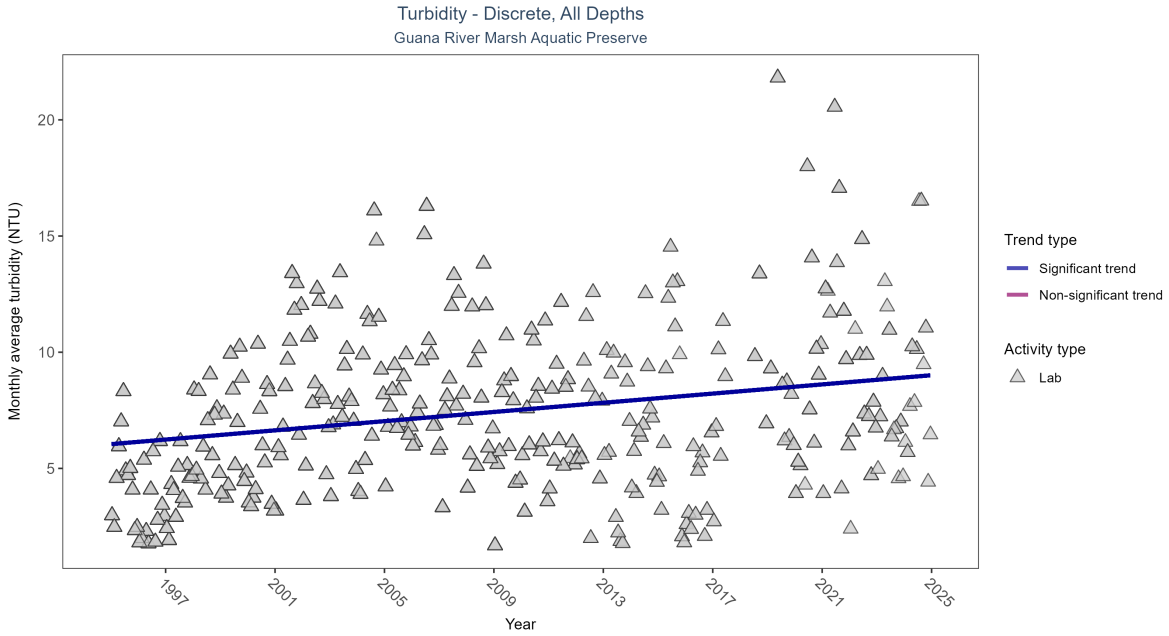

Figure 25: Scatter plot of monthly average turbidity over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only turbidity values measured in the laboratory (triangles) are included in the plot.

Table 13: Seasonal Kendall-Tau Results for - Turbidity

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
Lab	Significantly increasing trend	5026	30	1995 - 2024	5.2	0.21099	6.04406	0.09888	0

Monthly average turbidity increased by 0.1 NTU per year, indicating a decrease in water clarity.

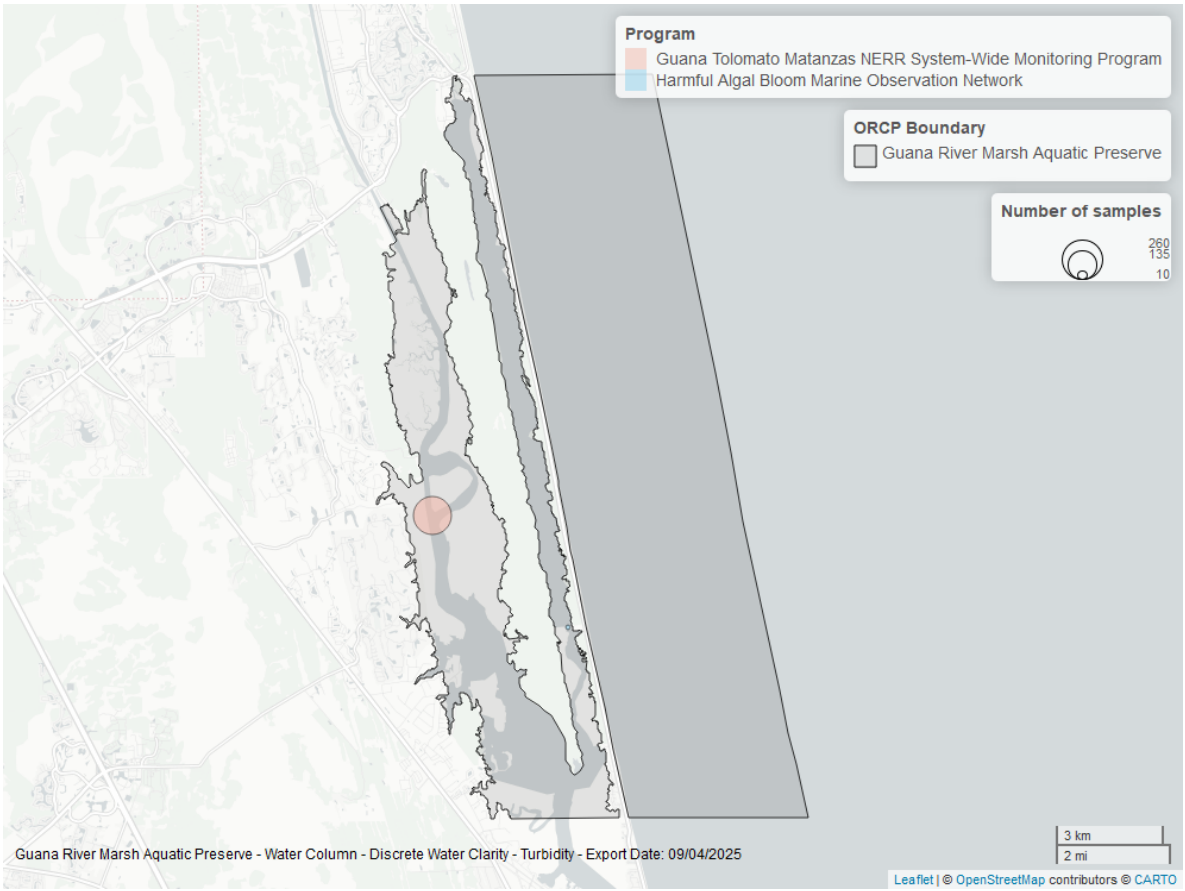

Figure 26: Map showing location of discrete water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Turbidity - Continuous

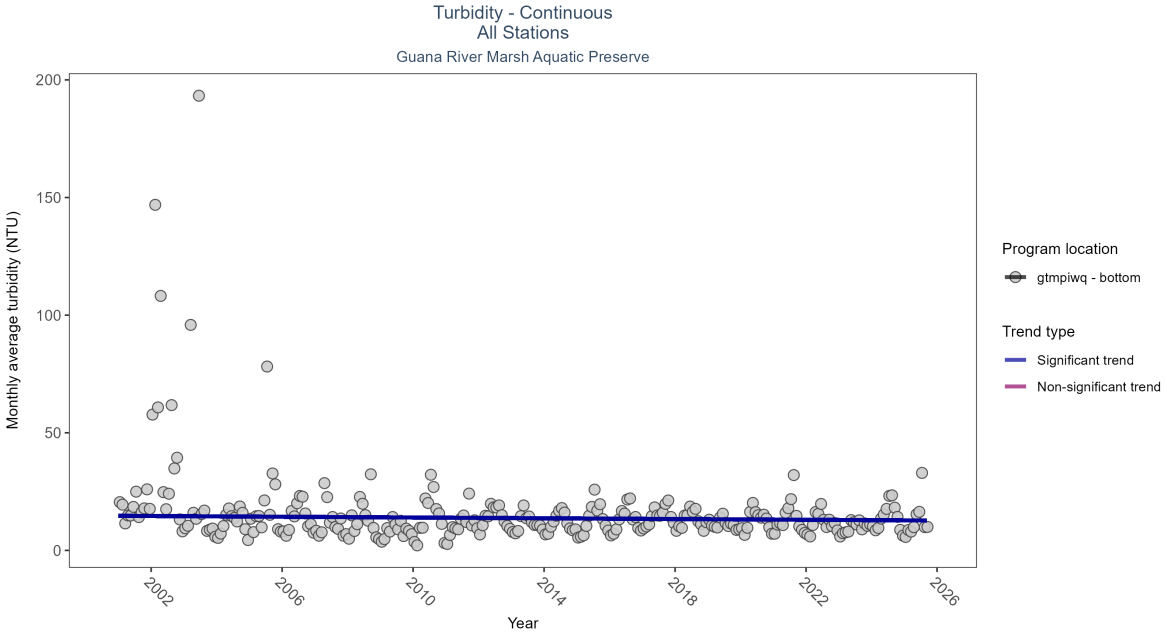

Figure 27: Scatter plot of monthly average turbidity over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 14: Seasonal Kendall-Tau Results - Turbidity

Program Location	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
gtmpiwq	Significantly decreasing trend	665212	25	2001 - 2025	10	-0.1	14.7	-0.08	0.0107

At one program location, monthly average turbidity decreased by 0.08 NTU per year.

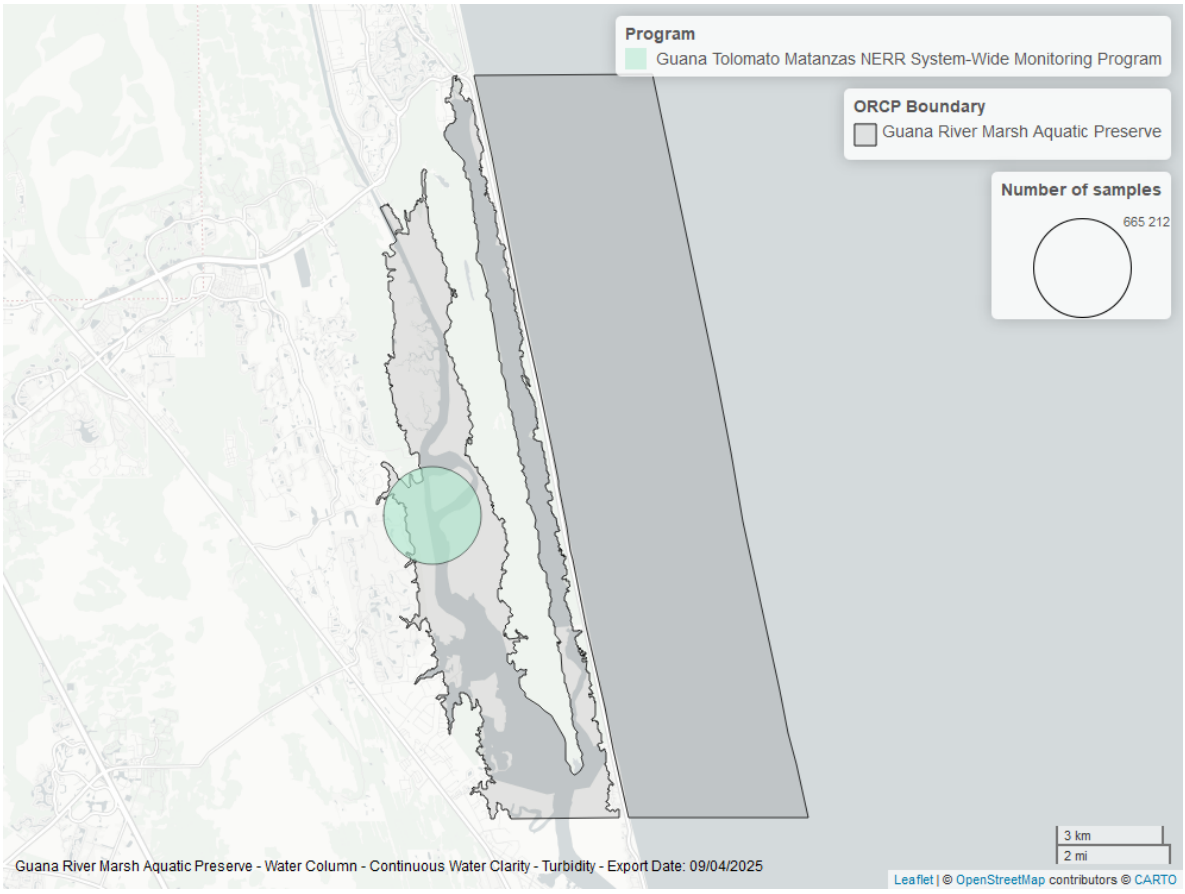

Figure 28: Map showing location of turbidity continuous water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Total Suspended Solids - Discrete

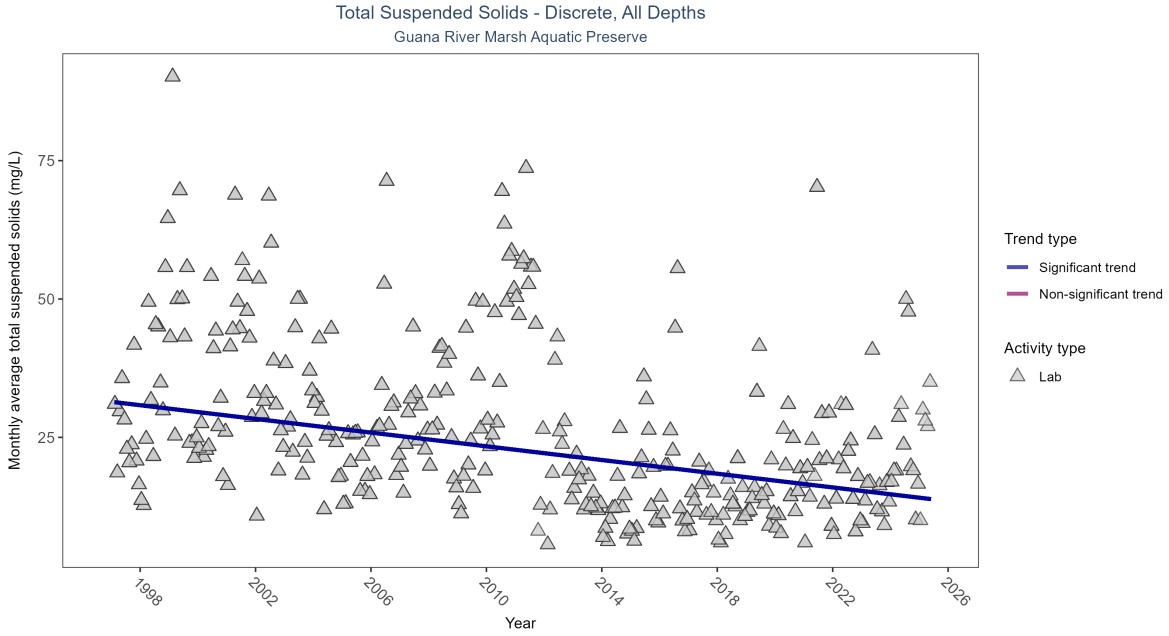

Figure 29: Scatter plot of monthly average total suspended solids (TSS) over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only TSS values obtained from laboratory analyses (triangles) are included in the plot.

Table 15: Seasonal Kendall-Tau Results for - Total Suspended Solids

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
Lab	Significantly decreasing trend	1732	29	1997 - 2025	22.4	-0.3289	31.42952	-0.61905	0

Monthly average total suspended solids decreased by 0.62 mg/L per year, indicating an increase in water clarity.

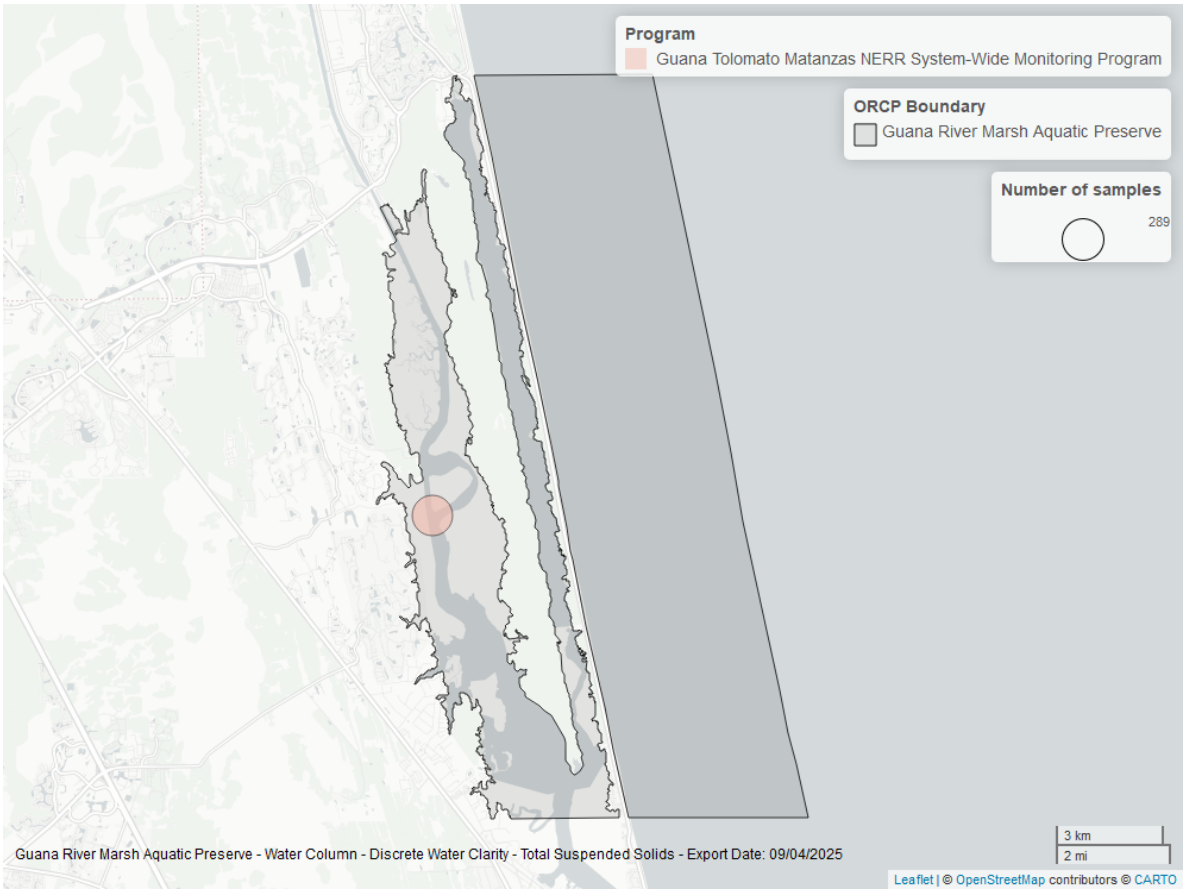

Figure 30: Map showing location of discrete water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Chlorophyll a, Uncorrected for Pheophytin - Discrete

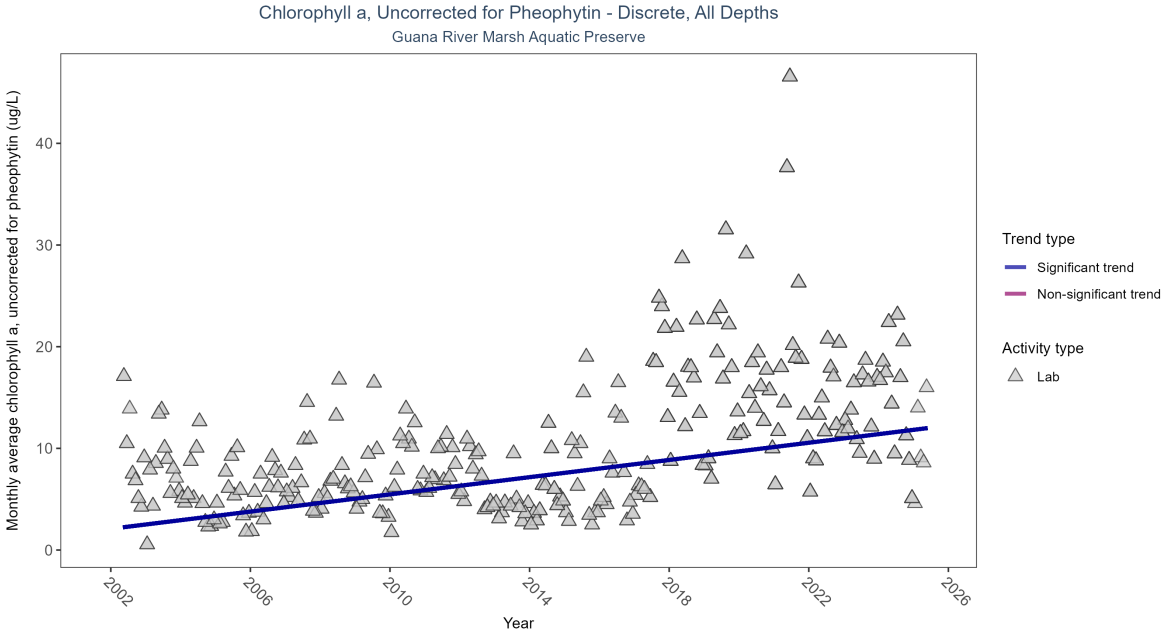

Figure 31: Scatter plot of monthly average levels of chlorophyll a, uncorrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles) is included in the plot.

Table 16: Seasonal Kendall-Tau Results for - Chlorophyll a, Uncorrected for Pheophytin

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
Lab	Significantly increasing trend	1342	24	2002 - 2025	7.8	0.40411	2.08835	0.42319	0

Monthly average chlorophyll a, uncorrected for pheophytin, increased by 0.42 µg/L per year, indicating a decrease in water clarity.

Figure 32: Map showing location of discrete water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Chlorophyll a, Corrected for Pheophytin - Discrete

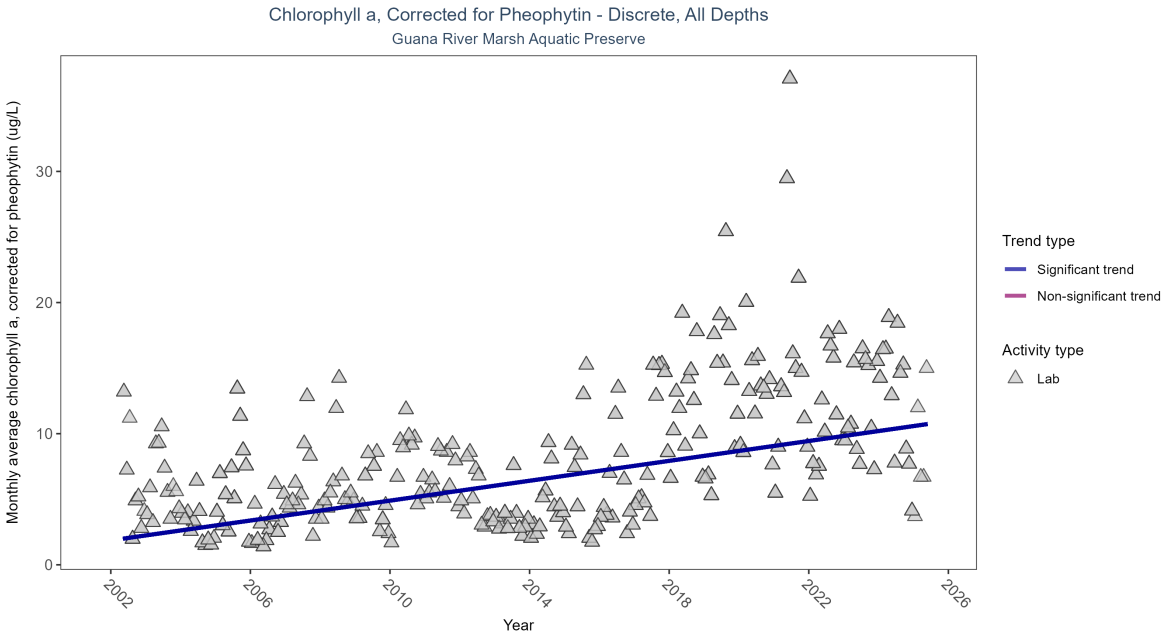

Figure 33: Scatter plot of monthly average levels of chlorophyll a, corrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles) is included in the plot.

Table 17: Seasonal Kendall-Tau Results for - Chlorophyll a, Corrected for Pheophytin

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
Lab	Significantly increasing trend	1703	24	2002 - 2025	5.5	0.42773	1.8595	0.37912	0

Monthly average chlorophyll a, corrected for pheophytin, increased by 0.38 µg/L per year, indicating a decrease in water clarity.

Figure 34: Map showing location of discrete water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Secchi Depth - Discrete

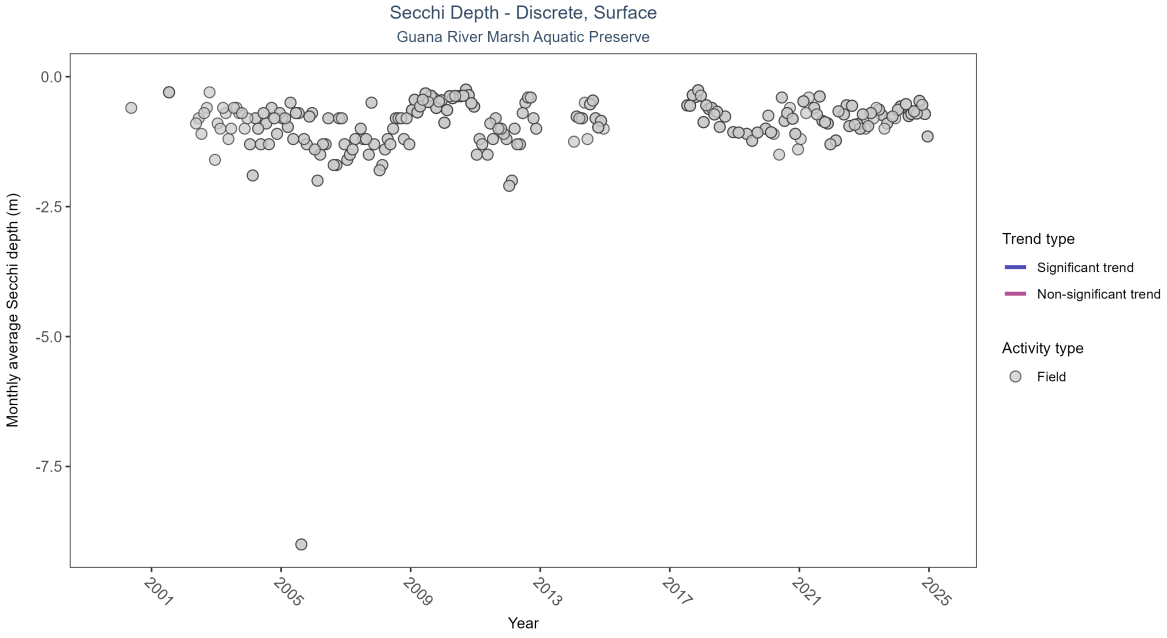

Figure 35: Scatter plot of monthly average Secchi depth over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Secchi depth is only measured in the field (circles).

Table 18: Seasonal Kendall-Tau Results for - Secchi Depth

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
Field	No significant trend	1406	23	1999 - 2024	-0.7	0.07028	-0.80991	0.00298	0.1749

Secchi depth showed no detectable trend between 1999 and 2024.

Figure 36: Map showing location of discrete water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Colored Dissolved Organic Matter - Discrete

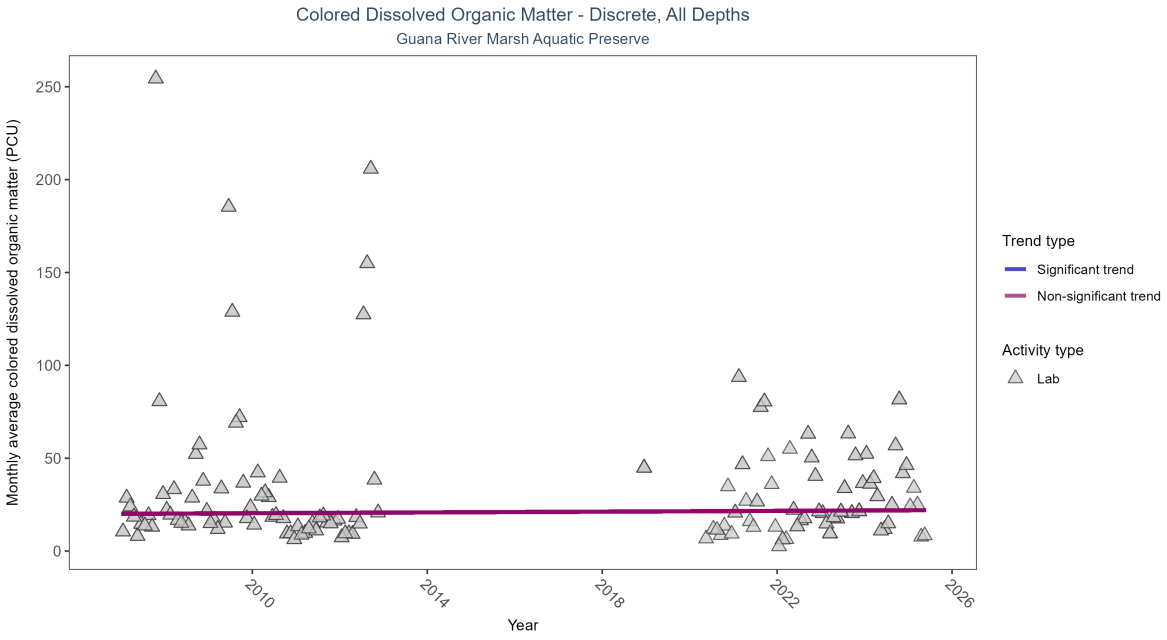

Figure 37: Scatter plot of monthly average colored dissolved organic matter (CDOM) over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed CDOM (triangles) is included in the plot.

Table 19: Seasonal Kendall-Tau Results for - Colored Dissolved Organic Matter

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
Lab	No significant trend	261	13	2007 - 2025	19.7238	0.03182	20.07147	0.105	0.6375

Colored dissolved organic matter showed no detectable trend between 2007 and 2025.

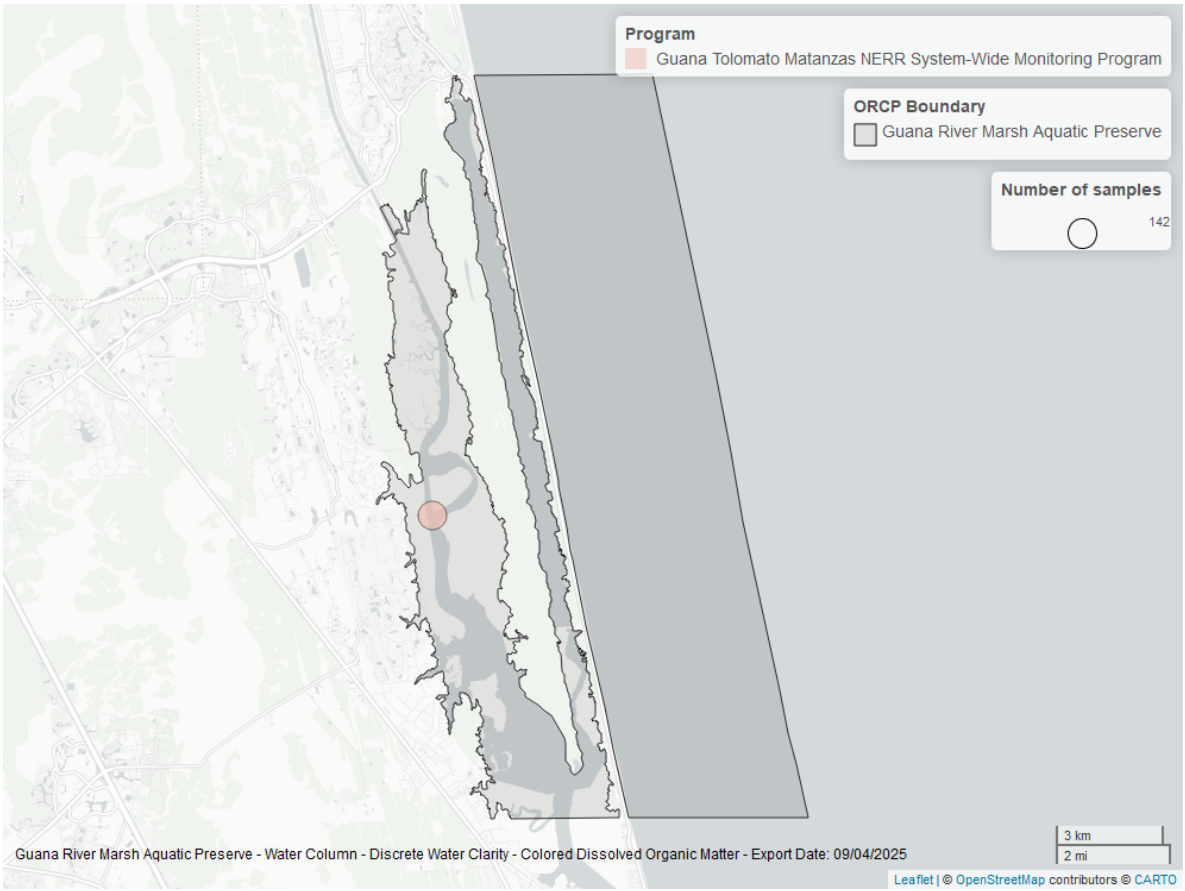

Figure 38: Map showing location of discrete water quality sampling locations within the boundaries of *Guana River Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.