

# Matlacha Pass Aquatic Preserve

## SEACAR Water Quality Analysis

Last compiled on 10 July, 2025

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# Indicators

## Nutrients

### Total Nitrogen - Discrete

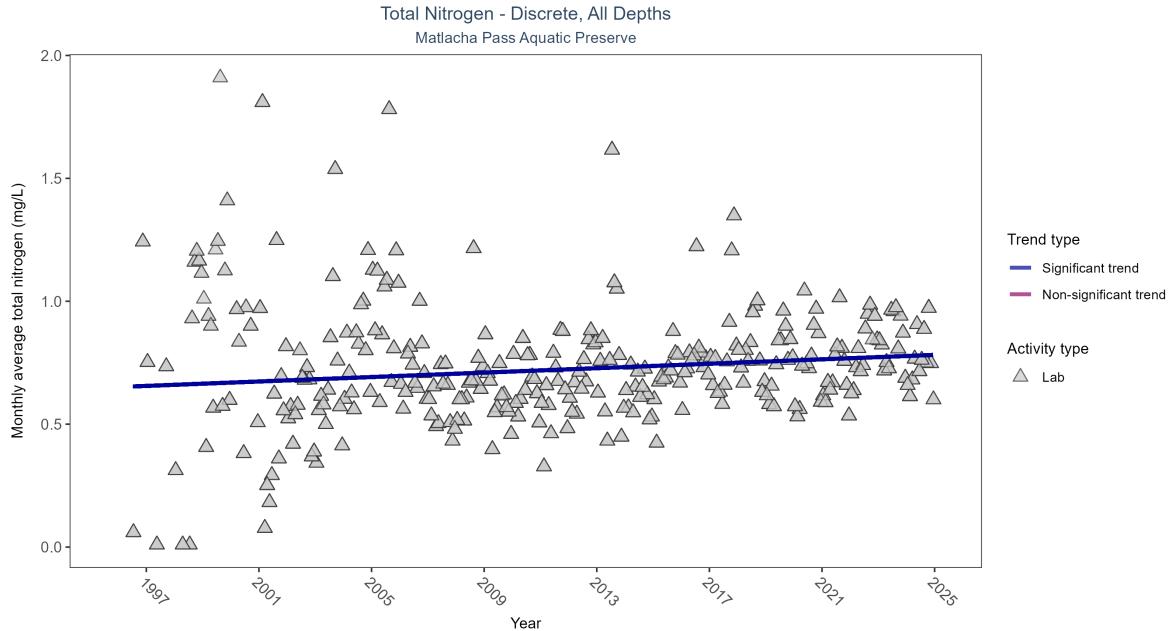


Figure 1: Scatter plot of monthly average total nitrogen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only nitrogen values obtained from laboratory analyses (triangles) are included in the 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	Significantly increasing trend	2040	29	1996 - 2024	0.705	0.13368	0.65106	0.00451	0.0008

Monthly average total nitrogen increased by less than 0.01 mg/L per year.

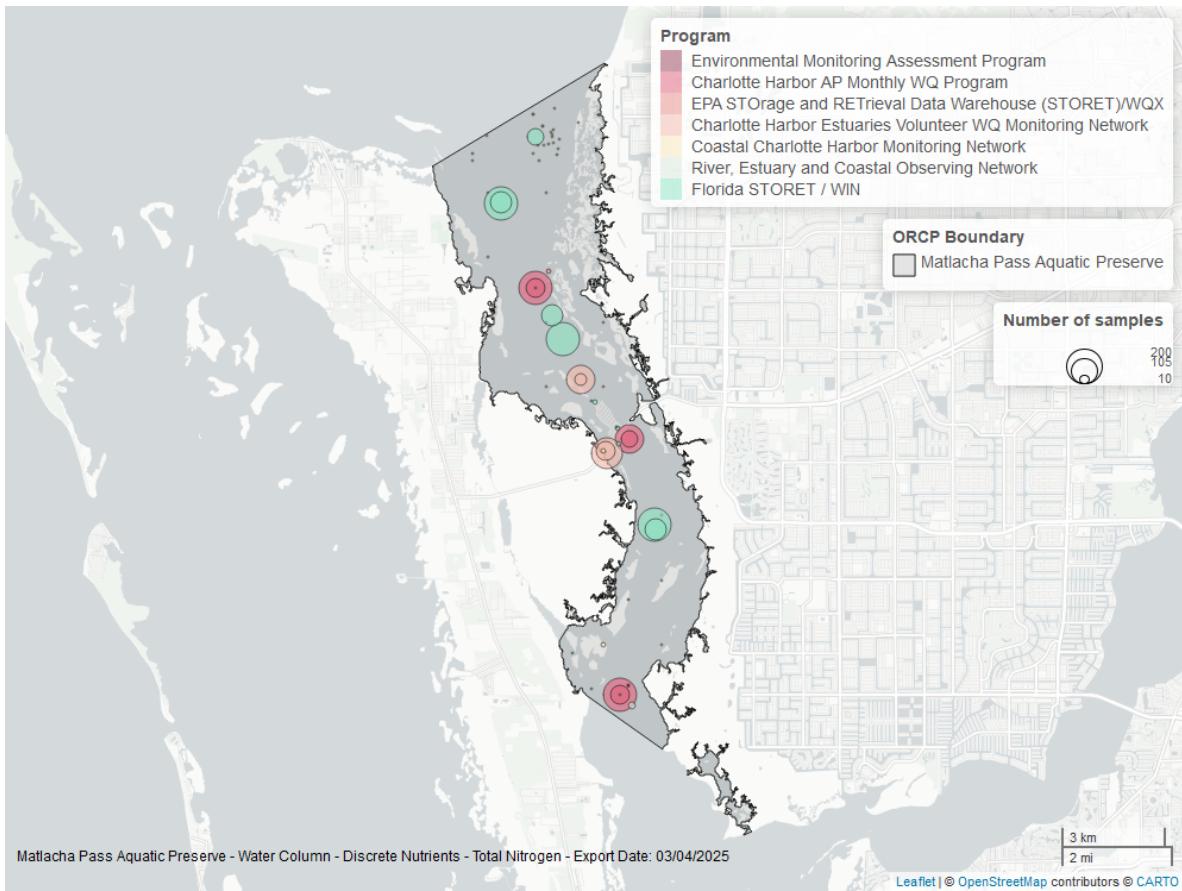


Figure 2: Map showing location of discrete water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Total Phosphorus - Discrete

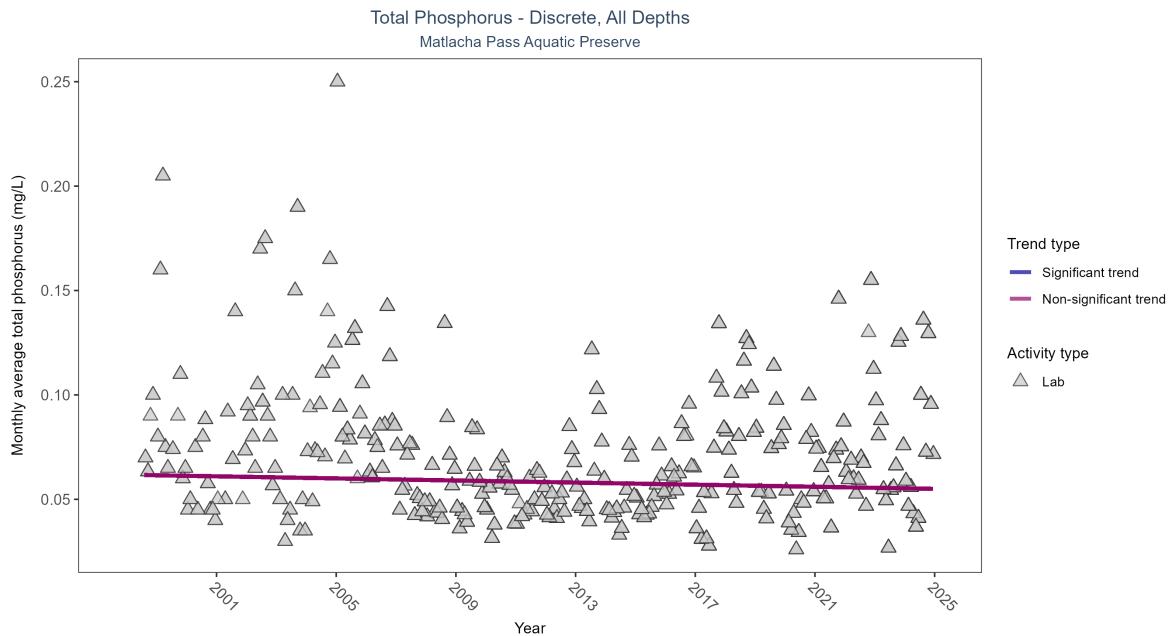


Figure 3: Scatter plot of monthly average total phosphorus over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only phosphorus values obtained from laboratory analyses (triangles) are included in 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	No significant trend	1936	27	1998 - 2024	0.06	-0.05408	0.06176	-0.00025	0.2344

Total phosphorus showed no detectable trend between 1998 and 2024.

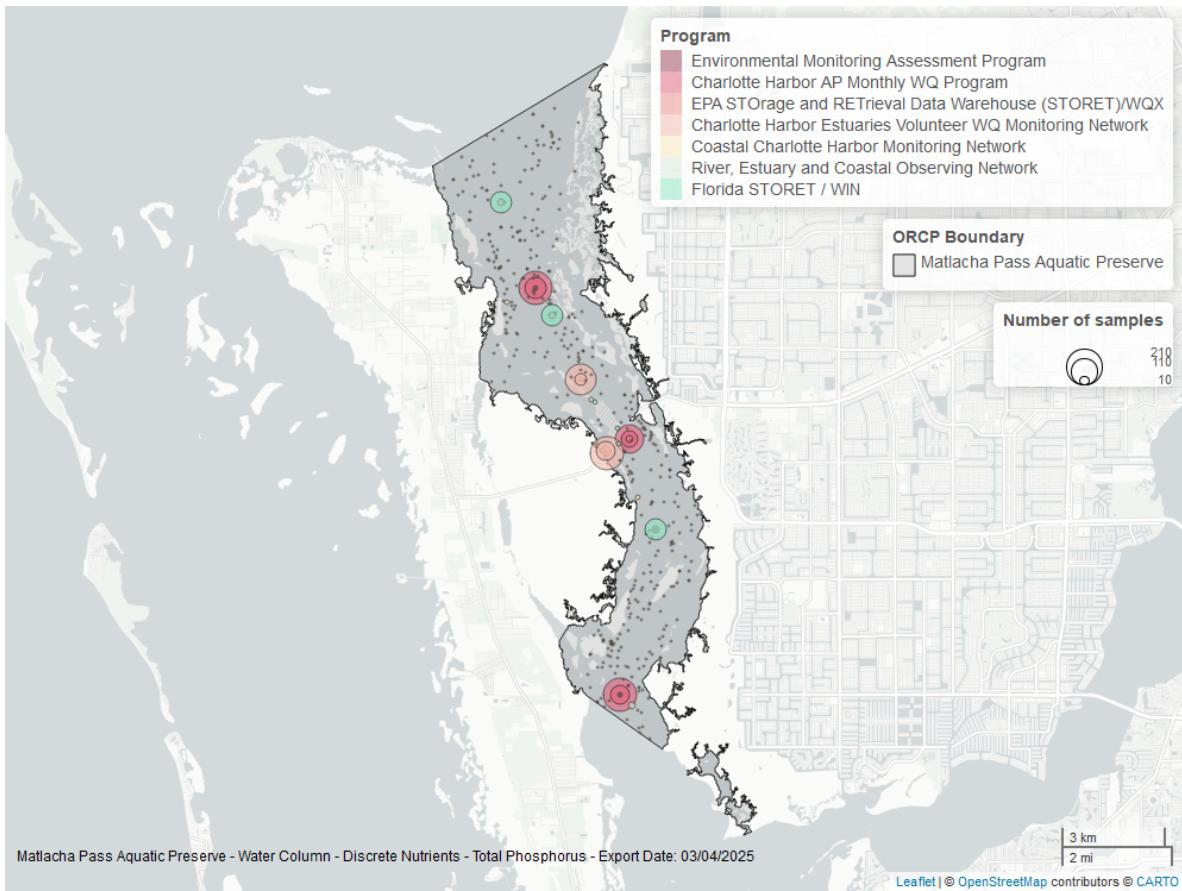


Figure 4: Map showing location of discrete water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Water Quality

### Dissolved Oxygen - Discrete

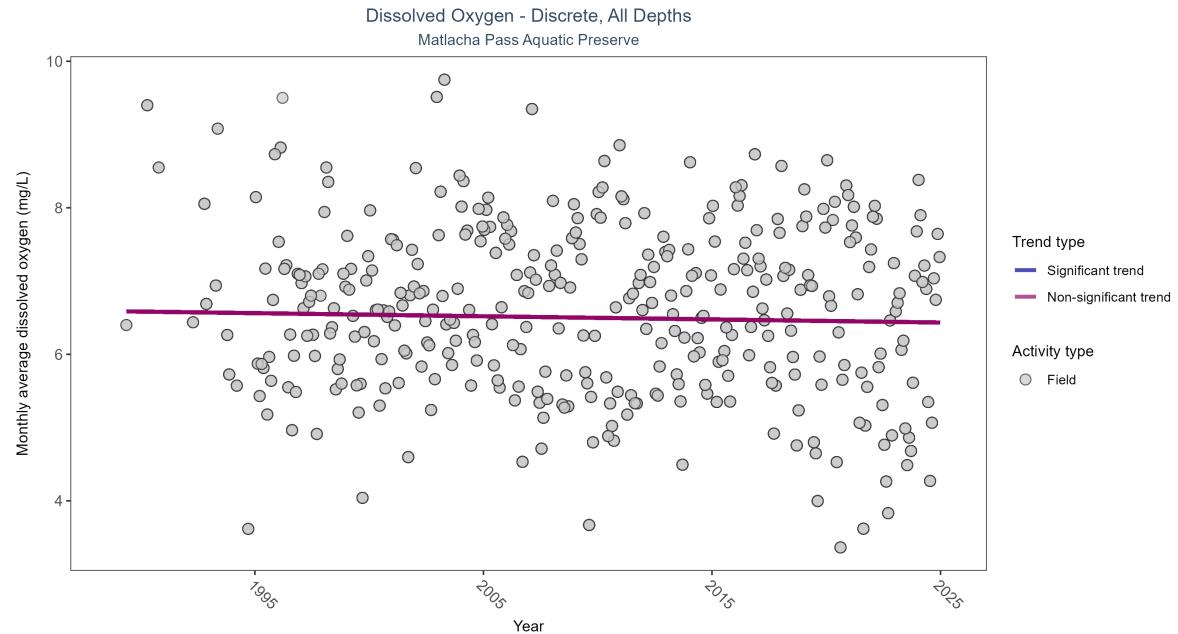


Figure 5: Scatter plot of monthly average dissolved oxygen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen values measured in the field (circles) are included in the plot.

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	No significant trend	11468	35	1989 - 2024	6.6	-0.03114	6.58766	-0.00427	0.4007

Dissolved oxygen showed no detectable trend between 1989 and 2024.

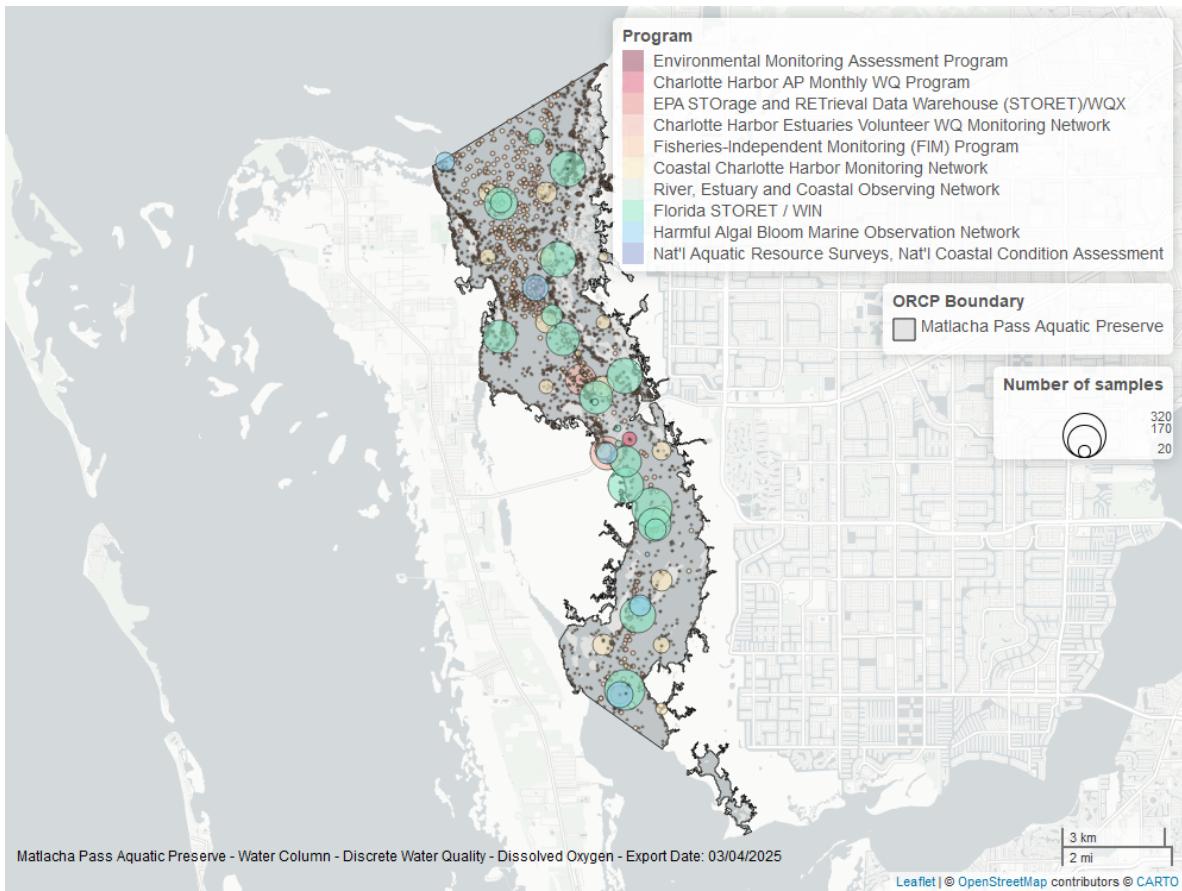


Figure 6: Map showing location of discrete water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Dissolved Oxygen - Continuous

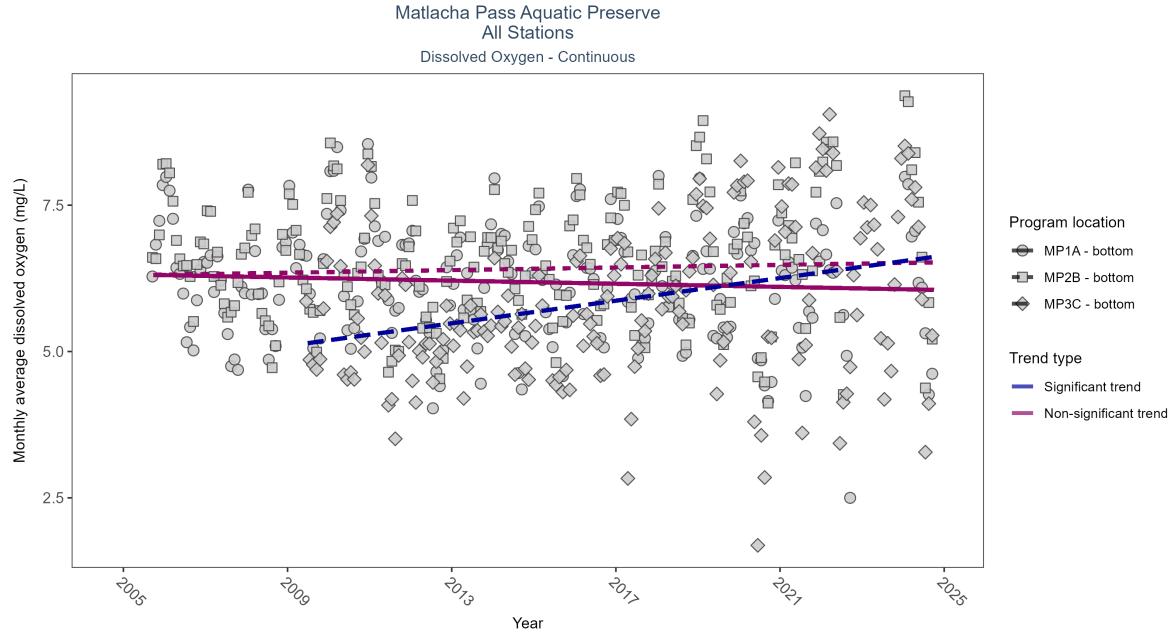


Figure 7: Scatter plot of monthly average dissolved oxygen over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
MP1A	No significant trend	551545	19	2005 - 2024	6.3	-0.07	6.32	-0.01	0.1782
MP2B	No significant trend	563271	19	2005 - 2024	6.7	0.07	6.30	0.01	0.1479
MP3C	Significantly increasing trend	486873	16	2009 - 2024	5.9	0.30	5.10	0.10	0

At one program location, monthly average dissolved oxygen increased by 0.10 mg/L per year. No detectable change in monthly average dissolved oxygen was observed at two locations.

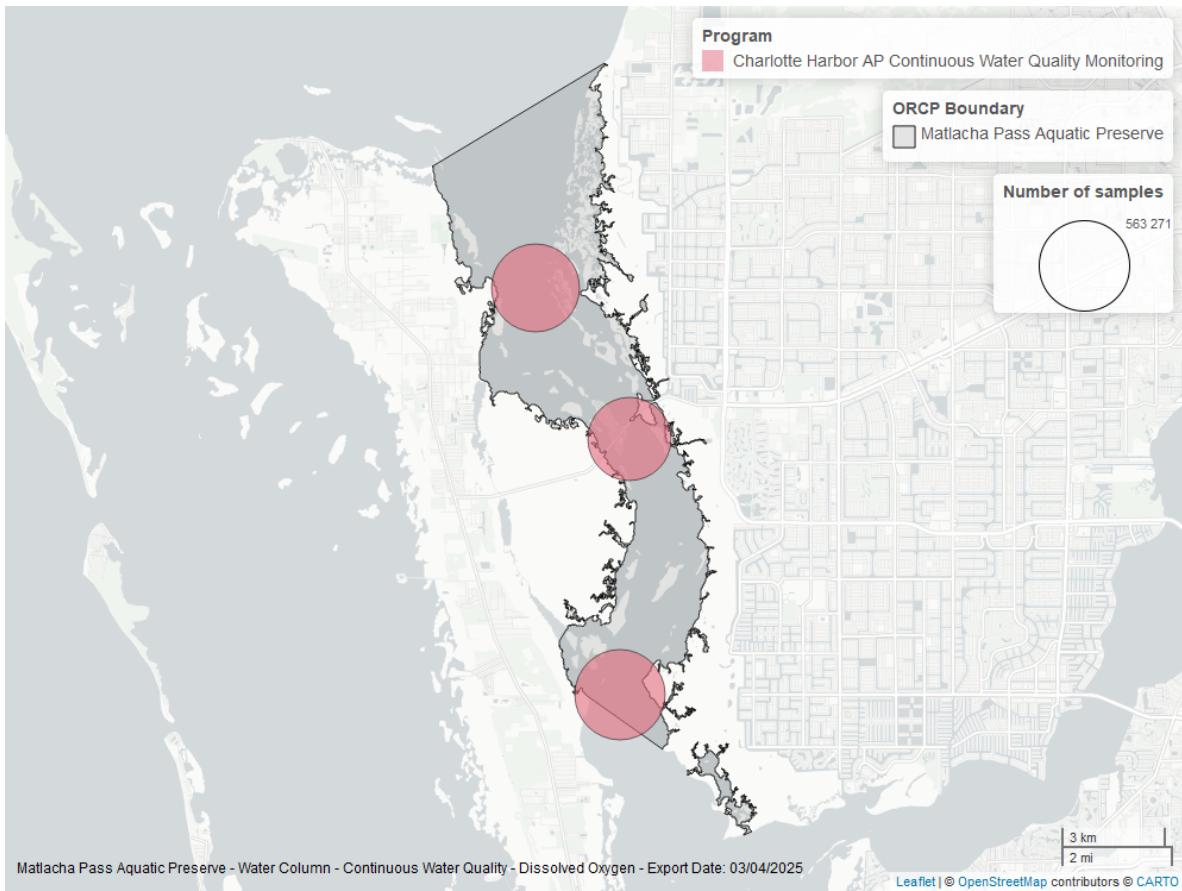


Figure 8: Map showing location of dissolved oxygen continuous water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Dissolved Oxygen Saturation - Discrete

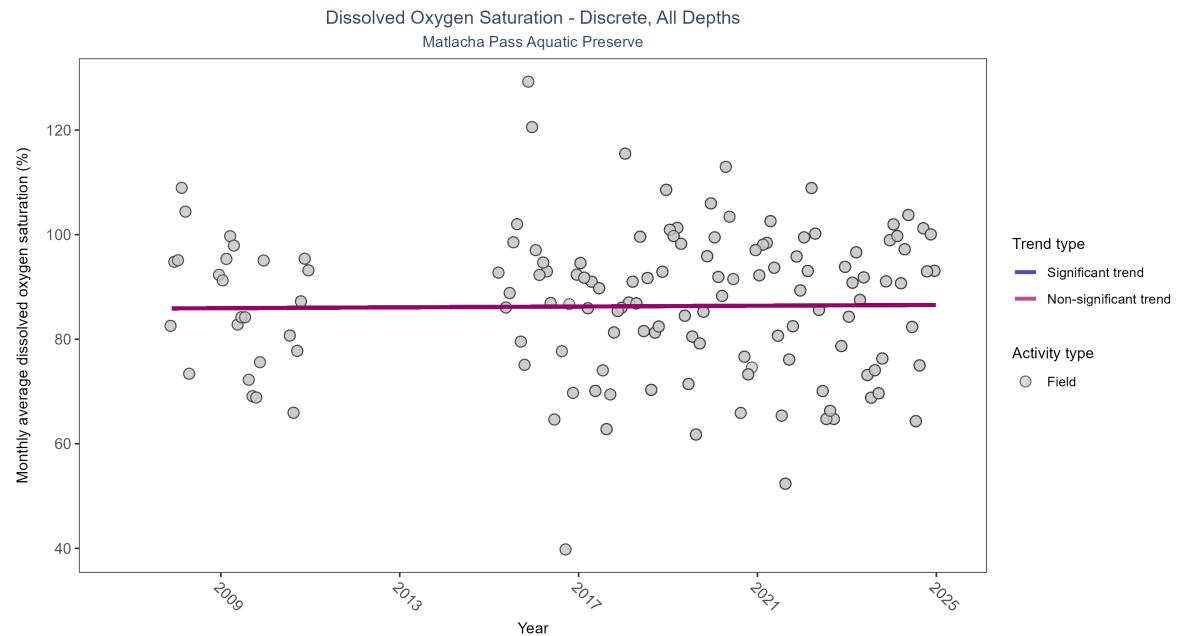


Figure 9: Scatter plot of monthly average dissolved oxygen saturation over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen saturation values measured in the field (circles) 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	No significant trend	1240	14	2007 - 2024	89.75	0.01209	85.85922	0.03896	0.8047

Dissolved oxygen saturation showed no detectable trend between 2007 and 2024.

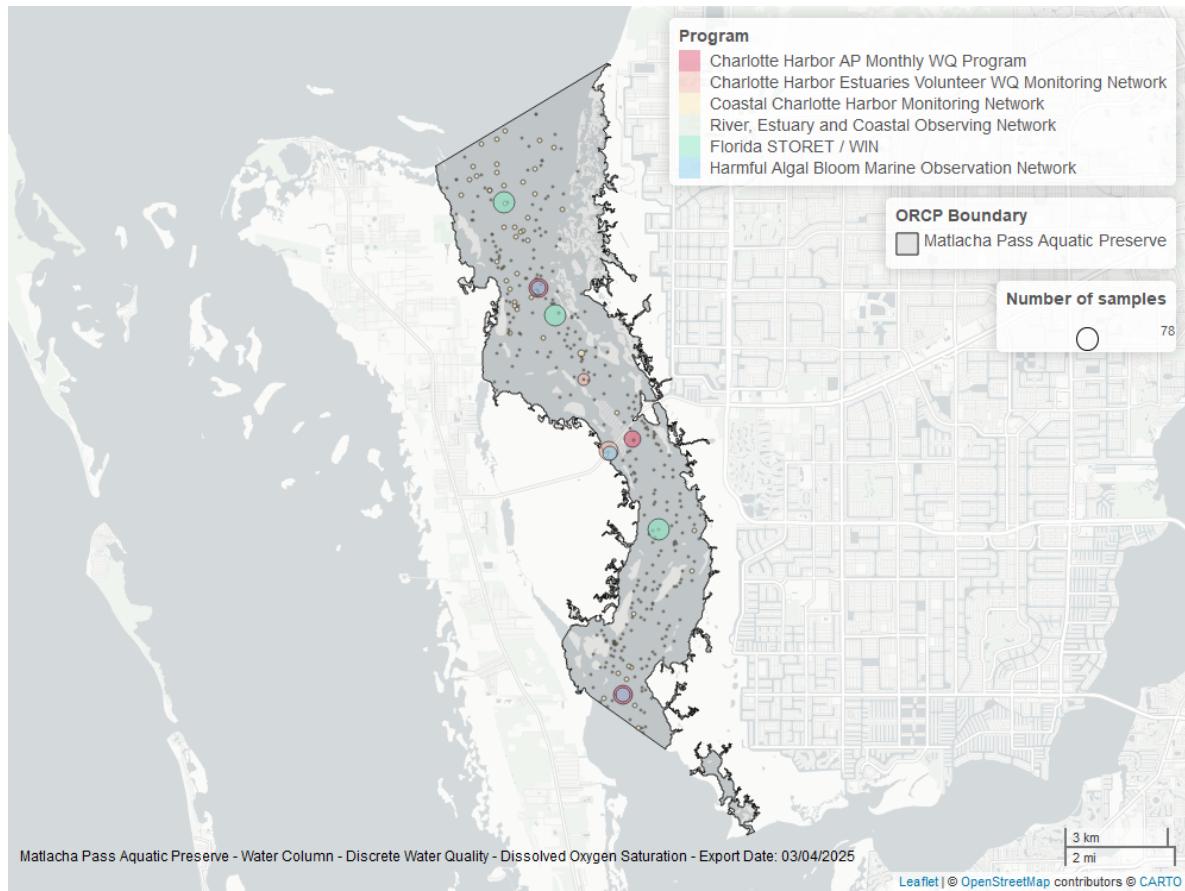


Figure 10: Map showing location of discrete water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Dissolved Oxygen Saturation - Continuous

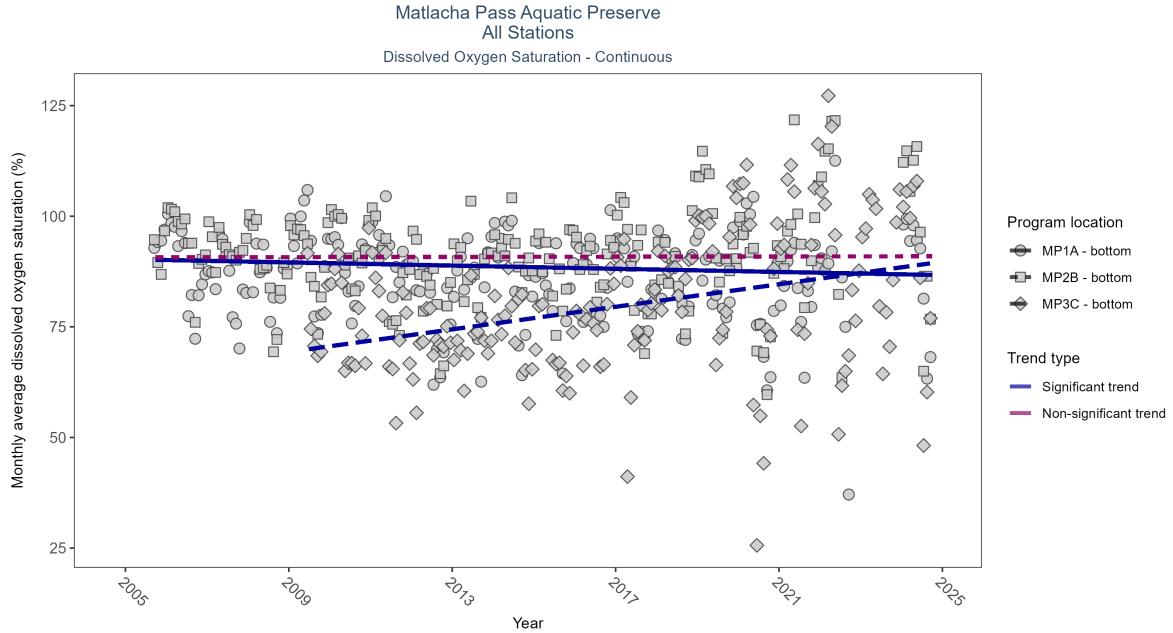


Figure 11: Scatter plot of monthly average dissolved oxygen saturation over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
MP1A	Significantly decreasing trend	548903	19	2005 - 2024	88.1	-0.13	90.27	-0.18	0.012
MP2B	No significant trend	563571	19	2005 - 2024	91.3	0.01	90.71	0.01	0.8921
MP3C	Significantly increasing trend	488214	16	2009 - 2024	81.4	0.29	69.33	1.27	0

At one program location, monthly average dissolved oxygen saturation increased by 1.27% per year. At one program location, monthly average dissolved oxygen saturation decreased by 0.18% per year. No detectable change in monthly average dissolved oxygen saturation was observed at one location.

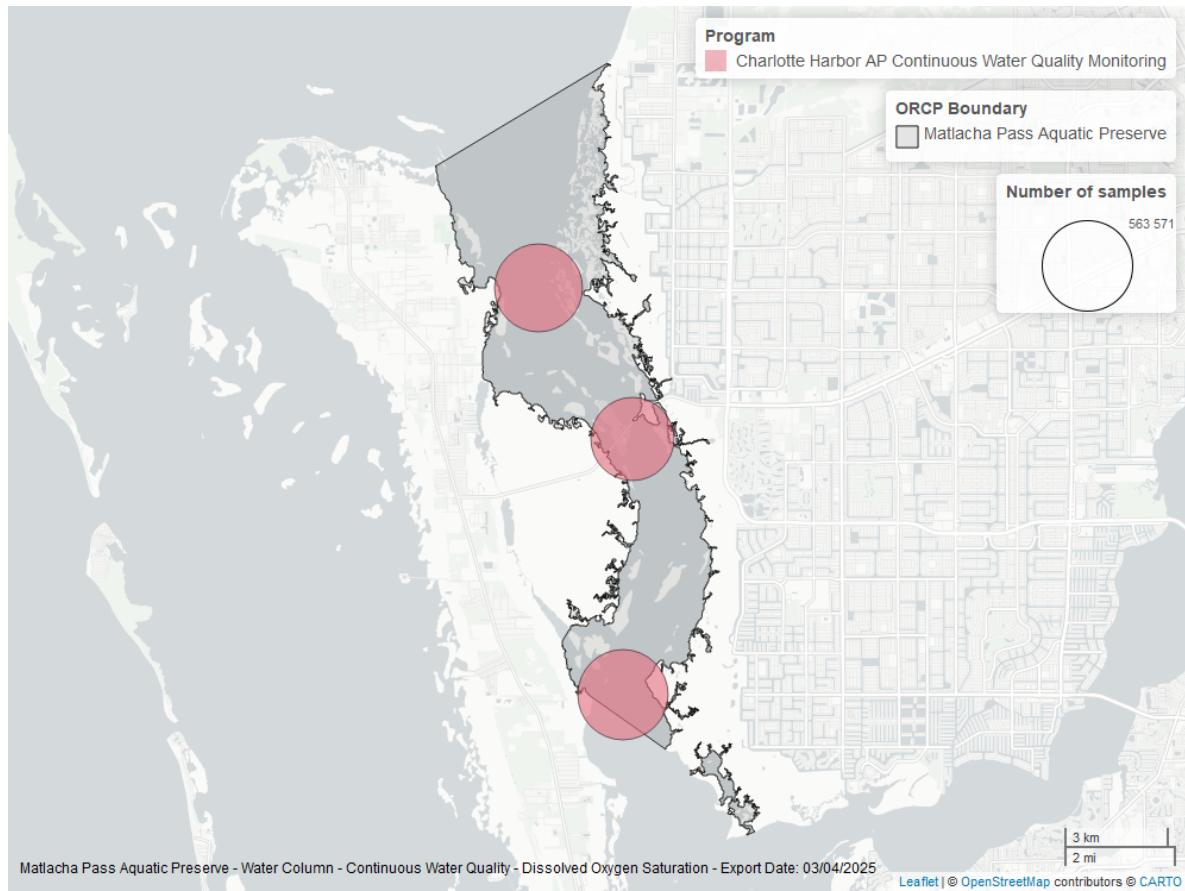


Figure 12: Map showing location of dissolved oxygen saturation continuous water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Salinity - Discrete

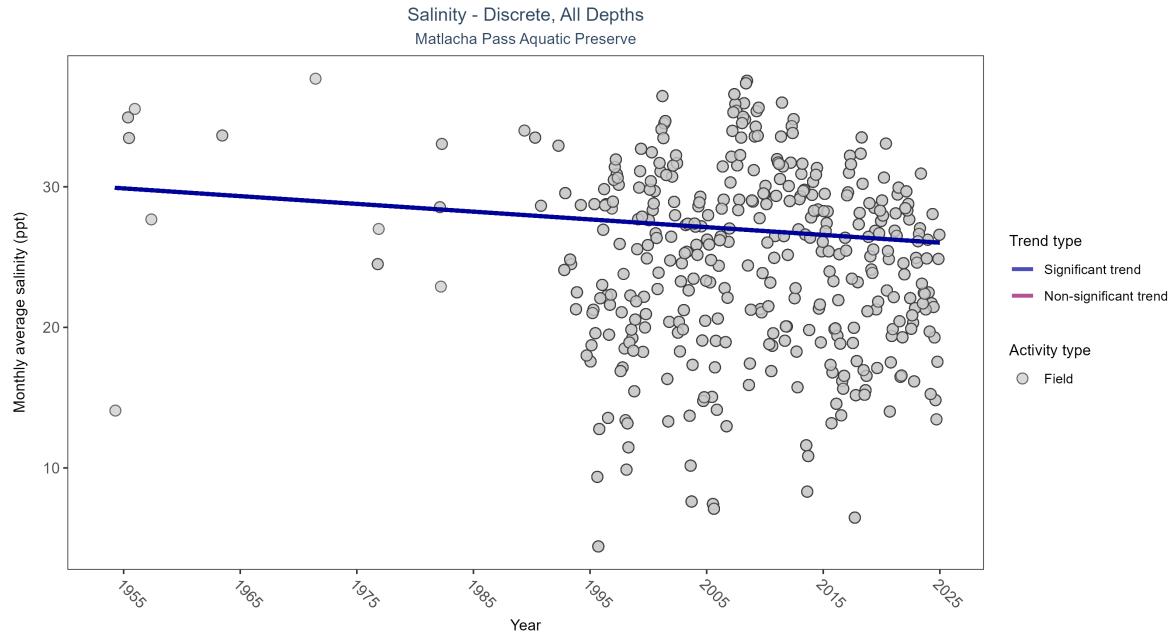


Figure 13: Scatter plot of monthly average salinity over time. If the time series included ten or more years of discrete observations, significant (blue) or non-significant (magenta) trend lines are also shown. Discrete salinity values derived from grab samples analyzed in the field (circles) or the 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	10706	42	1954 - 2024	25.9	-0.07486	29.94254	-0.05518	0.0351

Monthly average salinity decreased by 0.06 ppt per year.

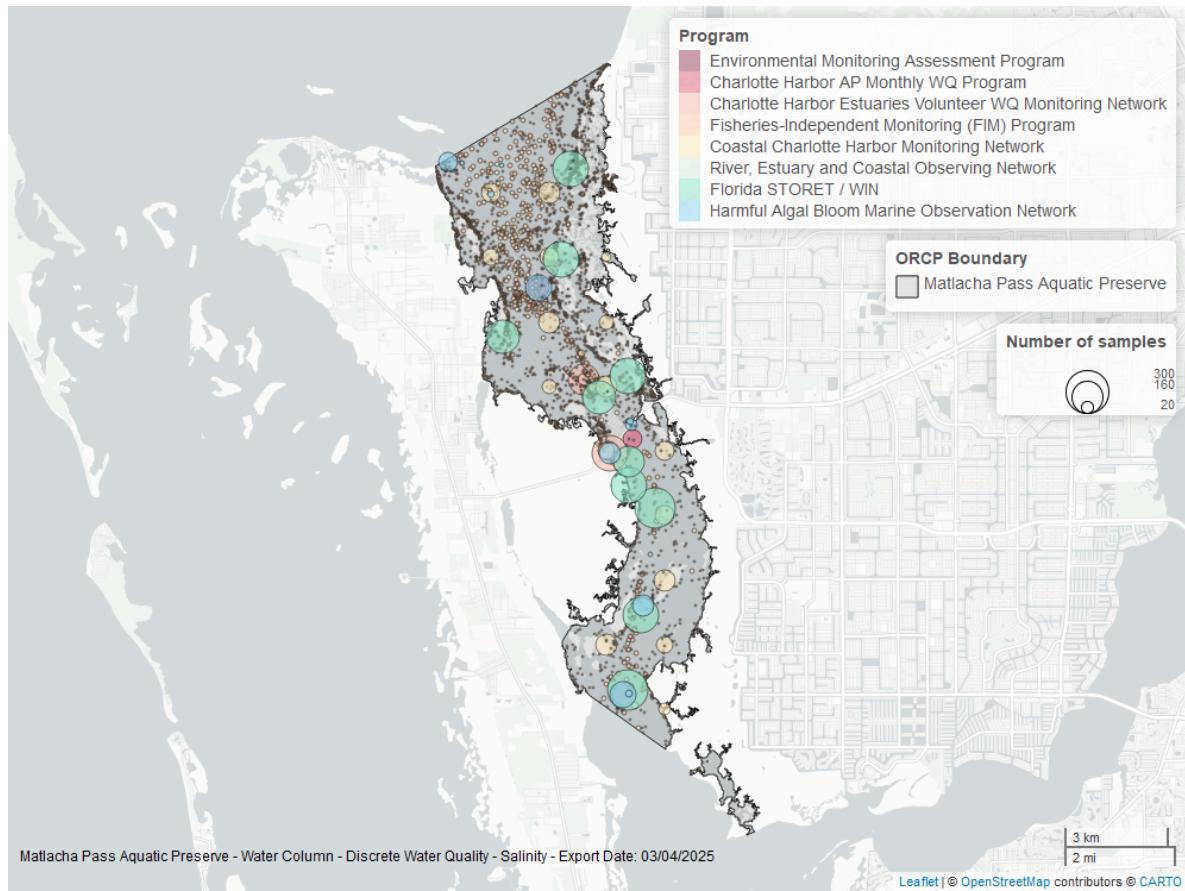


Figure 14: Map showing location of discrete water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Salinity - Continuous

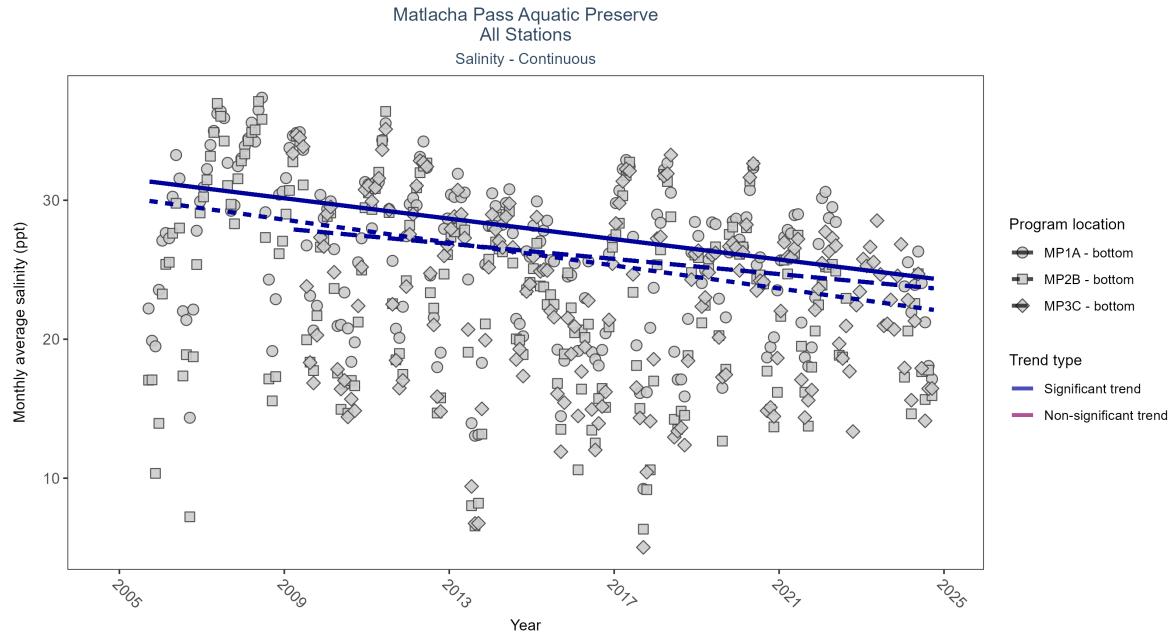


Figure 15: Scatter plot of monthly average salinity over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
MP1A	Significantly decreasing trend	566644	19	2005 - 2024	27.0	-0.36	31.61	-0.37	0
MP2B	Significantly decreasing trend	586611	19	2005 - 2024	24.4	-0.34	30.25	-0.41	0
MP3C	Significantly decreasing trend	514294	16	2009 - 2024	23.6	-0.21	27.96	-0.27	0.0002

At three program locations, monthly average salinity decreased between 0.27 and 0.41 ppt per year.

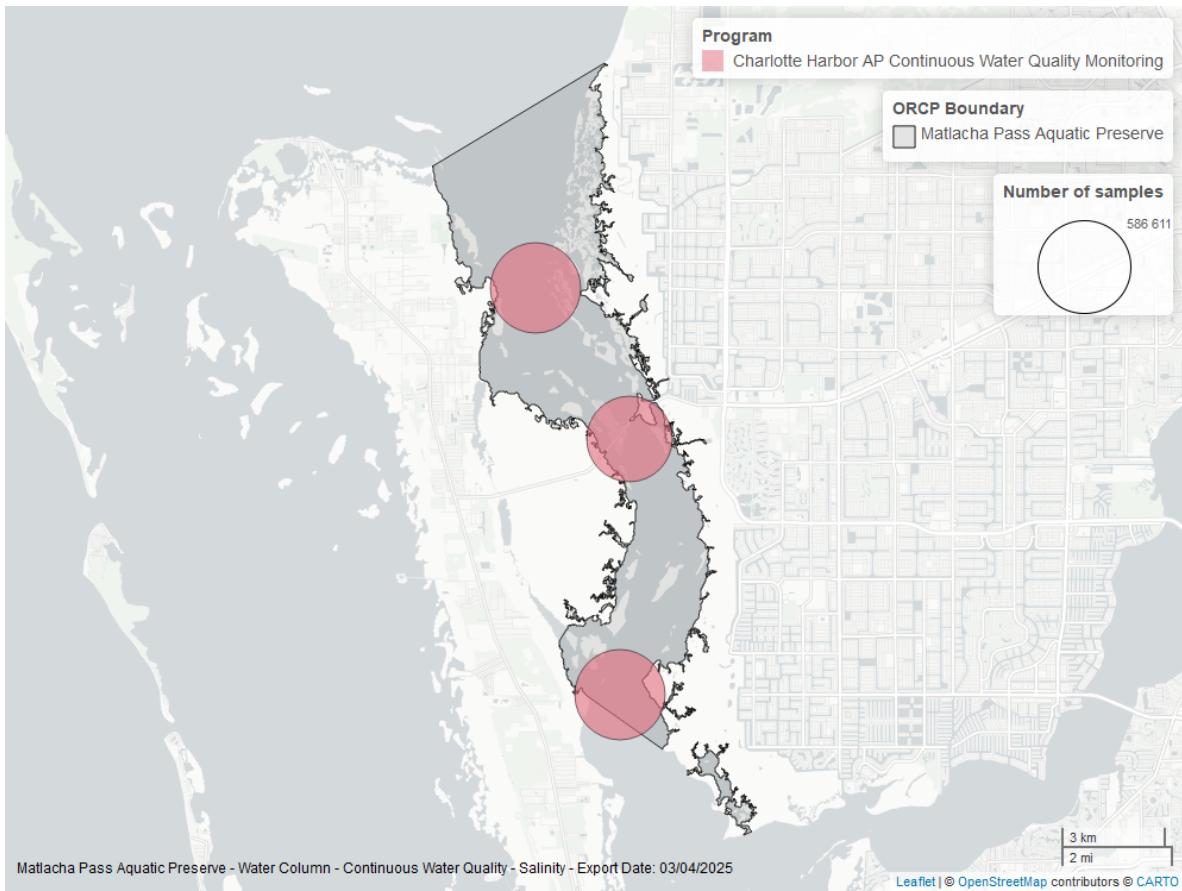


Figure 16: Map showing location of salinity continuous water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Water Temperature - Discrete

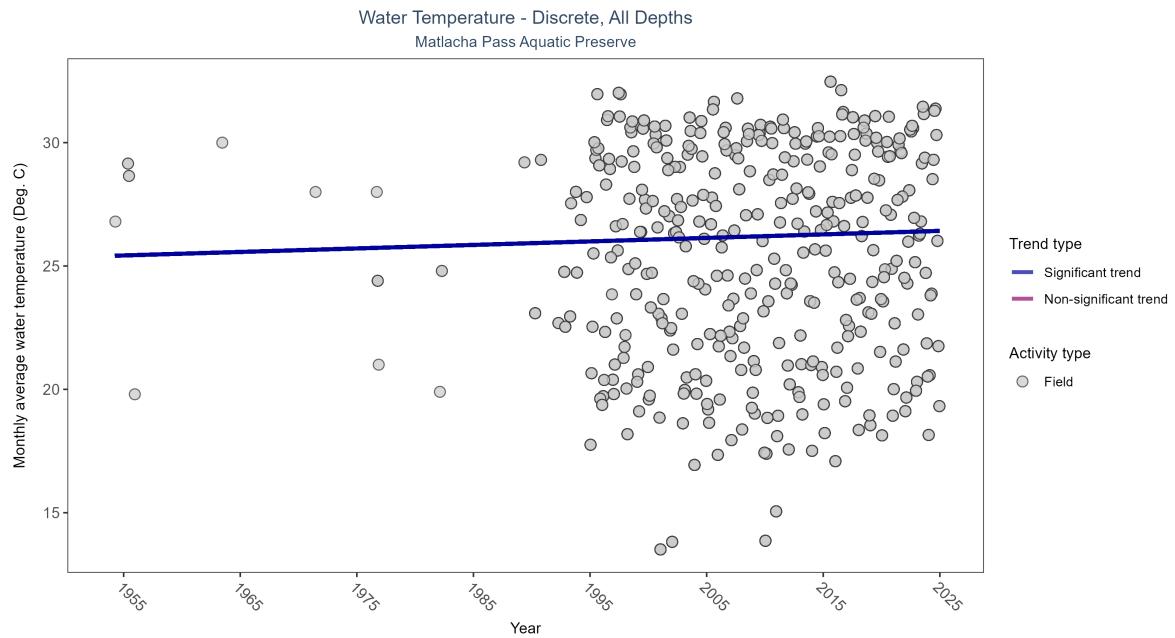


Figure 17: Scatter plot of monthly average water temperature over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only water temperature measurements taken in the field (circles) are included in 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	11709	41	1954 - 2024	26.1	0.07179	25.41246	0.01422	0.0438

Monthly average water temperature increased by  $0.01^{\circ}\text{C}$  per year.

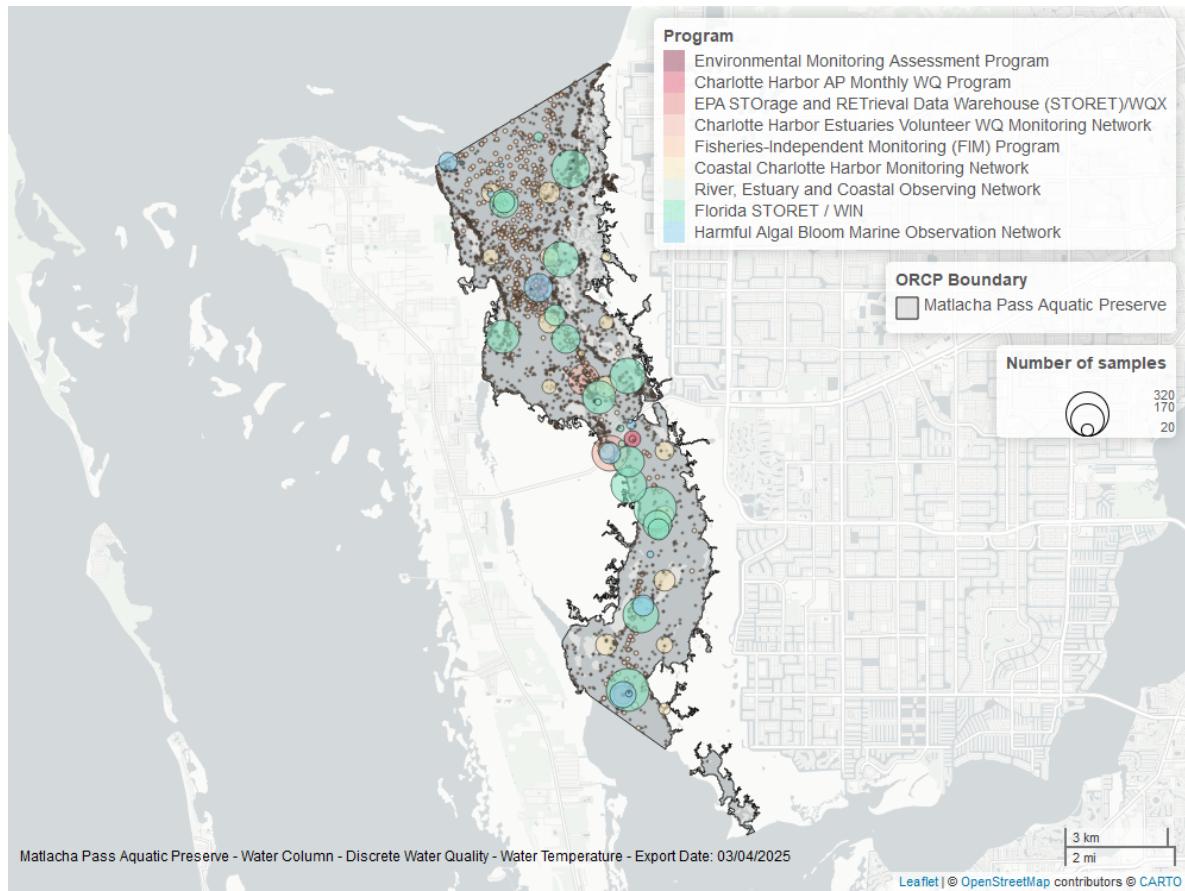


Figure 18: Map showing location of discrete water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Water Temperature - Continuous

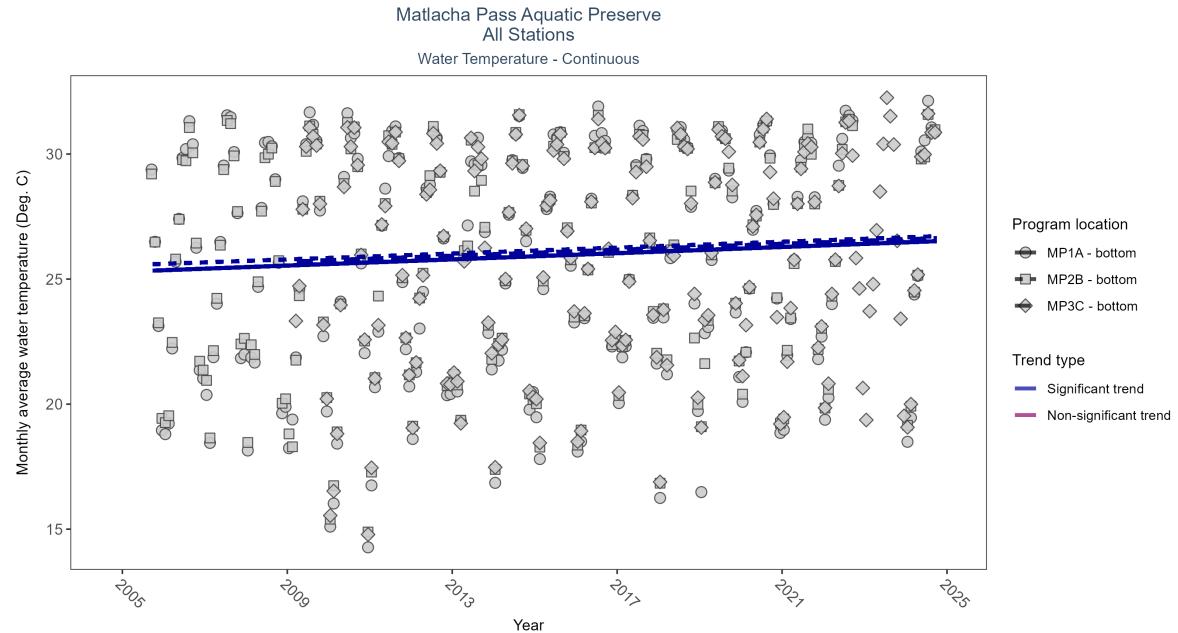


Figure 19: Scatter plot of monthly average water temperature over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
MP1A	Significantly increasing trend	599828	19	2005 - 2024	26.5	0.25	25.29	0.06	0
MP2B	Significantly increasing trend	595300	19	2005 - 2024	26.3	0.22	25.55	0.06	0
MP3C	Significantly increasing trend	518244	16	2009 - 2024	26.7	0.20	25.69	0.06	0.0002

At three program locations, monthly average water temperature increased between 0.06 and 0.06°C per year.

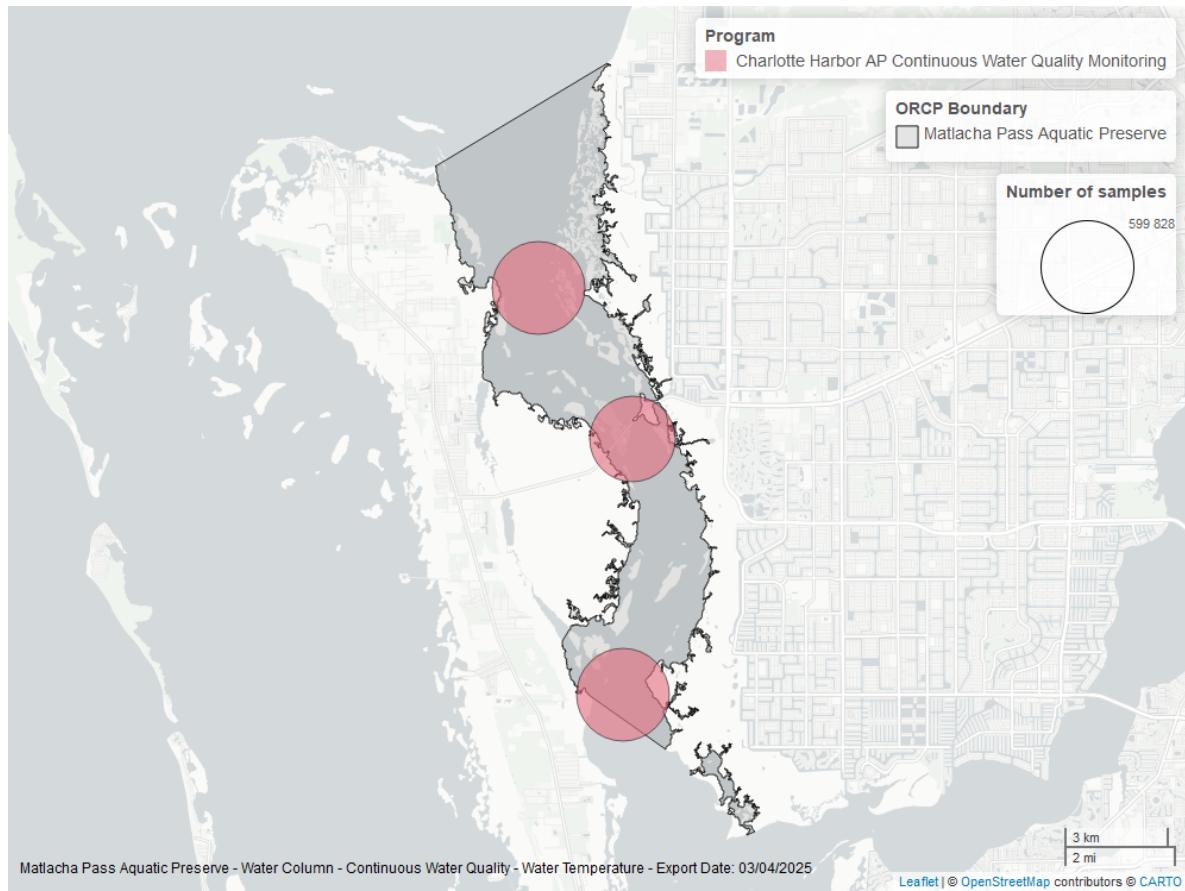


Figure 20: Map showing location of water temperature continuous water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## pH - Discrete

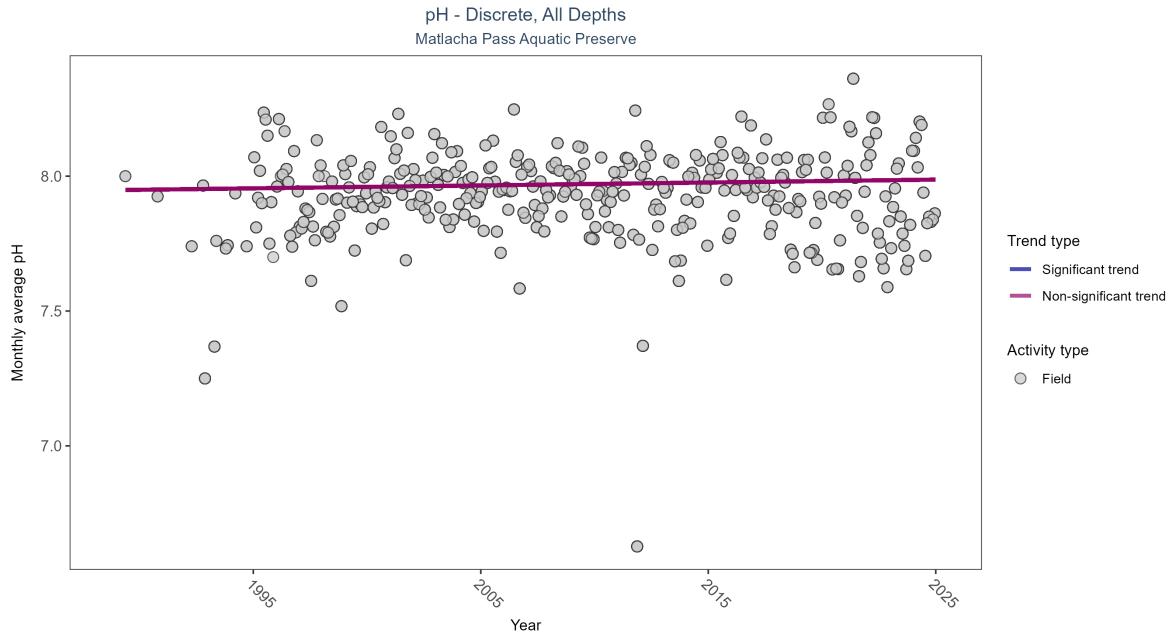


Figure 21: Scatter plot of monthly average pH over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only pH values measured in the field (circles) are included in the plot.

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	No significant trend	10827	35	1989 - 2024	7.93	0.03381	7.94838	0.00108	0.314

pH showed no detectable trend between 1989 and 2024.

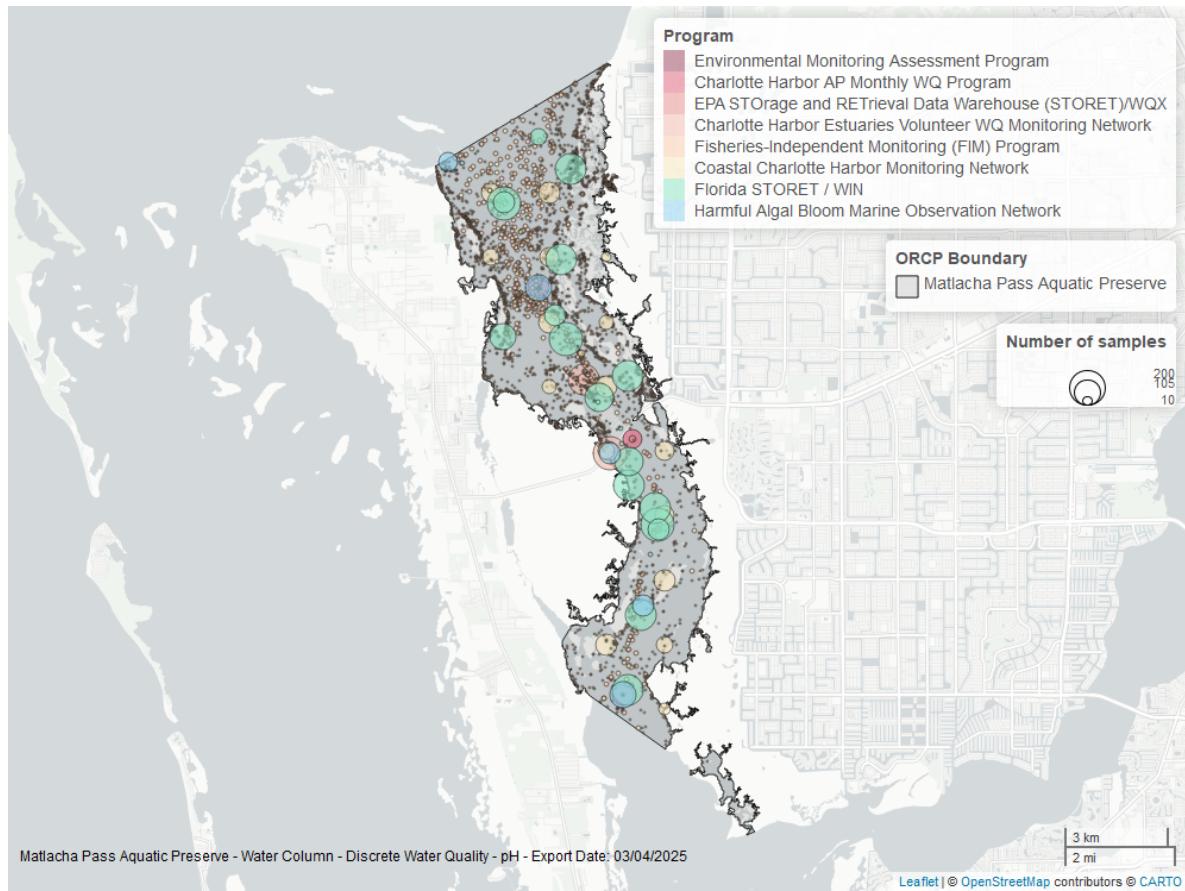


Figure 22: Map showing location of discrete water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## pH - Continuous

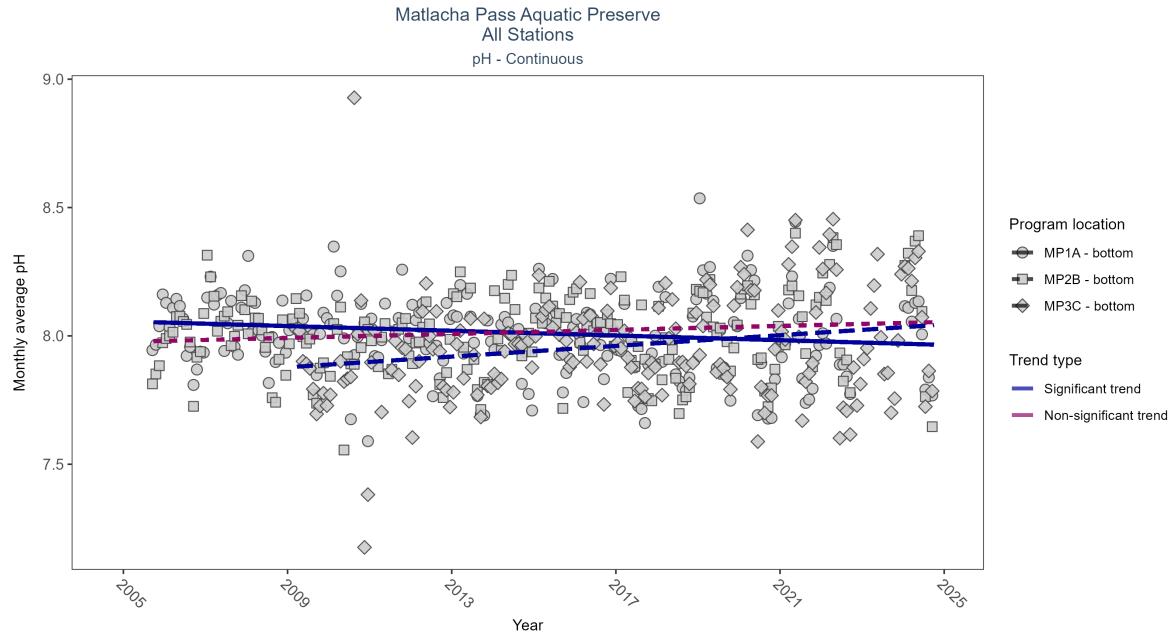


Figure 23: Scatter plot of monthly average pH over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
MP1A	Significantly decreasing trend	515072	19	2005 - 2024	8	-0.14	8.06	0.00	0.0064
MP2B	No significant trend	529320	19	2005 - 2024	8	0.09	7.98	0.00	0.0862
MP3C	Significantly increasing trend	456260	16	2009 - 2024	8	0.19	7.88	0.01	0.0011

At one program location, monthly average pH increased by 0.01 pH units per year. At one program location, monthly average pH decreased by less than 0.01 pH units per year. No detectable change in monthly average pH was observed at one location.

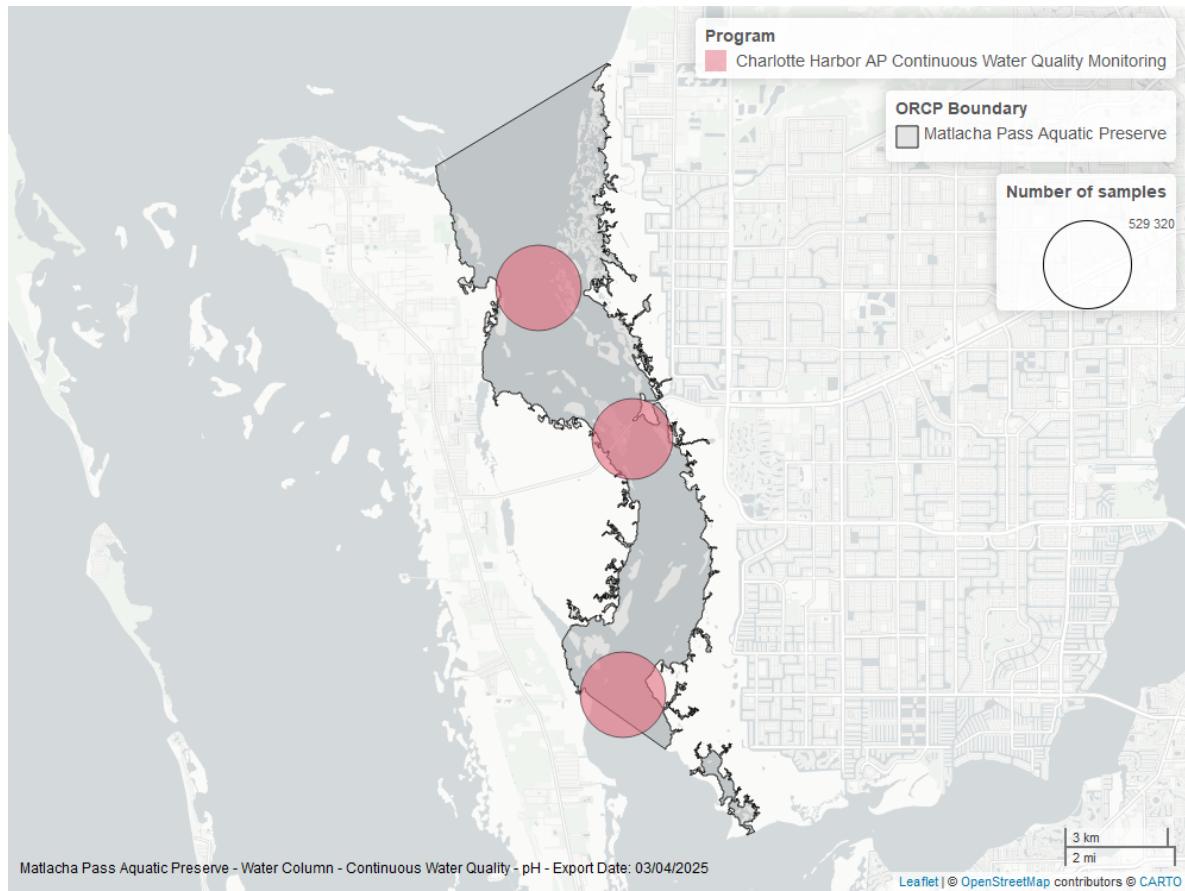


Figure 24: Map showing location of ph continuous water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Water Clarity

### Turbidity - Discrete

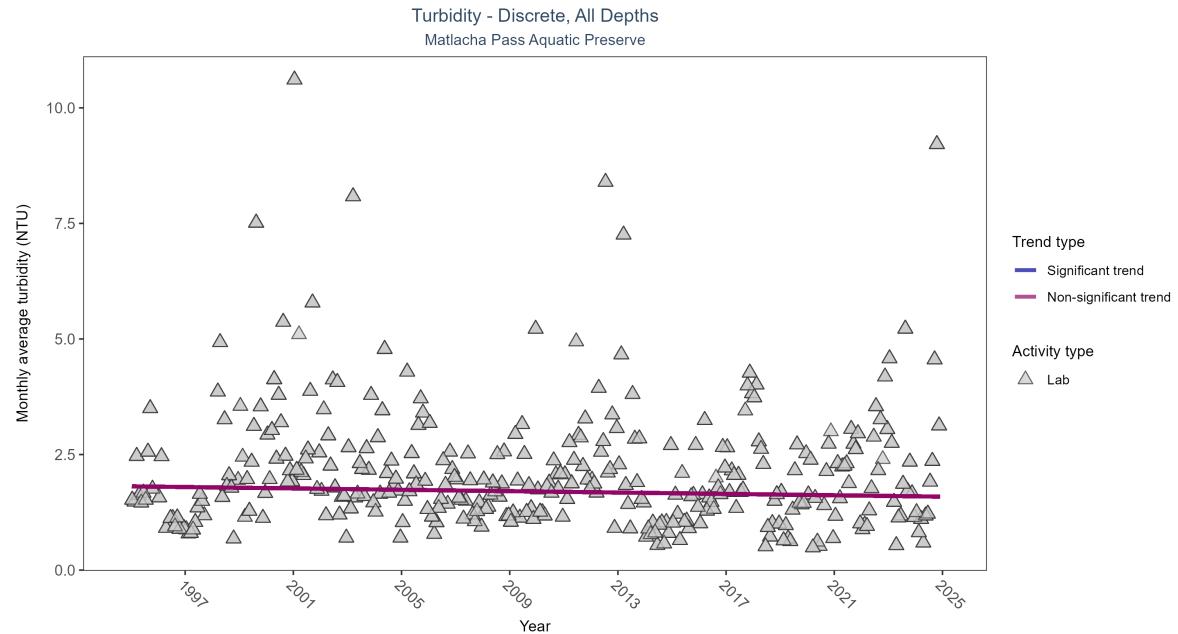


Figure 25: Scatter plot of monthly average turbidity over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only turbidity values measured in the laboratory (triangles) are included in the plot.

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	No significant trend	3464	30	1995 - 2024		1.7	-0.04095	1.81156	-0.00743	0.2351

Turbidity showed no detectable trend between 1995 and 2024.

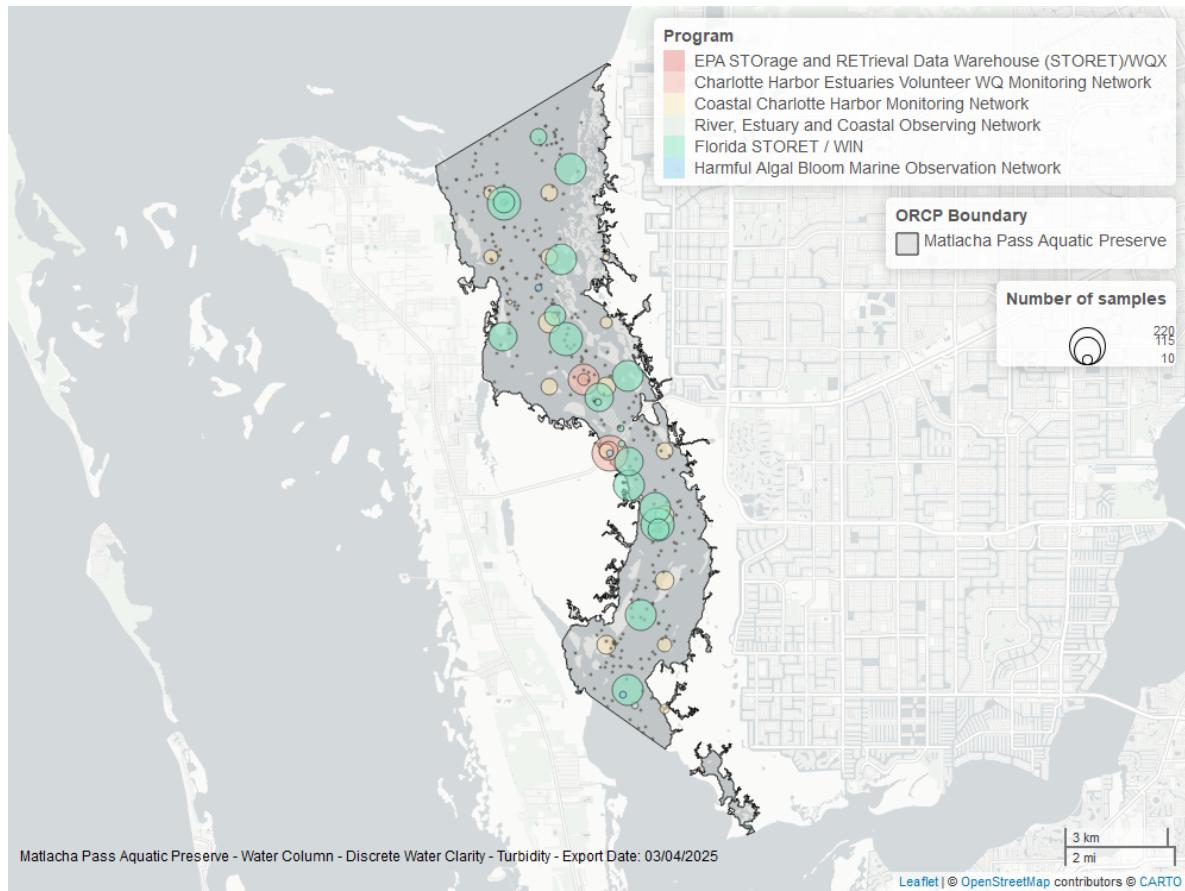


Figure 26: Map showing location of discrete water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Turbidity - Continuous

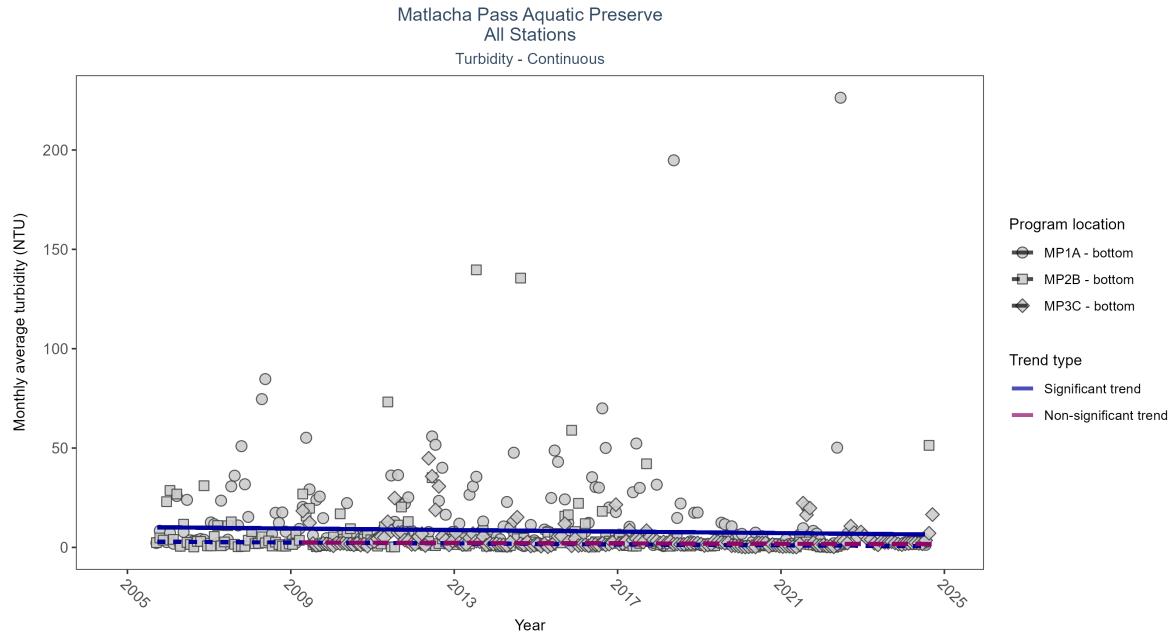


Figure 27: Scatter plot of monthly average turbidity over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
MP1A	Significantly decreasing trend	451479	19	2005 - 2024	2	-0.17	10.27	-0.19	0.0008
MP2B	Significantly decreasing trend	511121	19	2005 - 2024	1	-0.21	2.93	-0.12	0
MP3C	No significant trend	447439	16	2009 - 2024	2	-0.09	2.44	-0.05	0.1059

At two program locations, monthly average turbidity decreased by 0.12 NTU per year at one site and by 0.19 NTU per year at the other. No detectable change in monthly average turbidity was observed at one location.

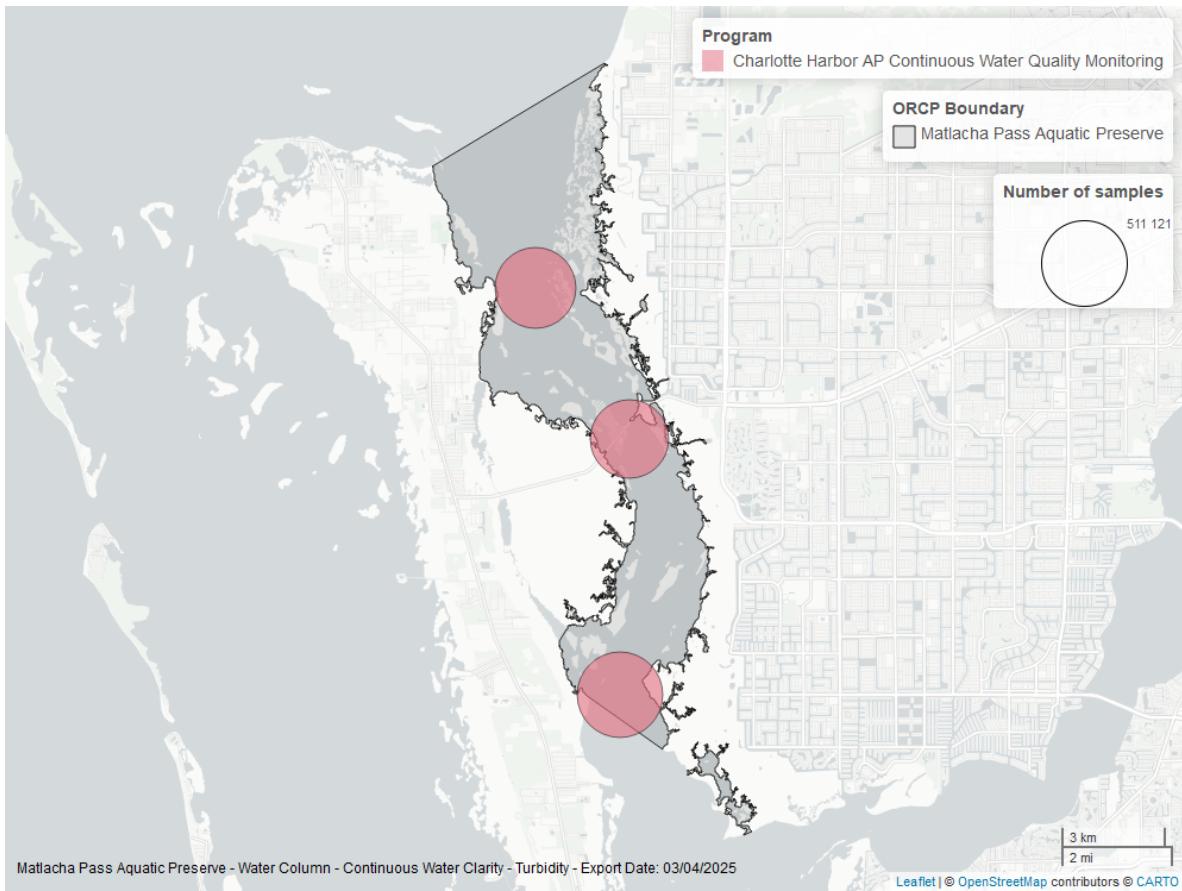


Figure 28: Map showing location of turbidity continuous water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Total Suspended Solids - Discrete

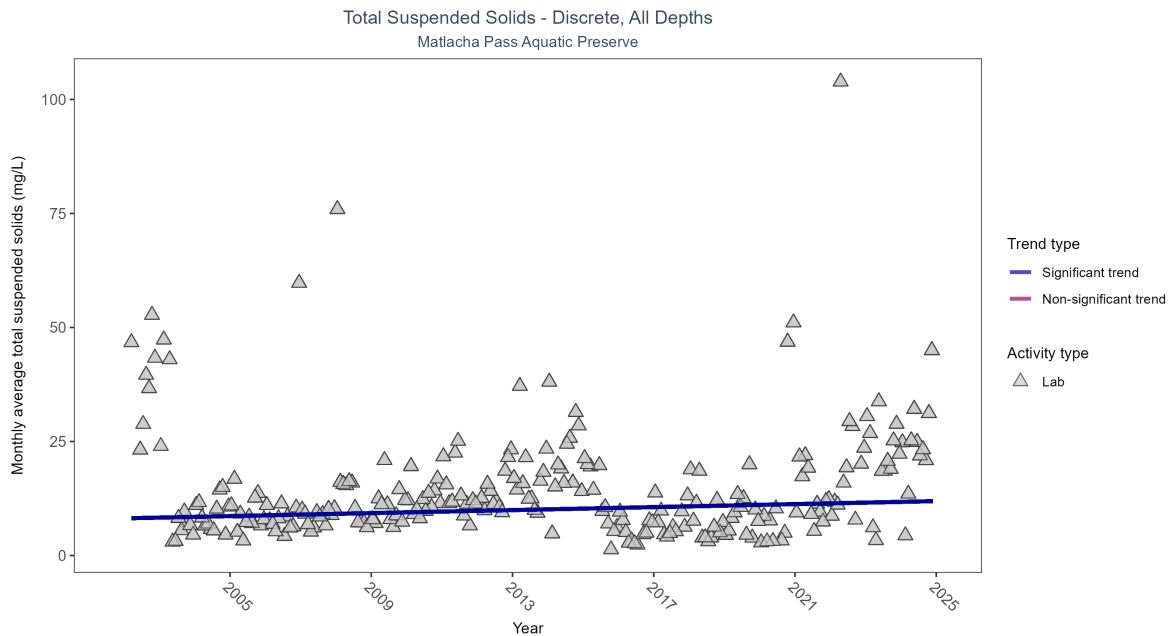


Figure 29: Scatter plot of monthly average total suspended solids (TSS) over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only TSS values obtained from laboratory analyses (triangles) are included 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 increasing trend	1819	23	2002 - 2024	9.5	0.09267	8.15099	0.16423	0.0401

Monthly average total suspended solids increased by 0.16 mg/L per year, indicating a decrease in water clarity.

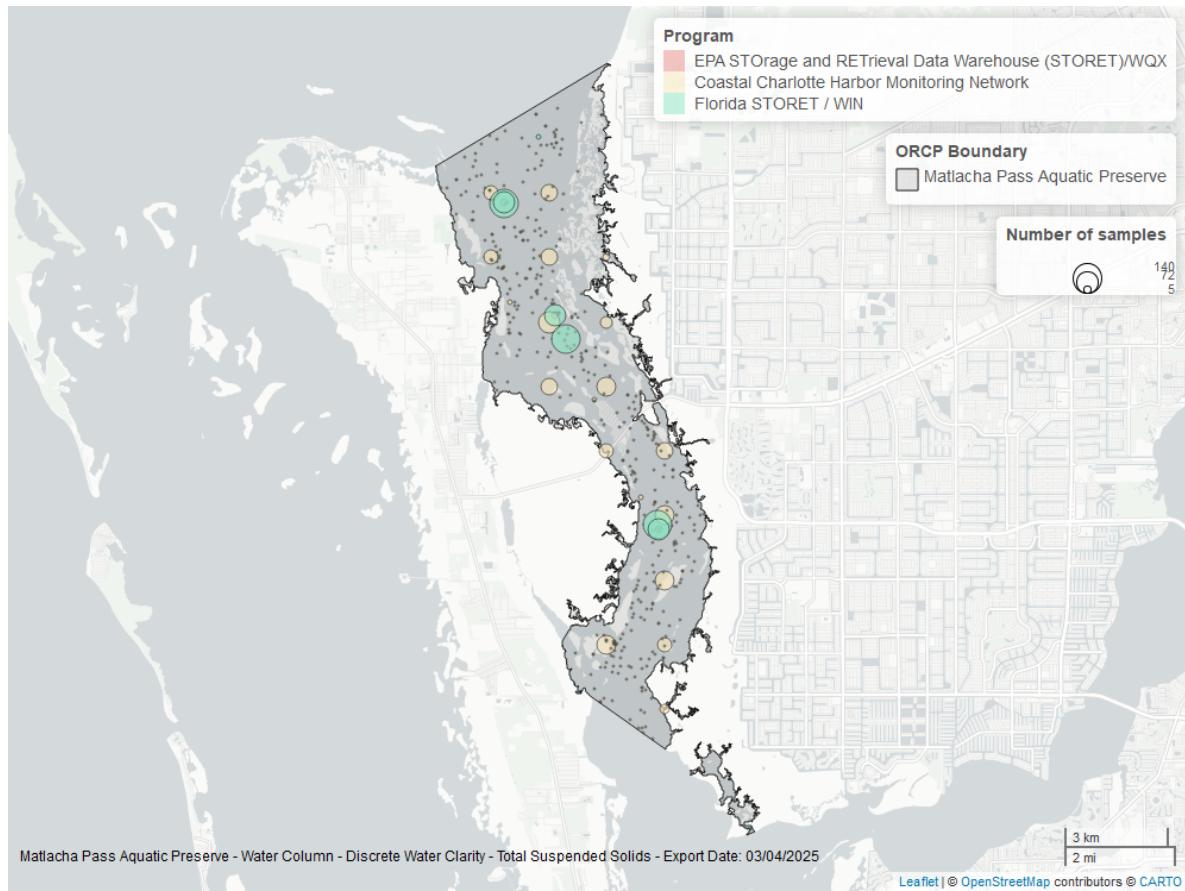


Figure 30: Map showing location of discrete water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Chlorophyll a, Uncorrected for Pheophytin - Discrete

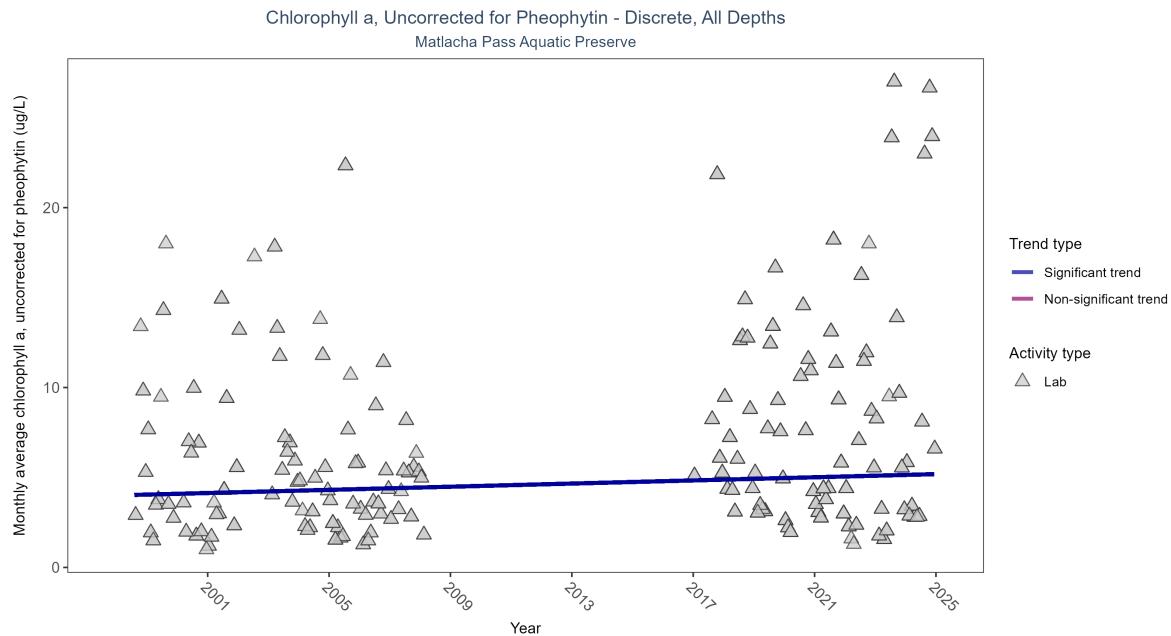


Figure 31: Scatter plot of monthly average levels of chlorophyll a, uncorrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles) 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	607	19	1998 - 2024	4.74	0.12723	4.00537	0.04375	0.0174

Monthly average chlorophyll a, uncorrected for pheophytin, increased by 0.04 µg/L per year, indicating a decrease in water clarity.

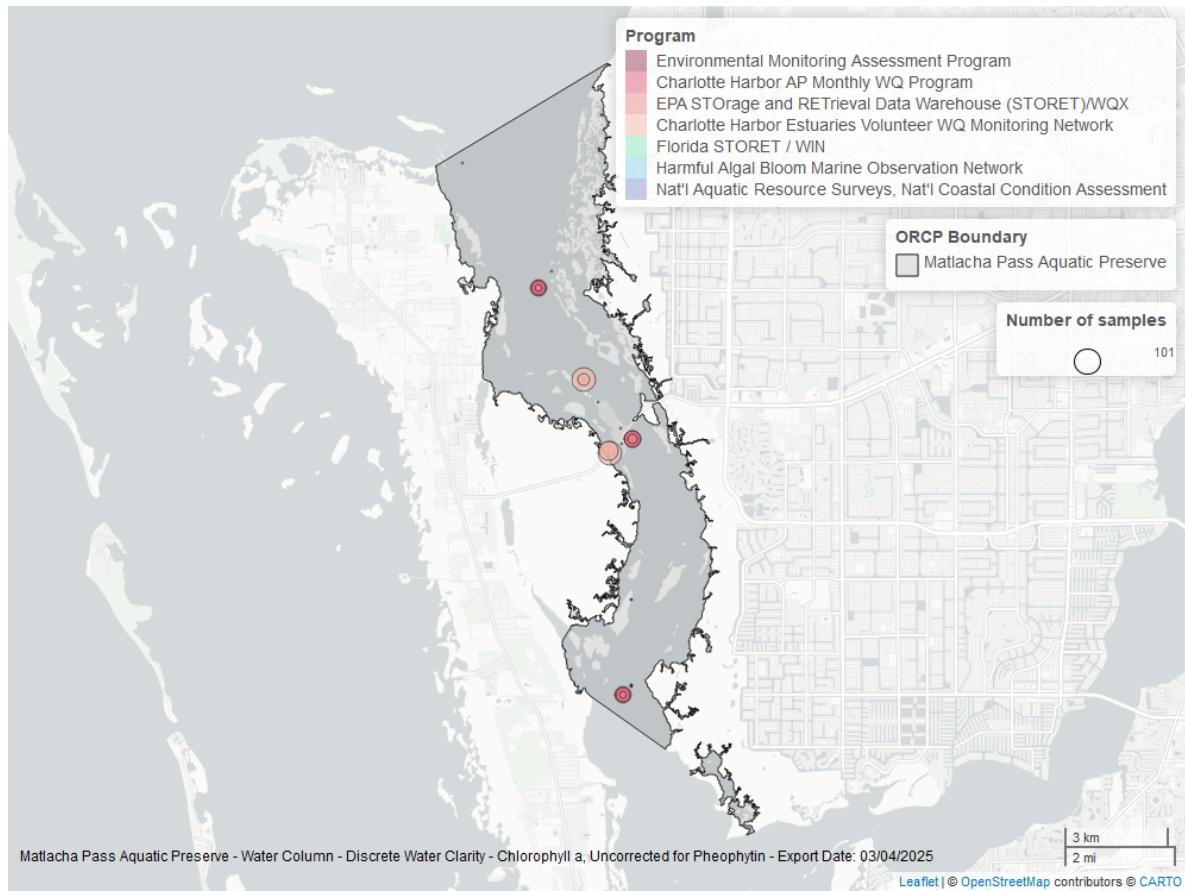


Figure 32: Map showing location of discrete water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Chlorophyll a, Corrected for Pheophytin - Discrete

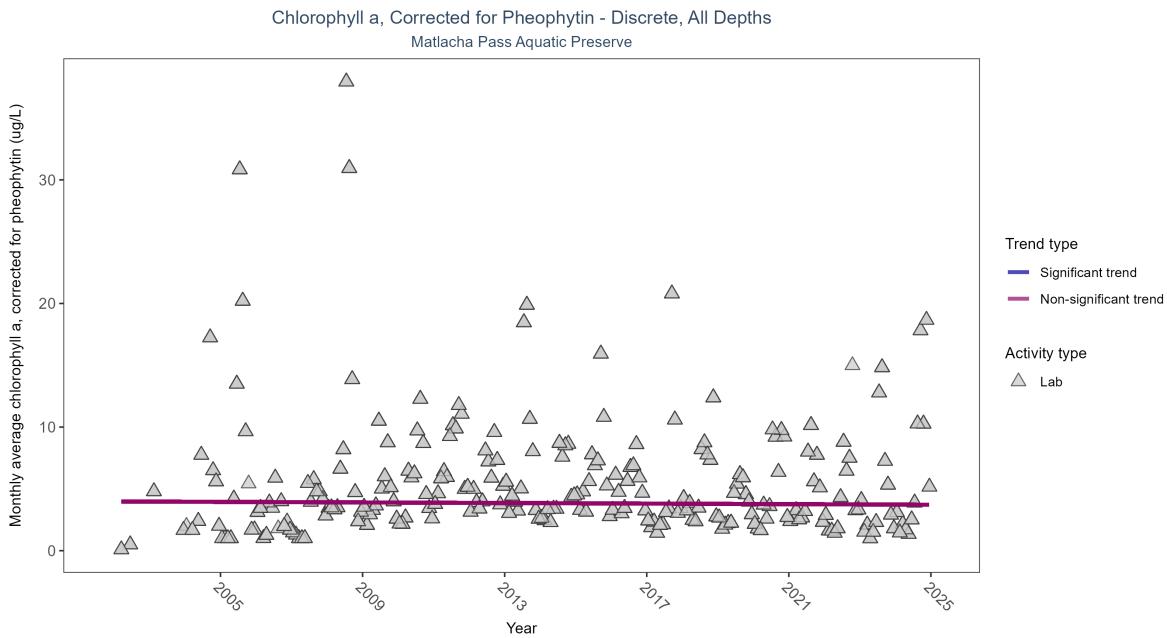


Figure 33: Scatter plot of monthly average levels of chlorophyll a, corrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles) 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	No significant trend	1959	23	2002 - 2024	3.4	-0.02422	3.9834	-0.01154	0.6137

Chlorophyll a, corrected for pheophytin, showed no detectable trend between 2002 and 2024.

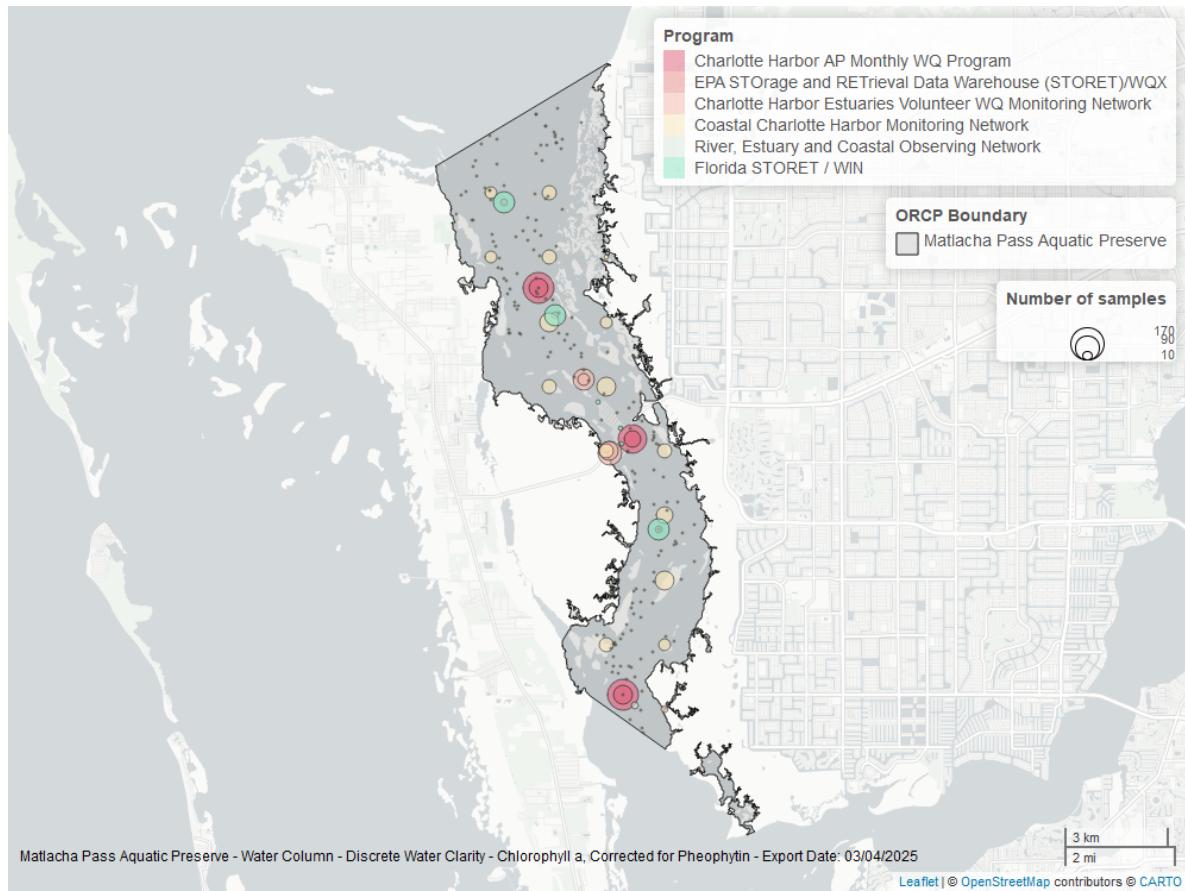


Figure 34: Map showing location of discrete water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Secchi Depth - Discrete

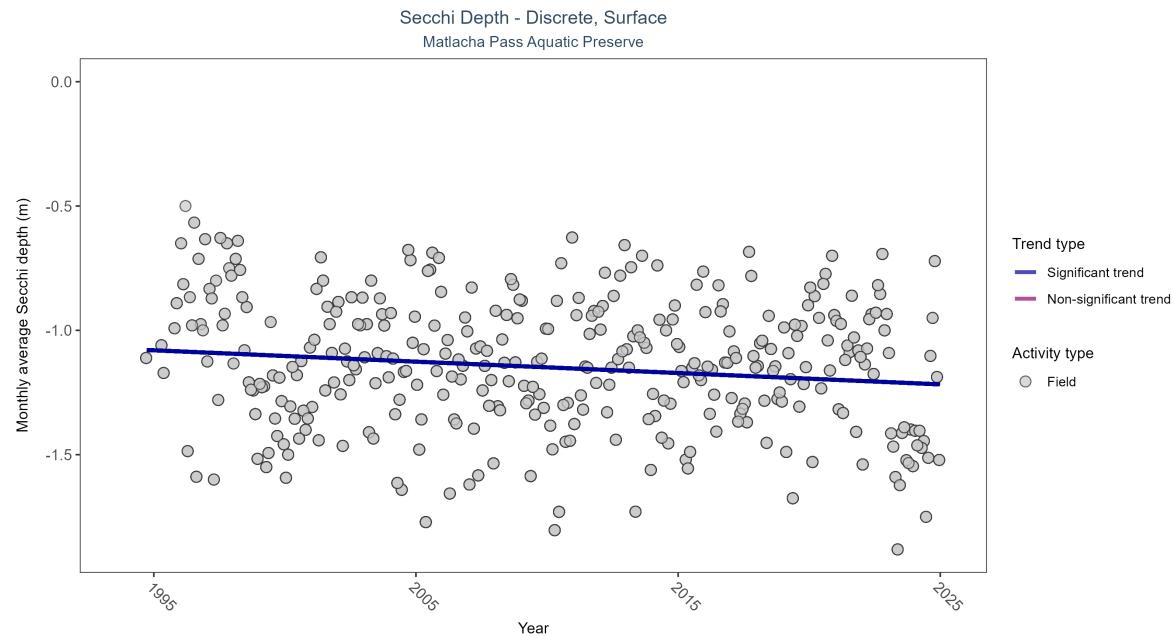


Figure 35: Scatter plot of monthly average Secchi depth over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Secchi depth is only measured in the field (circles).

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	Significantly decreasing trend	6543	31	1994 - 2024	-1	-0.09444	-1.07568	-0.00457	0.0125

Monthly average Secchi depth became deeper by less than 0.01 m per year, indicating an increase in water clarity.

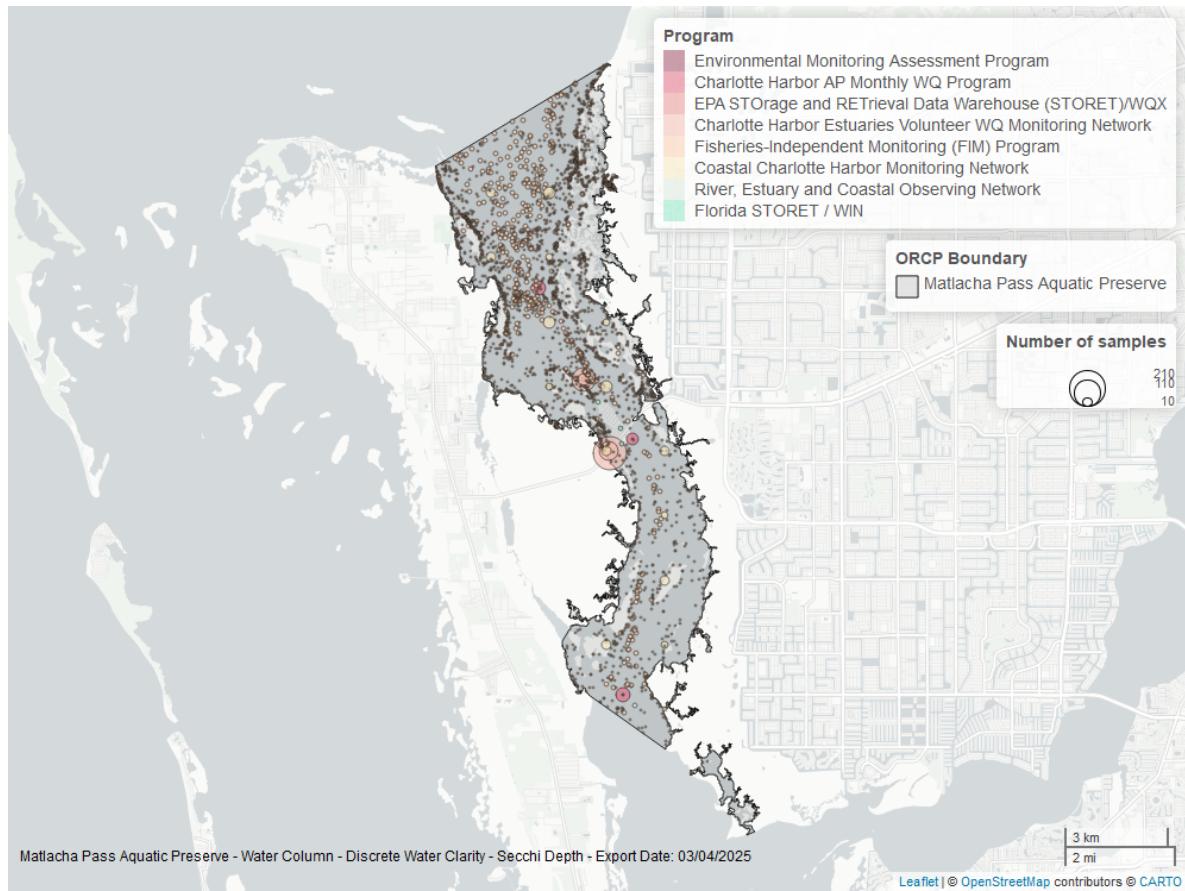


Figure 36: Map showing location of discrete water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Colored Dissolved Organic Matter - Discrete

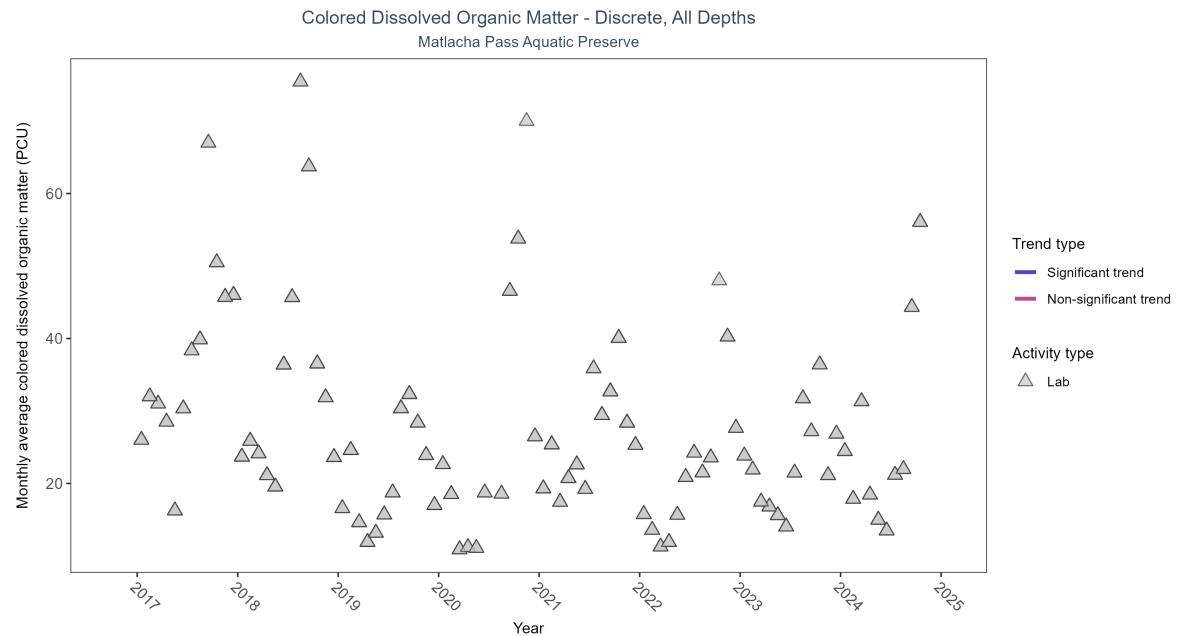


Figure 37: Scatter plot of monthly average colored dissolved organic matter (CDOM) over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed CDOM (triangles) is included in the 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	Insufficient data to calculate trend	504	8	2017 - 2024	25	-	-	-	-

There was insufficient data to fit a model for colored dissolved organic matter.

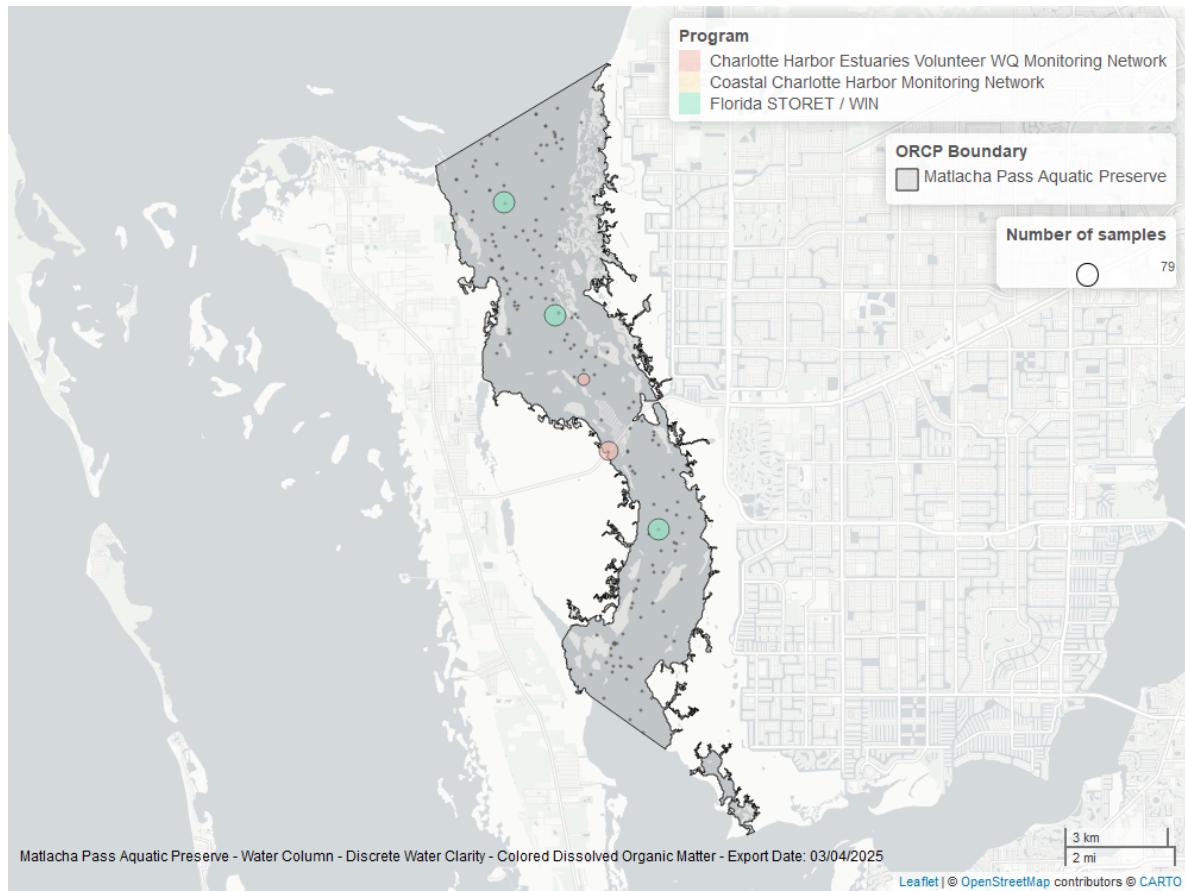


Figure 38: Map showing location of discrete water quality sampling locations within the boundaries of *Matlacha Pass Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.