Gasparilla Sound-Charlotte Harbor Aquatic Preserve

SEACAR Water Quality Analysis

Last compiled on 30 September, 2025

Contents

Indicators

Nutrients

Total Nitrogen - Discrete

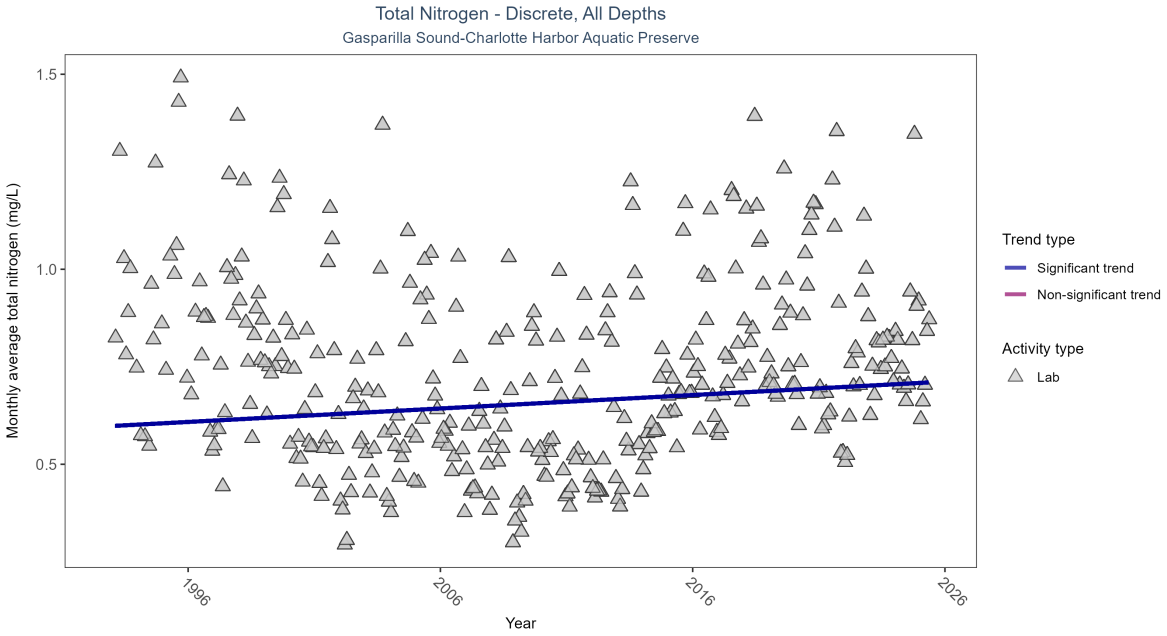

Figure 1: Scatter plot of monthly average total nitrogen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only nitrogen values obtained from laboratory analyses (triangles) are included in the 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	Significantly increasing trend	9152	33	1993 - 2025	0.673	0.11018	0.59816	0.00345	0.0037

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

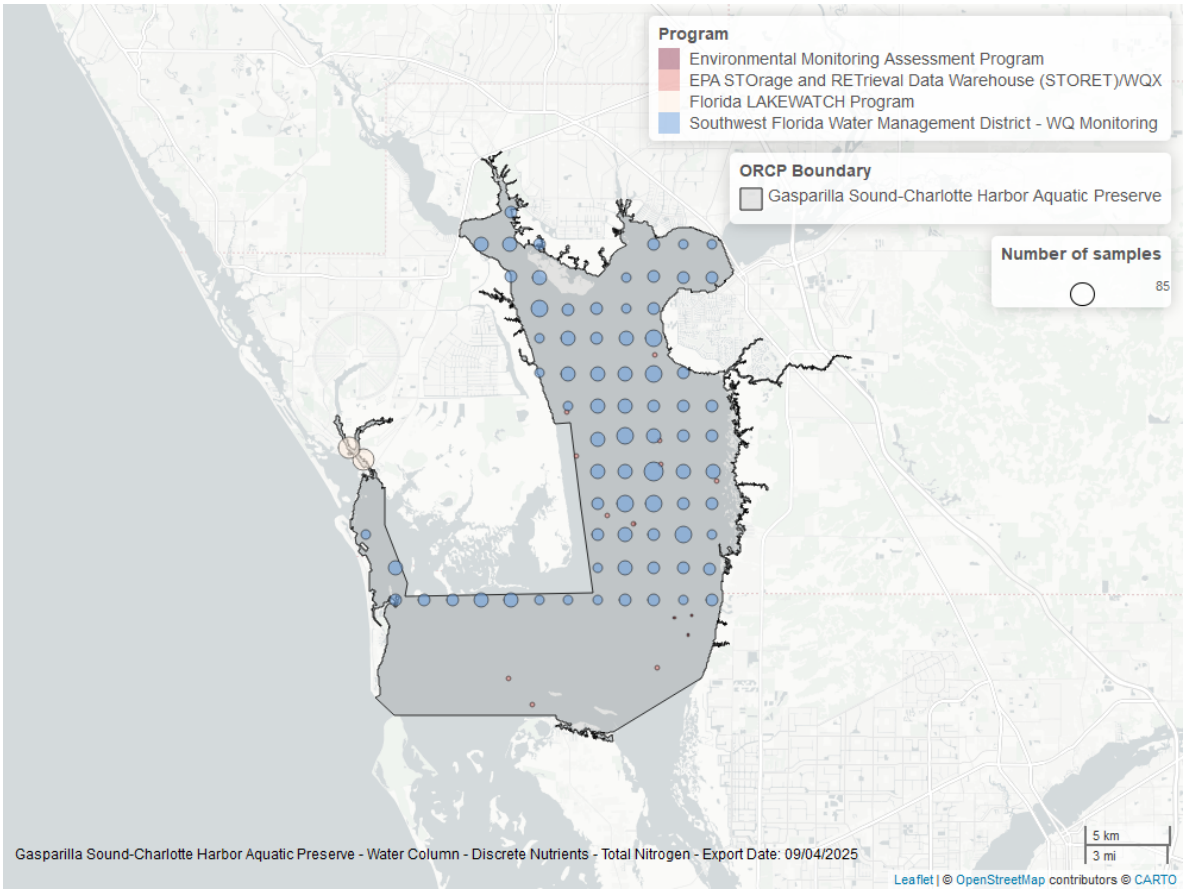

Figure 2: Map showing location of discrete water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Total Phosphorus - Discrete

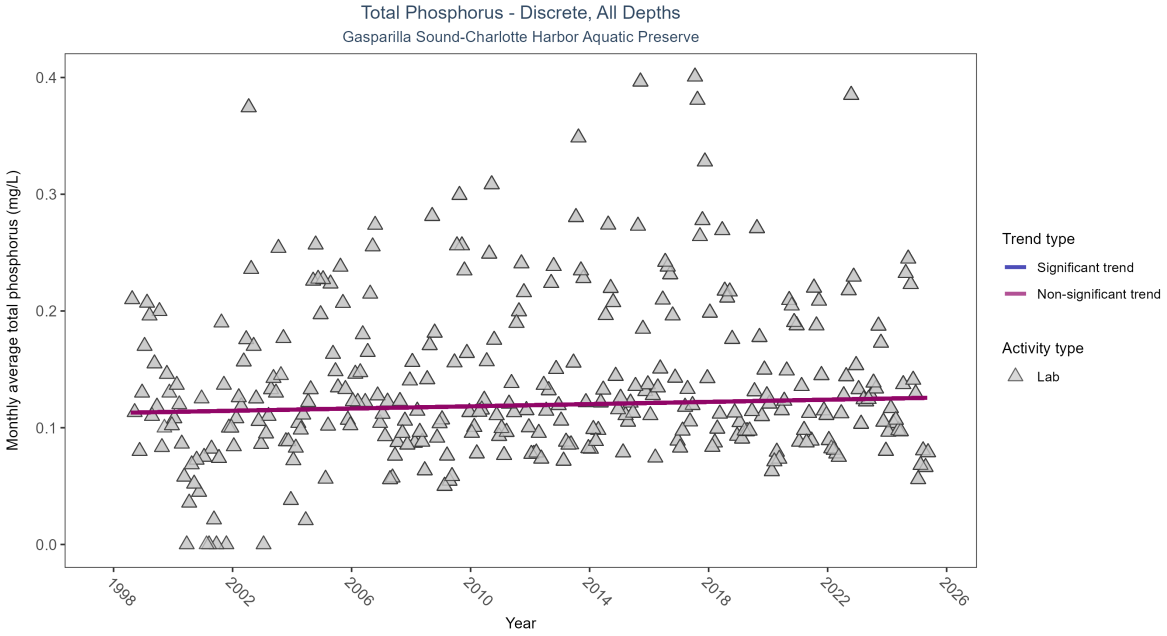

Figure 3: Scatter plot of monthly average total phosphorus over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only phosphorus values obtained from laboratory analyses (triangles) are included in 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	7044	28	1998 - 2025	0.114	0.06013	0.11264	0.00047	0.1351

Total phosphorus showed no detectable trend between 1998 and 2025.

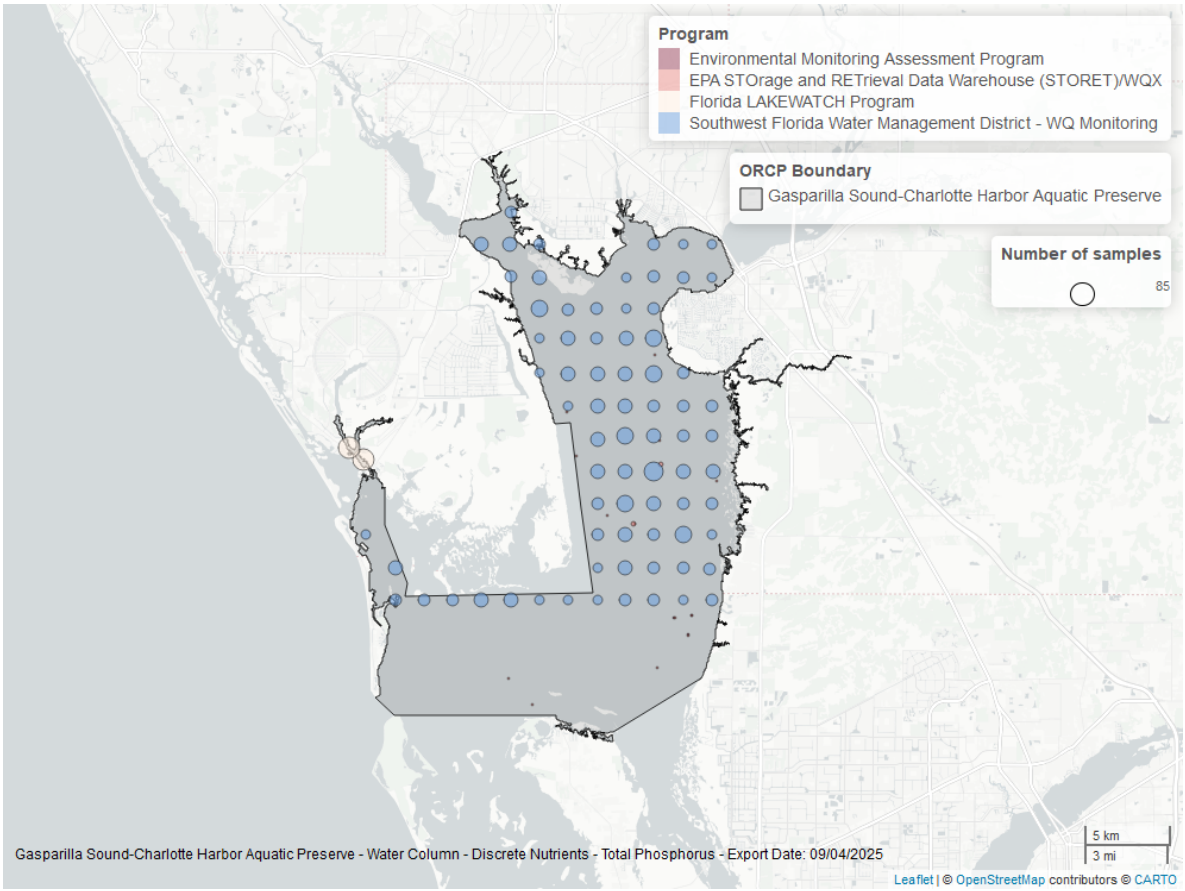

Figure 4: Map showing location of discrete water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Water Quality

Dissolved Oxygen - Discrete

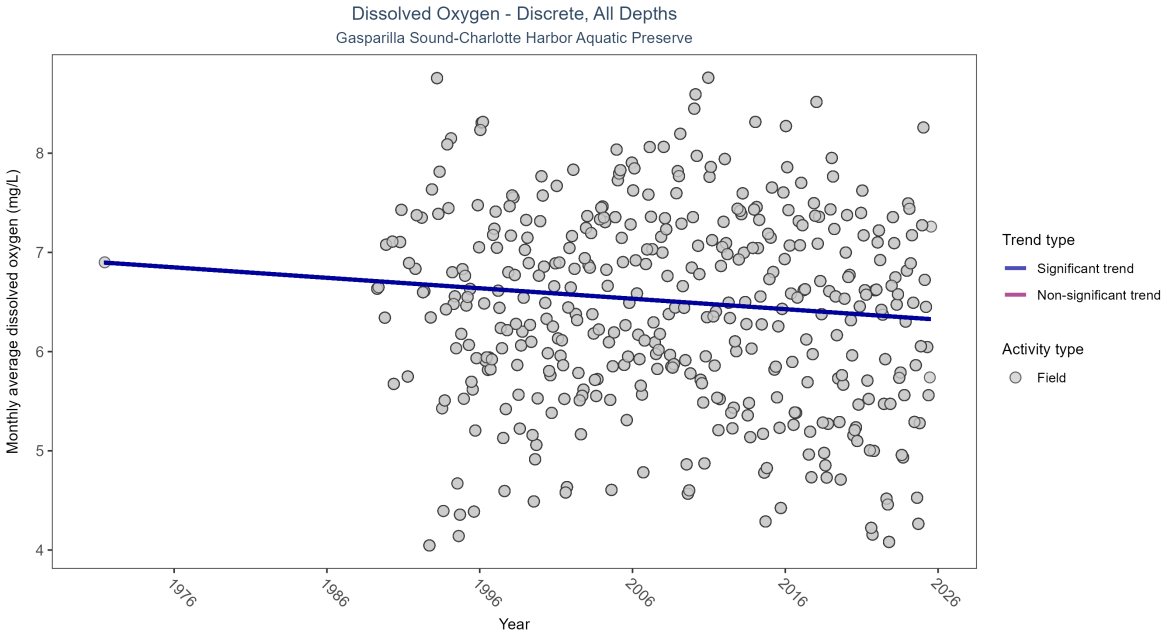

Figure 5: Scatter plot of monthly average dissolved oxygen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen values measured in the field (circles) are included in the plot.

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	72673	38	1971 - 2025	6.5	-0.13554	6.90197	-0.01054	1e-04

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

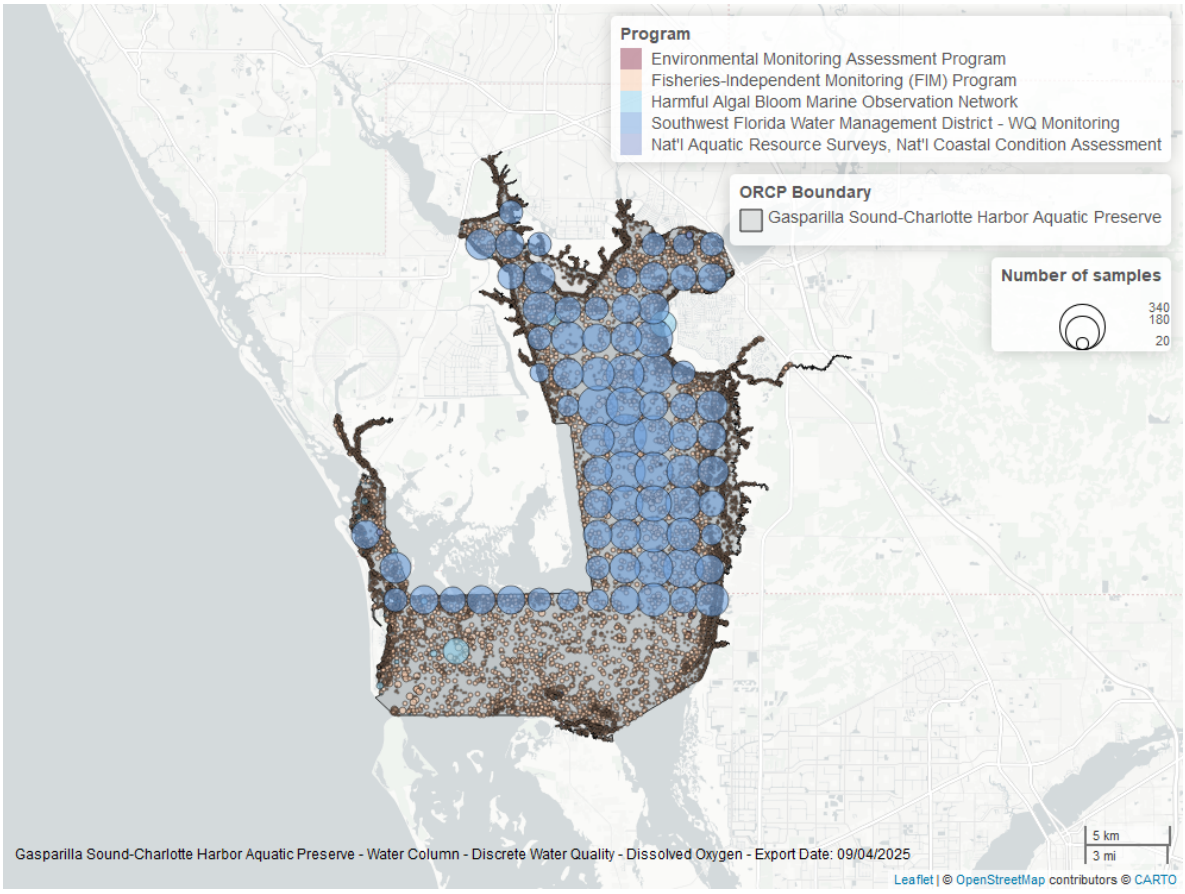

Figure 6: Map showing location of discrete water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Dissolved Oxygen - Continuous

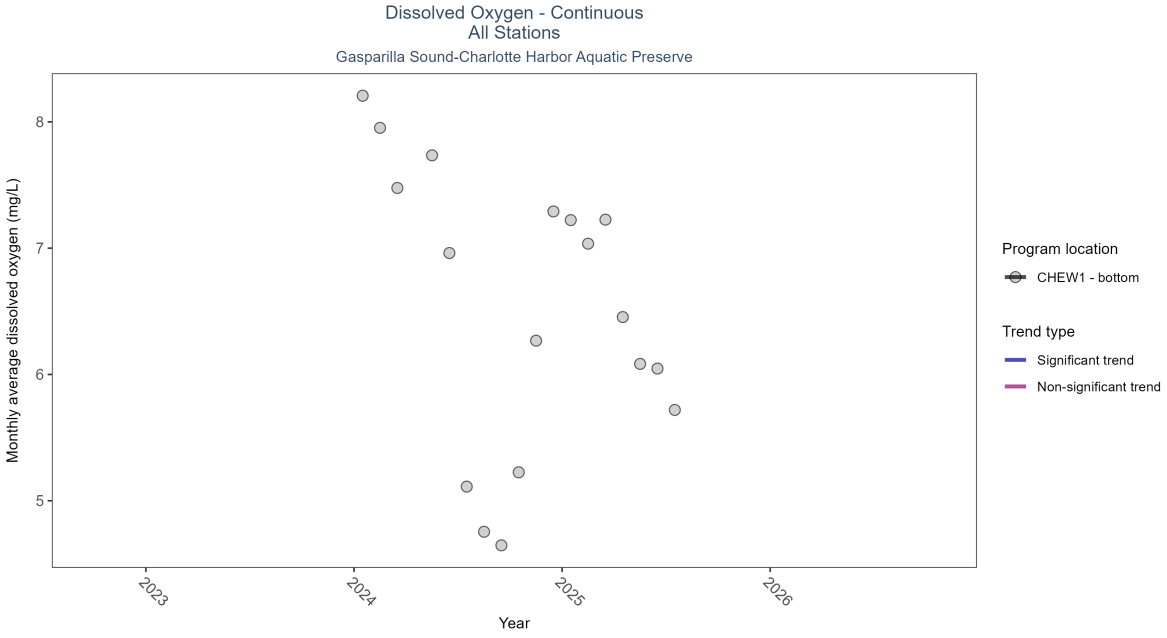

Figure 7: Scatter plot of monthly average dissolved oxygen over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
CHEW1	Insufficient data to calculate trend	39706	2	2024 - 2025	6.4	-	-	-	-

There was insufficient data to fit a model for one location.

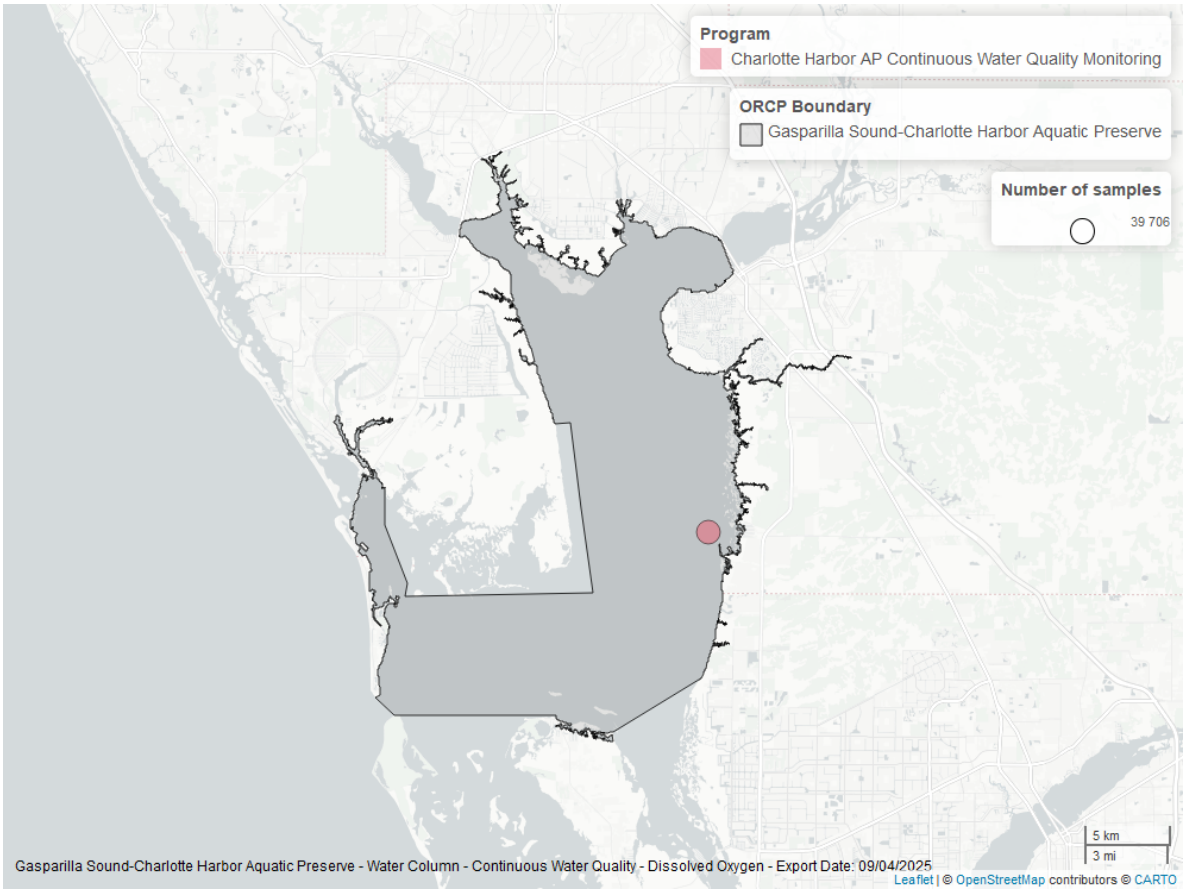

Figure 8: Map showing location of dissolved oxygen continuous water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Dissolved Oxygen Saturation - Discrete

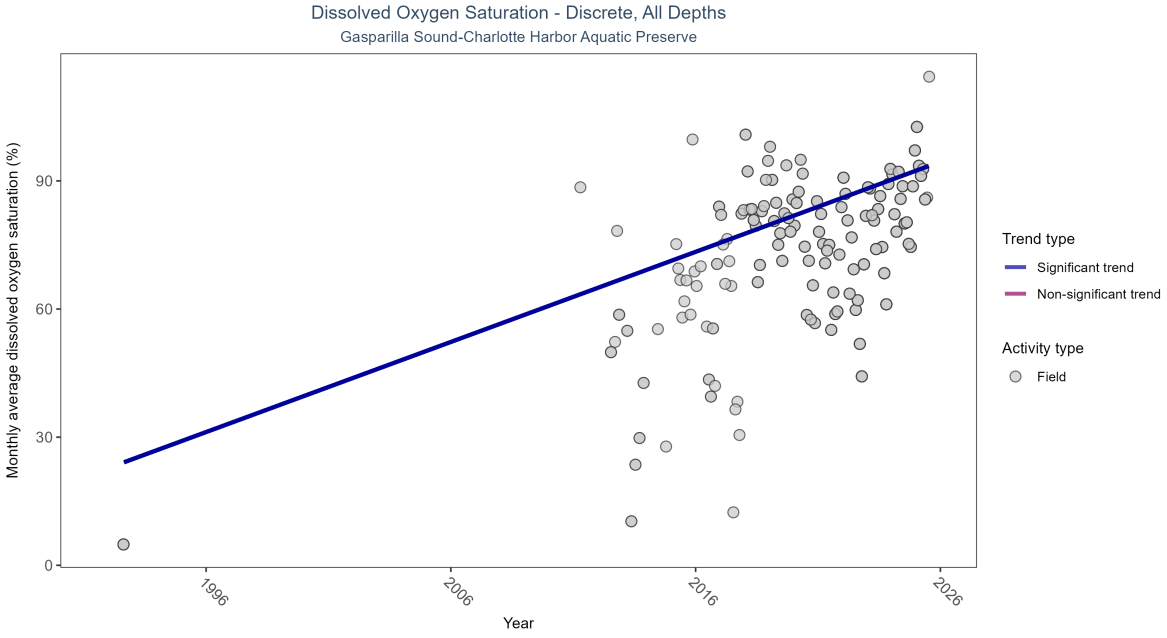

Figure 9: Scatter plot of monthly average dissolved oxygen saturation over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen saturation values measured in the field (circles) 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	930	16	1992 - 2025	86.1	0.37078	22.75463	2.10989	0

Monthly average dissolved oxygen saturation increased by 2.11% per year.

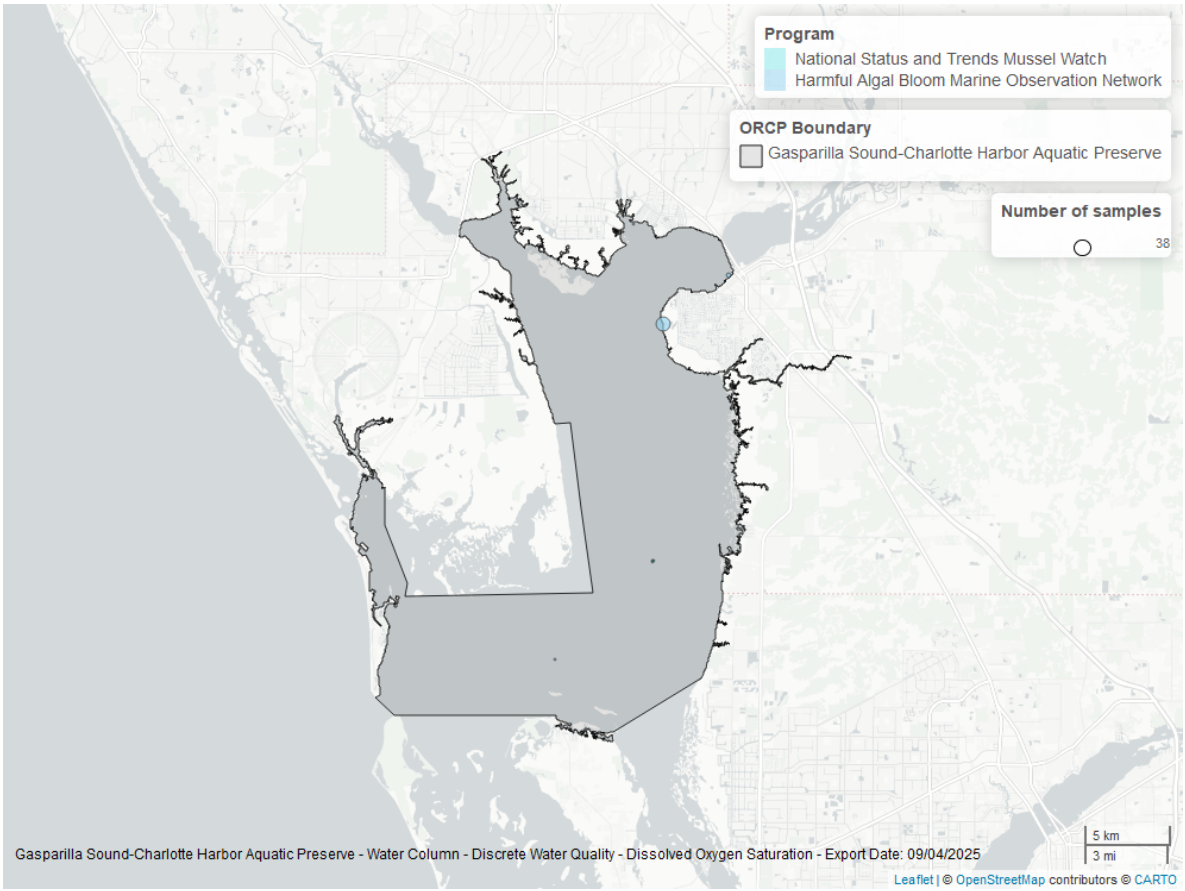

Figure 10: Map showing location of discrete water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Dissolved Oxygen Saturation - Continuous

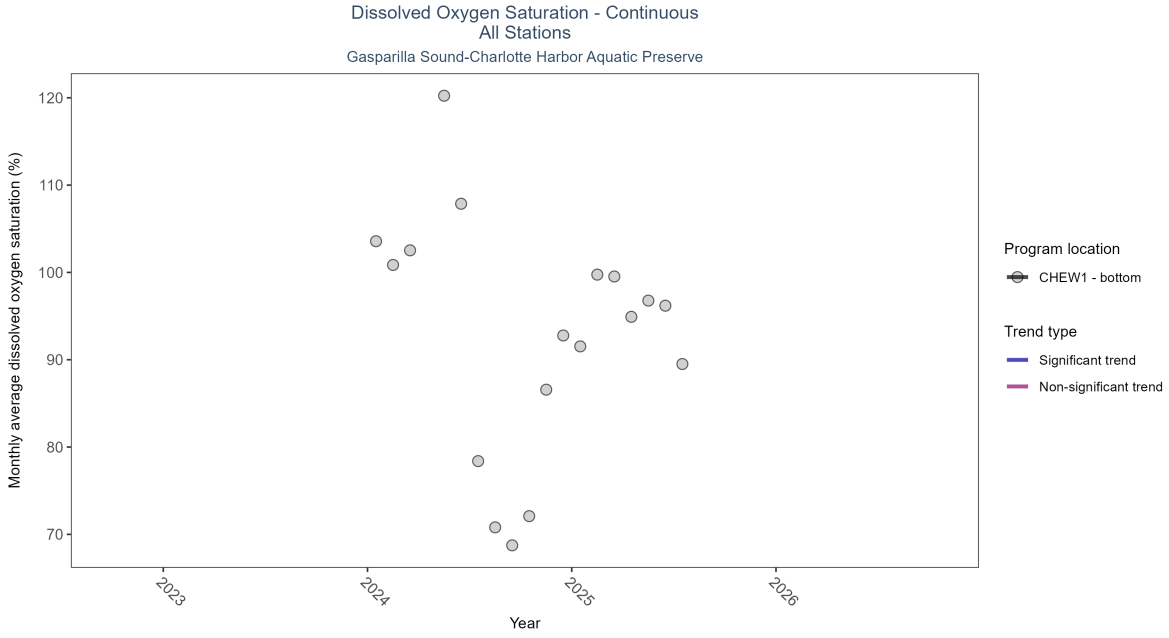

Figure 11: Scatter plot of monthly average dissolved oxygen saturation over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
CHEW1	Insufficient data to calculate trend	39704	2	2024 - 2025	89.9	-	-	-	-

There was insufficient data to fit a model for one location.

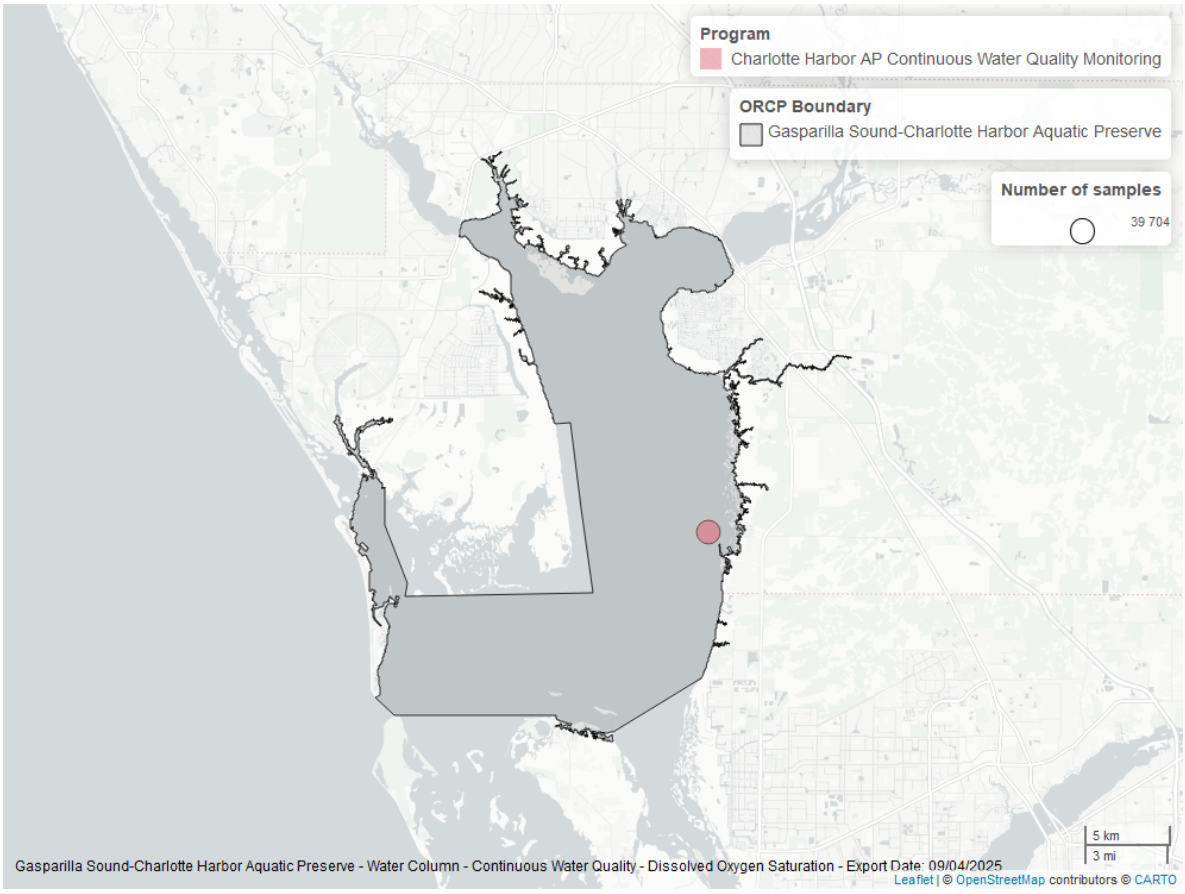

Figure 12: Map showing location of dissolved oxygen saturation continuous water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Salinity - Discrete

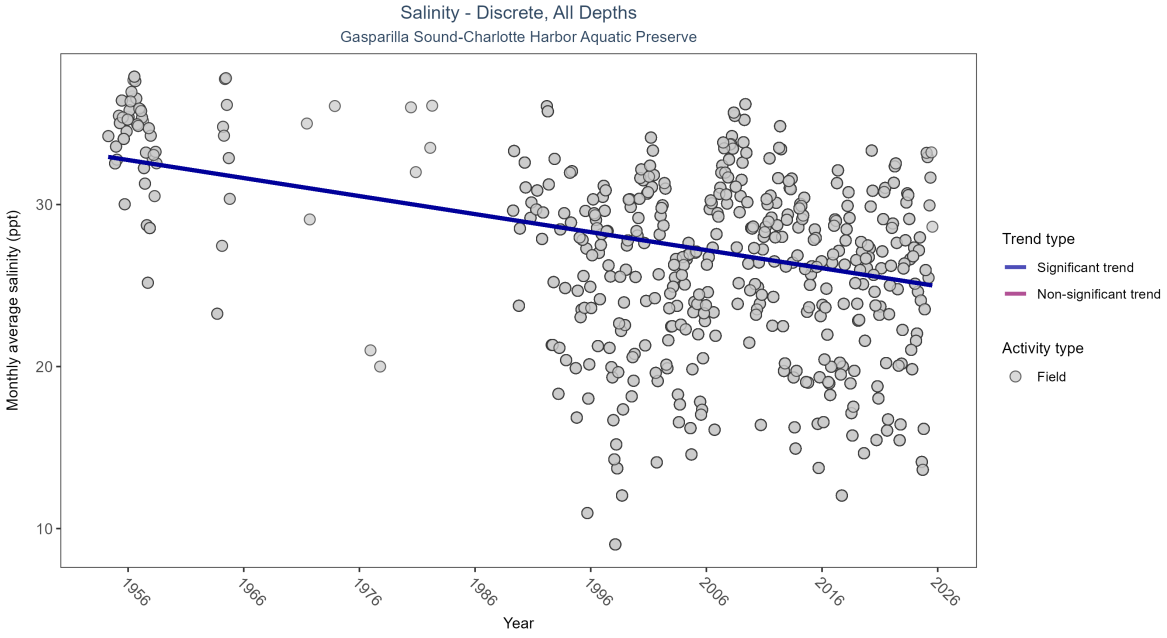

Figure 13: Scatter plot of monthly average salinity over time. If the time series included ten or more years of discrete observations, significant (blue) or non-significant (magenta) trend lines are also shown. Discrete salinity values derived from grab samples analyzed in the field (circles) or the 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	76014	50	1954 - 2025	26.635	-0.27536	32.9701	-0.11128	0

Monthly average salinity decreased by 0.11 ppt per year.

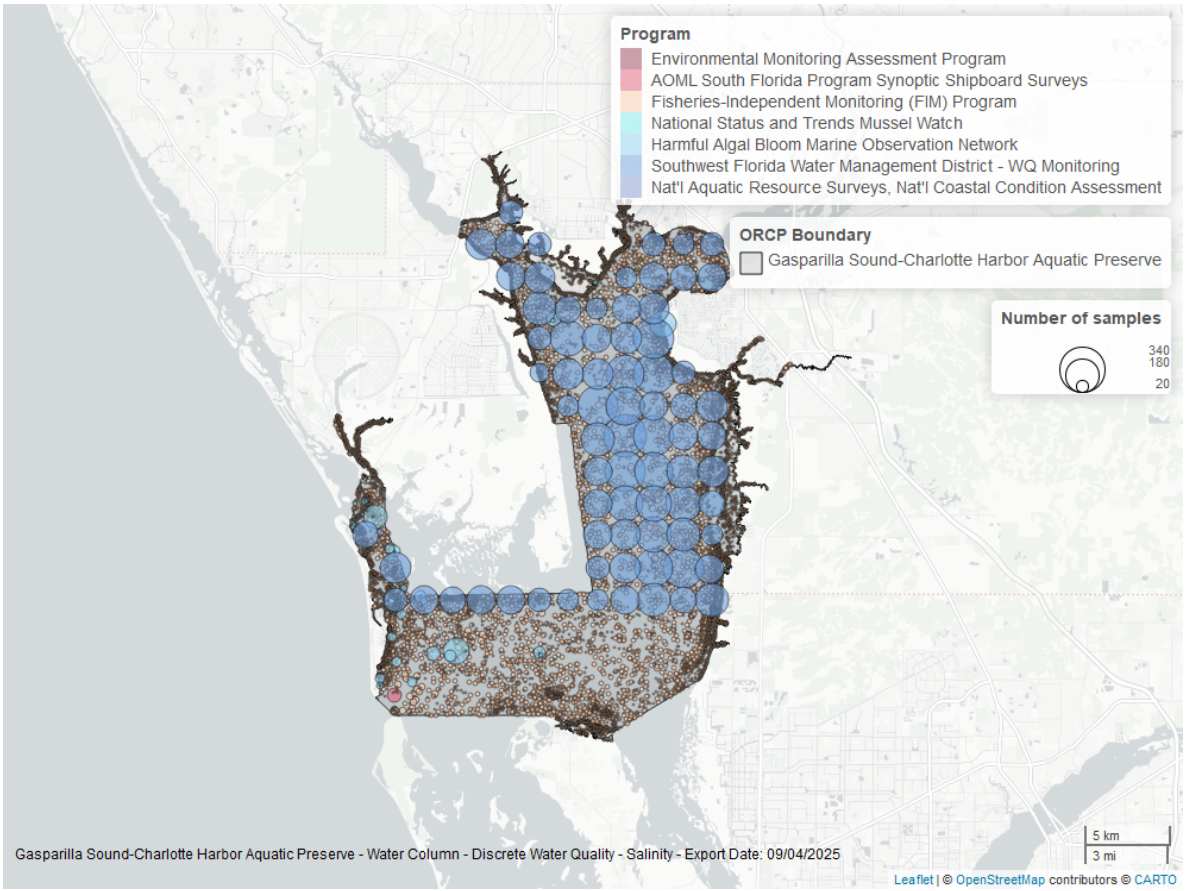

Figure 14: Map showing location of discrete water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Salinity - Continuous

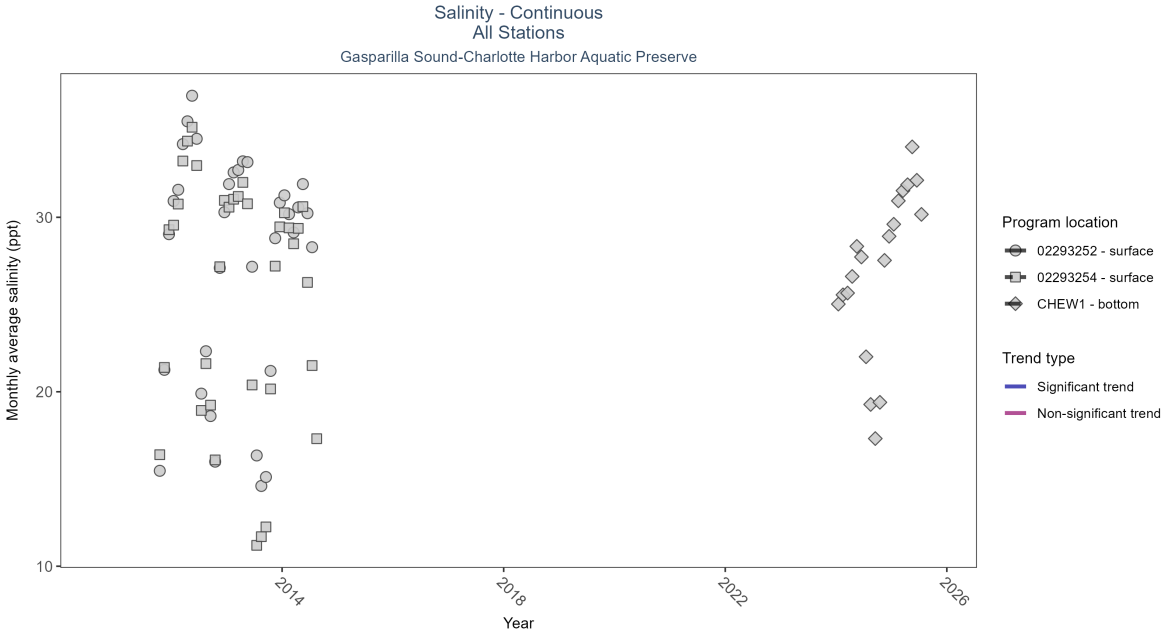

Figure 15: Scatter plot of monthly average salinity over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
02293254	Insufficient data to calculate trend	1030	4	2011 - 2014	29.0	-	-	-	-
02293252	Insufficient data to calculate trend	1002	4	2011 - 2014	30.0	-	-	-	-
CHEW1	Insufficient data to calculate trend	48346	2	2024 - 2025	27.5	-	-	-	-

There was insufficient data to fit a model for three locations.

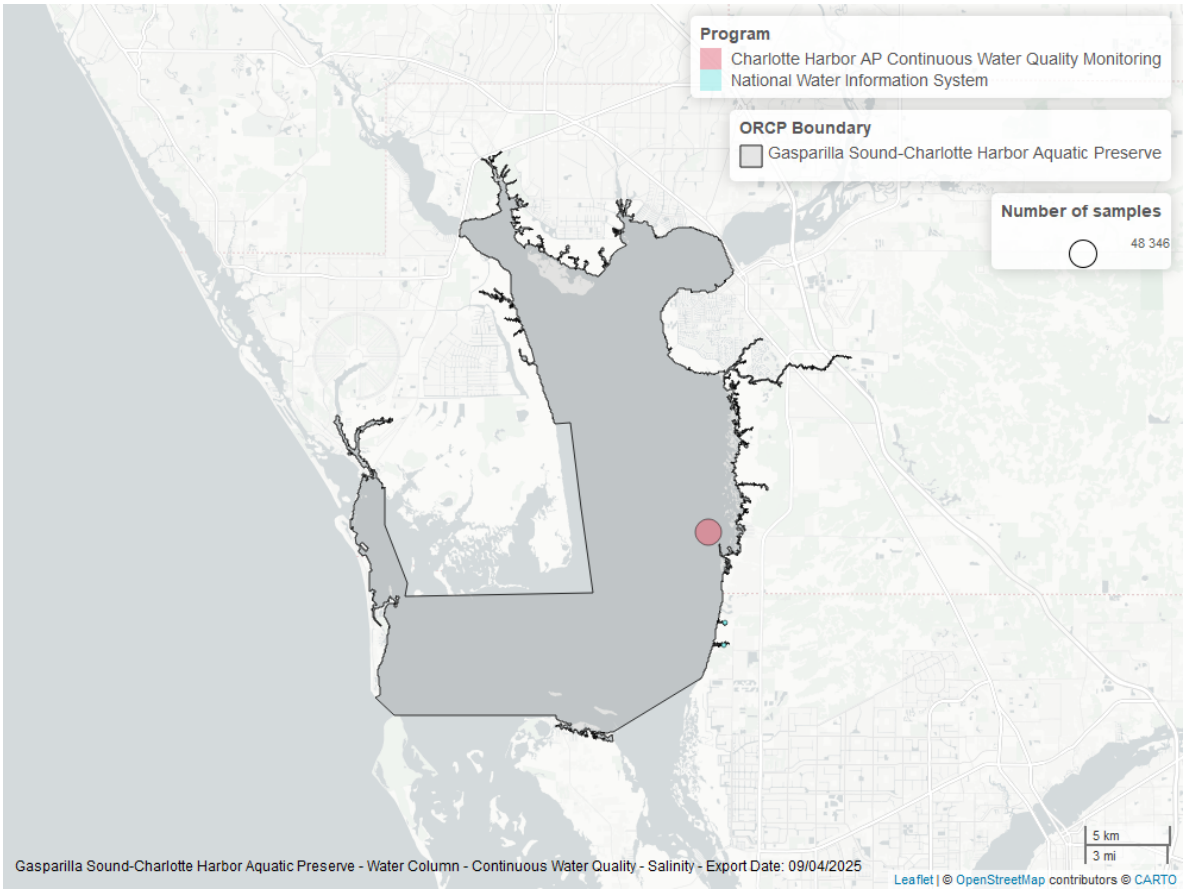

Figure 16: Map showing location of salinity continuous water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Water Temperature - Discrete

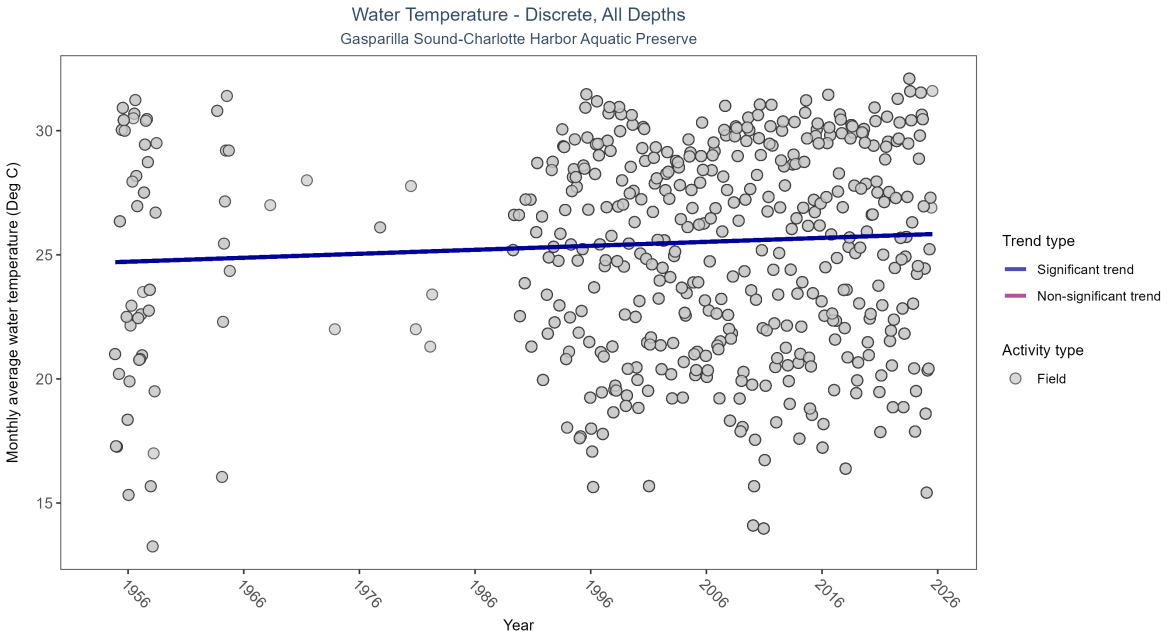

Figure 17: Scatter plot of monthly average water temperature over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only water temperature measurements taken in the field (circles) are included in 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	73705	50	1954 - 2025	26.1	0.14365	24.68864	0.01602	0

Monthly average water temperature increased by 0.02°C per year.

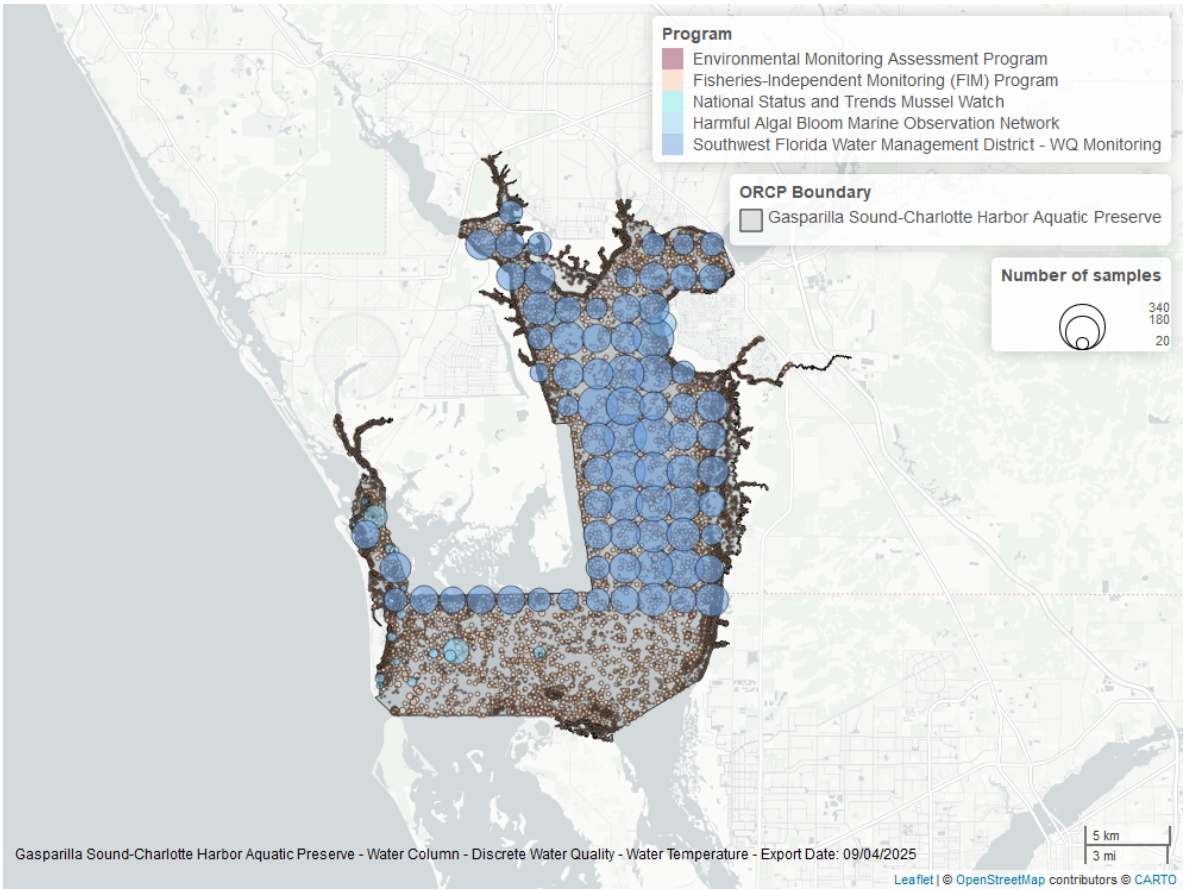

Figure 18: Map showing location of discrete water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Water Temperature - Continuous

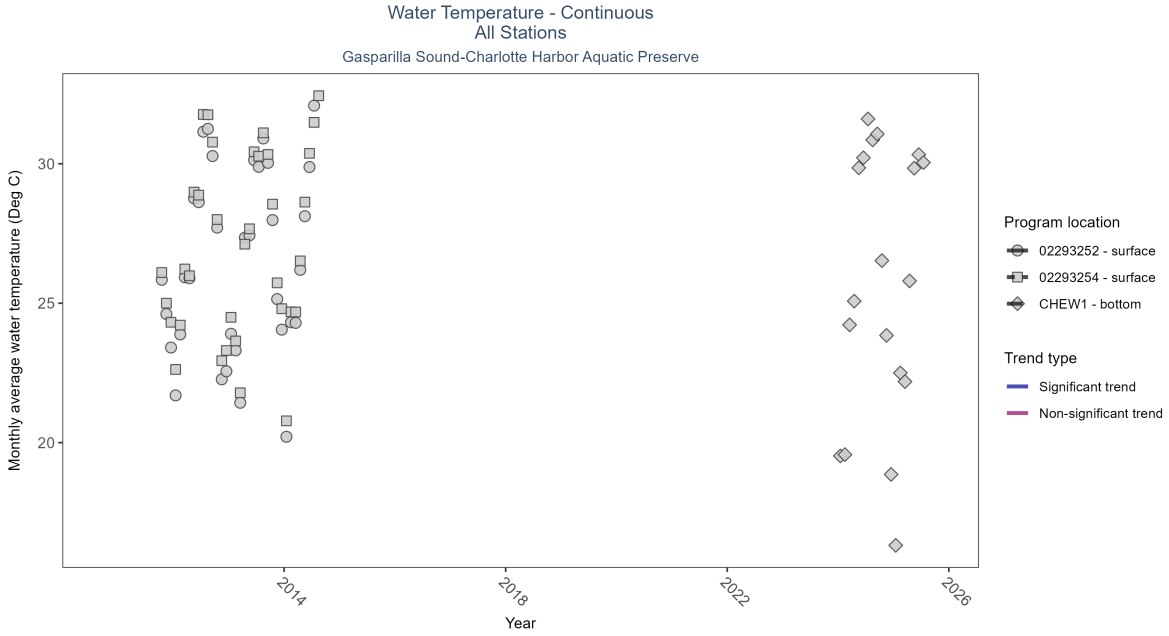

Figure 19: Scatter plot of monthly average water temperature over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
02293254	Insufficient data to calculate trend	1041	4	2011 - 2014	27.0	-	-	-	-
02293252	Insufficient data to calculate trend	1003	4	2011 - 2014	26.4	-	-	-	-
CHEW1	Insufficient data to calculate trend	48352	2	2024 - 2025	26.7	-	-	-	-

There was insufficient data to fit a model for three locations.

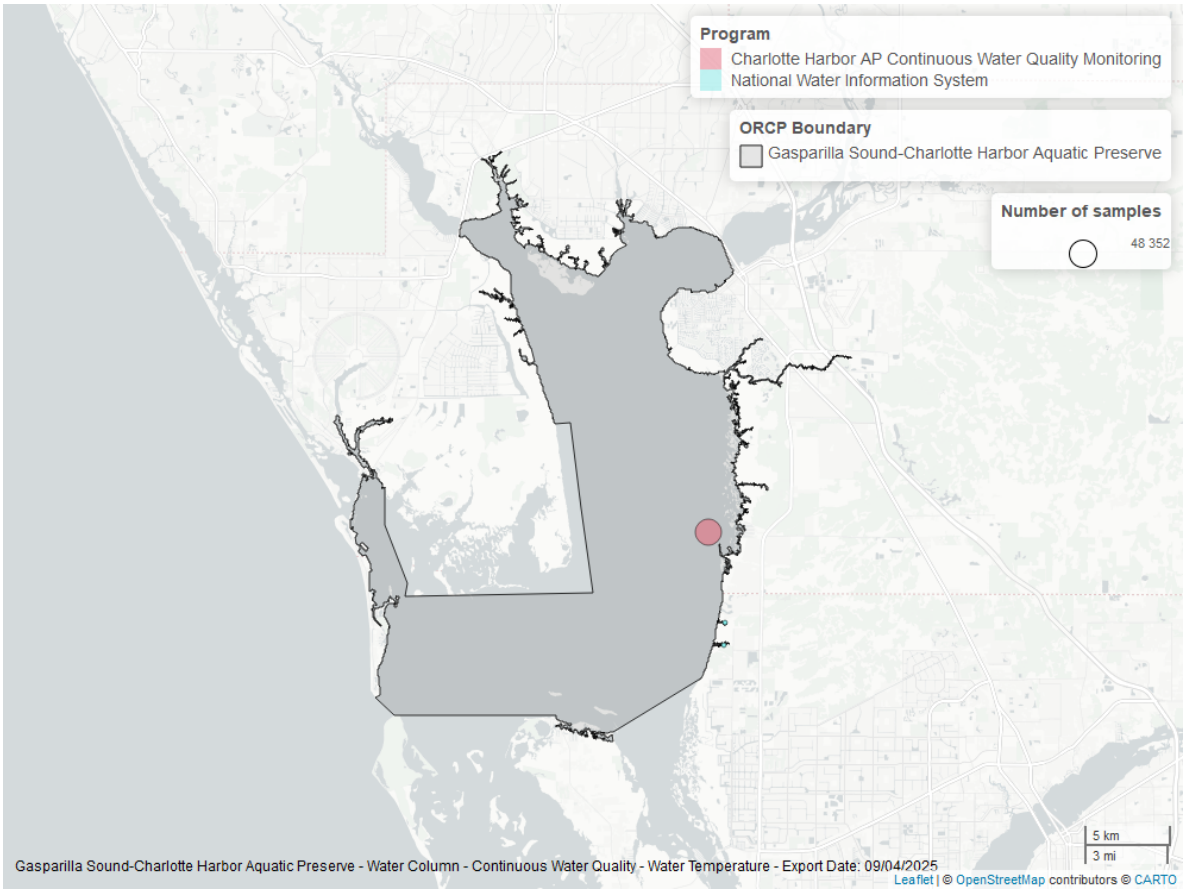

Figure 20: Map showing location of water temperature continuous water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

pH - Discrete

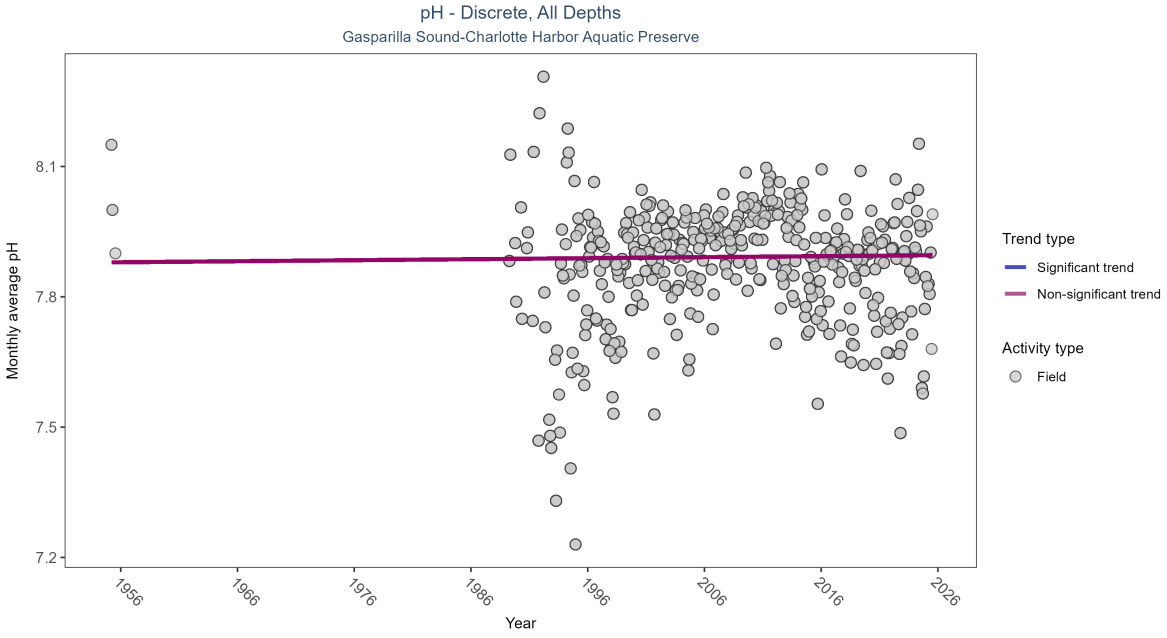

Figure 21: Scatter plot of monthly average pH over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only pH values measured in the field (circles) are included in the plot.

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	69372	38	1955 - 2025	7.9	0.01999	7.87931	0.00023	0.5775

pH showed no detectable trend between 1955 and 2025.

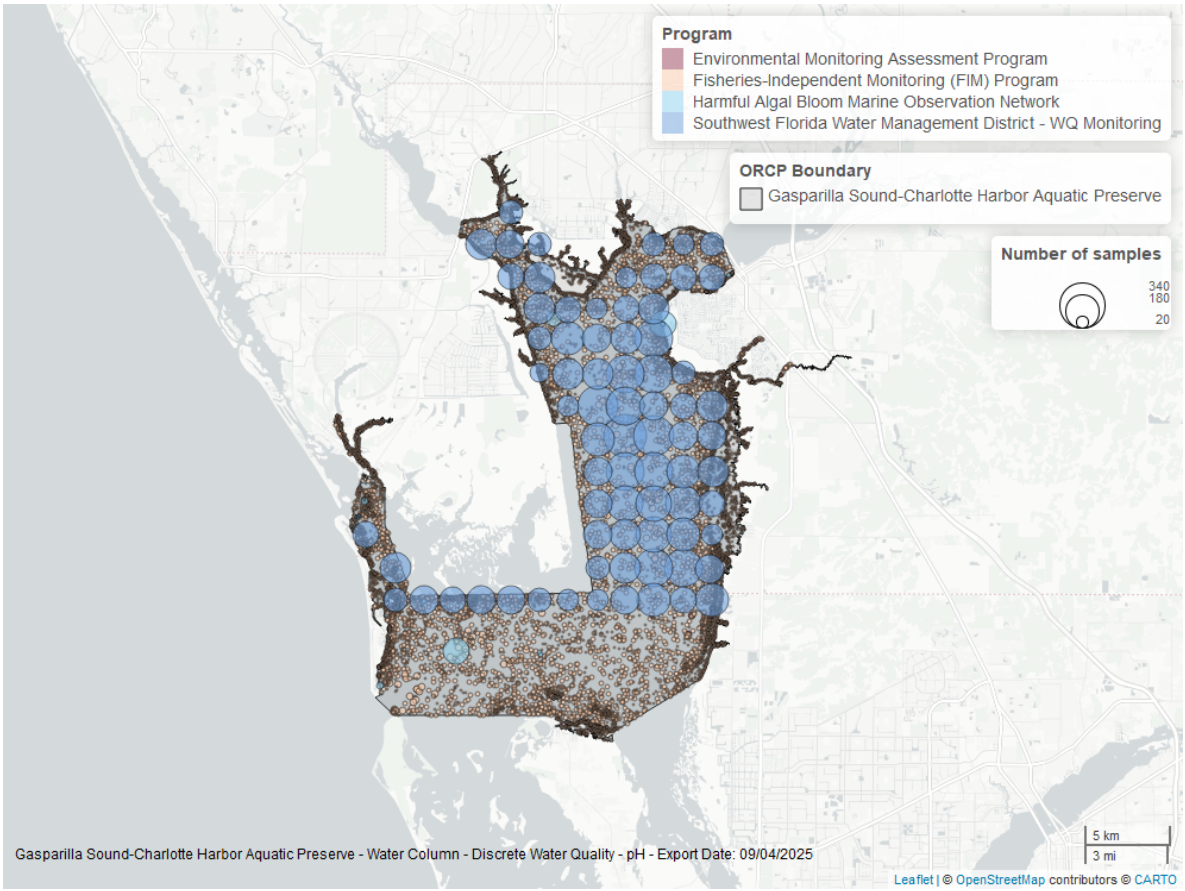

Figure 22: Map showing location of discrete water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

pH - Continuous

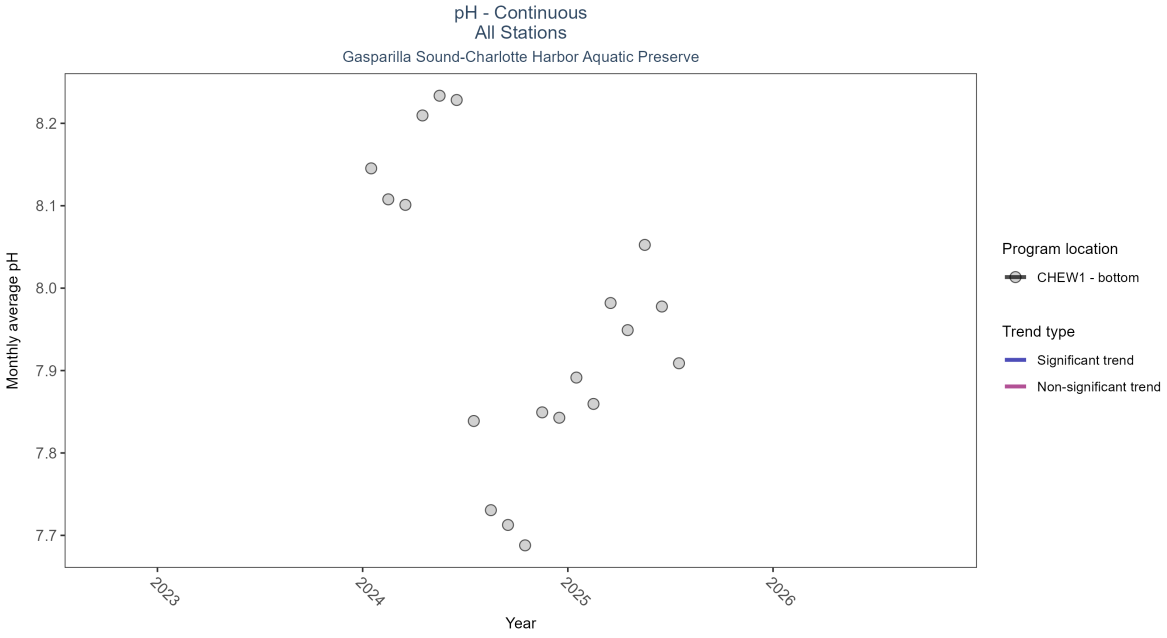

Figure 23: Scatter plot of monthly average pH over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
CHEW1	Insufficient data to calculate trend	44990	2	2024 - 2025	7.9	-	-	-	-

There was insufficient data to fit a model for one location.

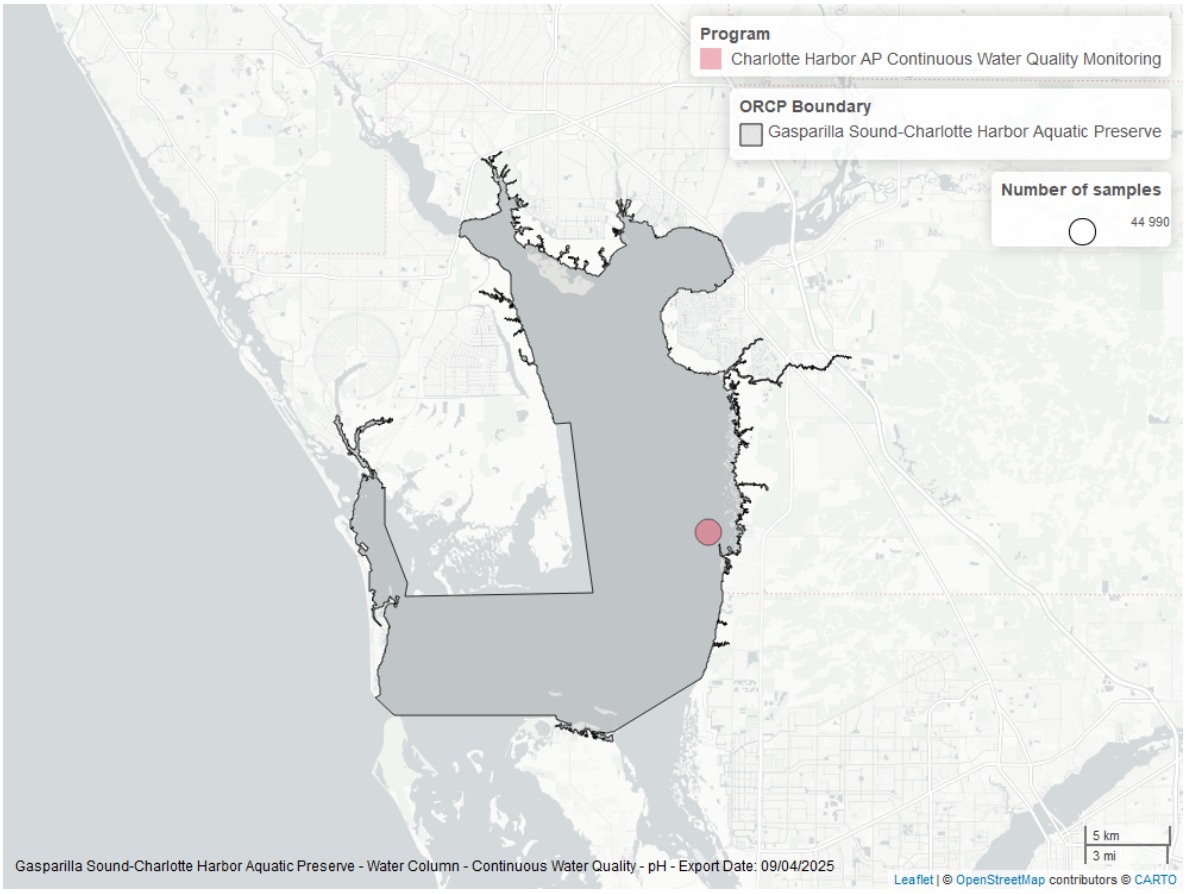

Figure 24: Map showing location of ph continuous water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Water Clarity

Turbidity - Discrete

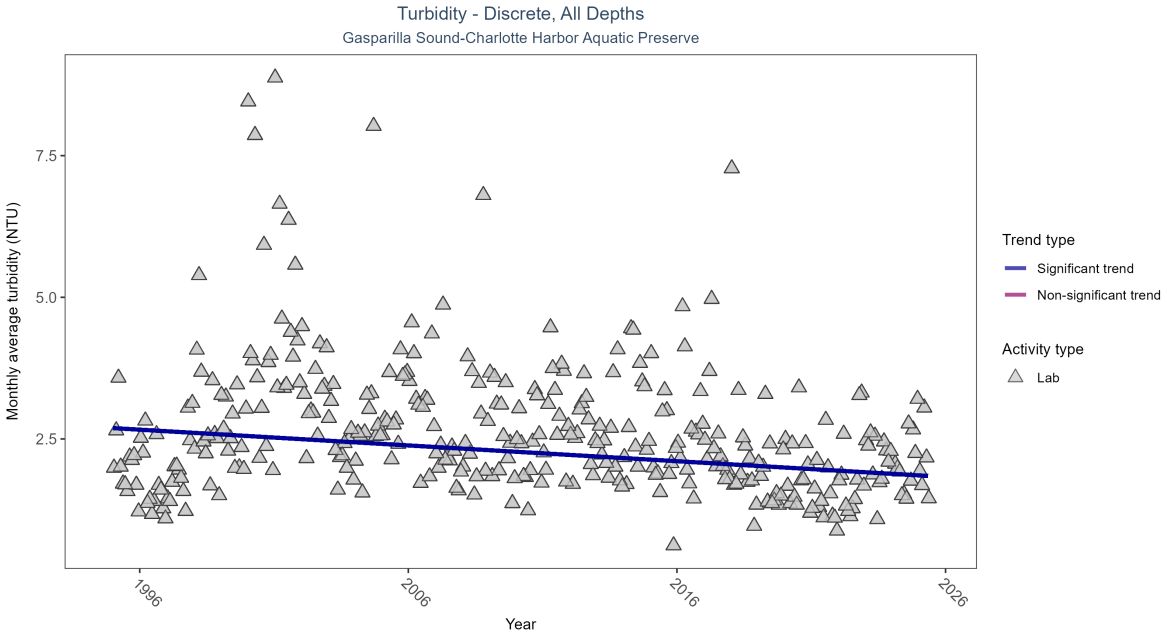

Figure 25: Scatter plot of monthly average turbidity over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only turbidity values measured in the laboratory (triangles) are included in the plot.

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 decreasing trend	12973	31	1995 - 2025	1.9	-0.19665	2.69147	-0.02782	0

Monthly average turbidity decreased by 0.03 NTU per year, indicating an increase in water clarity.

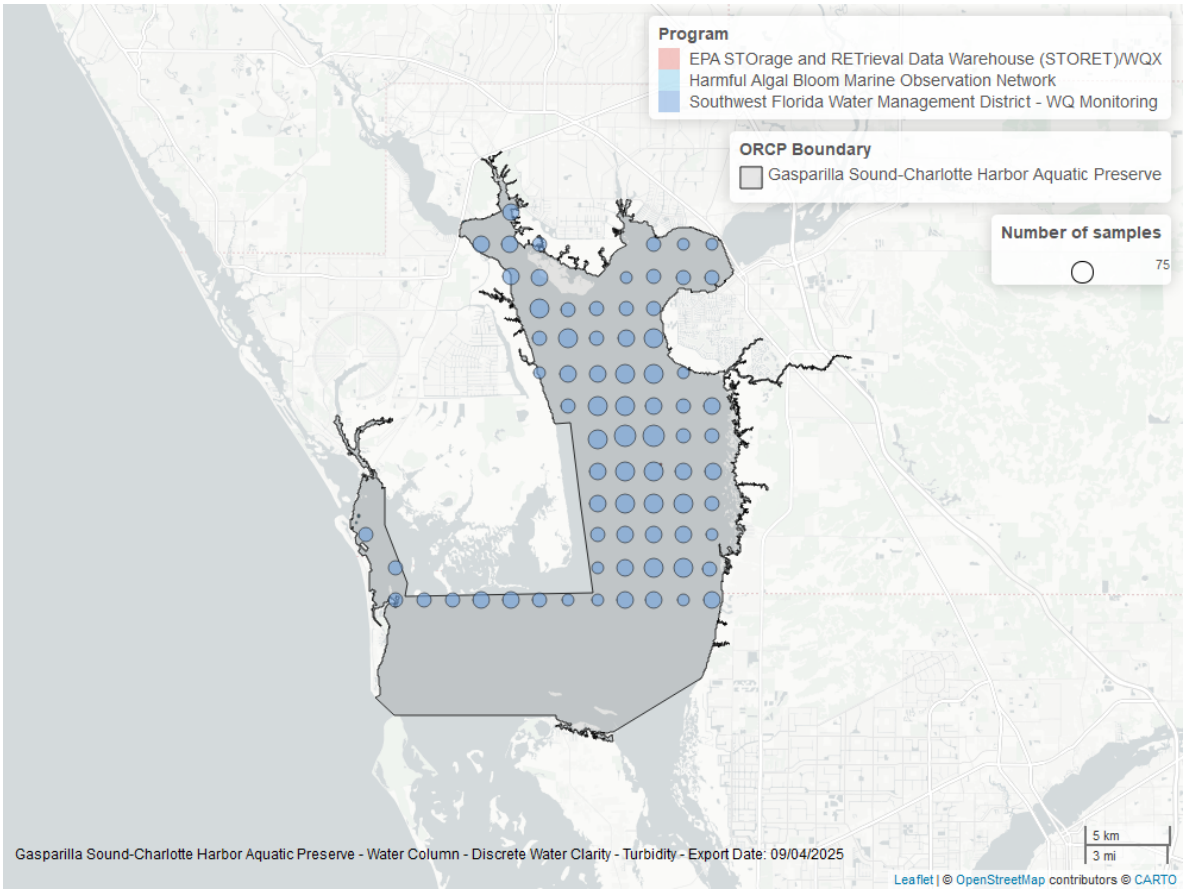

Figure 26: Map showing location of discrete water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Turbidity - Continuous

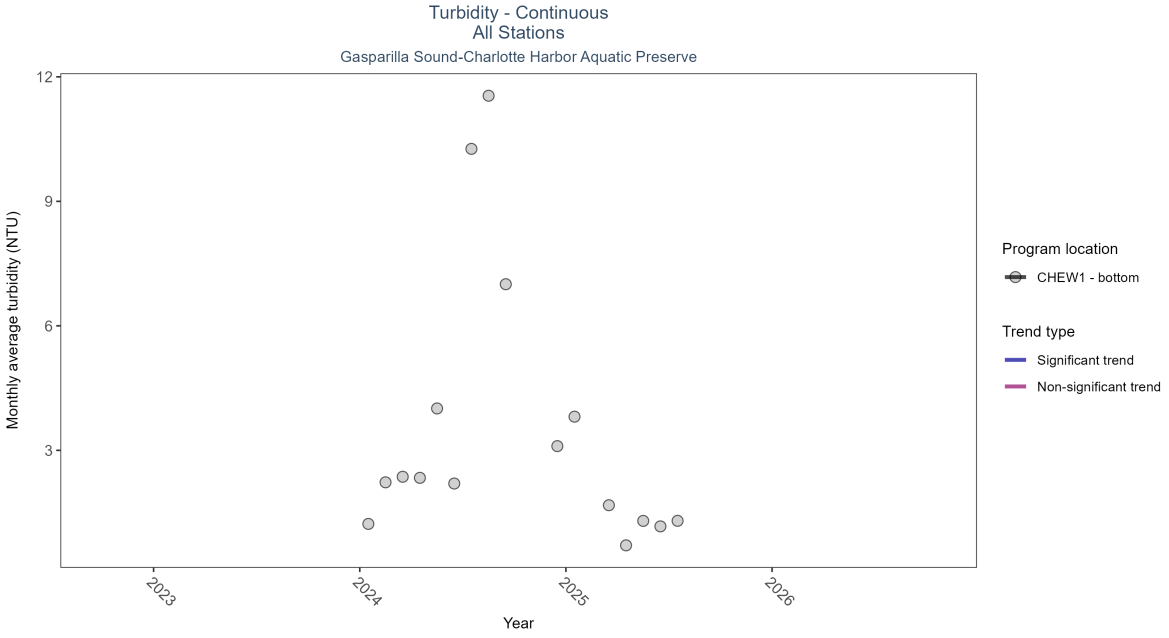

Figure 27: Scatter plot of monthly average turbidity over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
CHEW1	Insufficient data to calculate trend	33403	2	2024 - 2025	2	-	-	-	-

There was insufficient data to fit a model for one location.

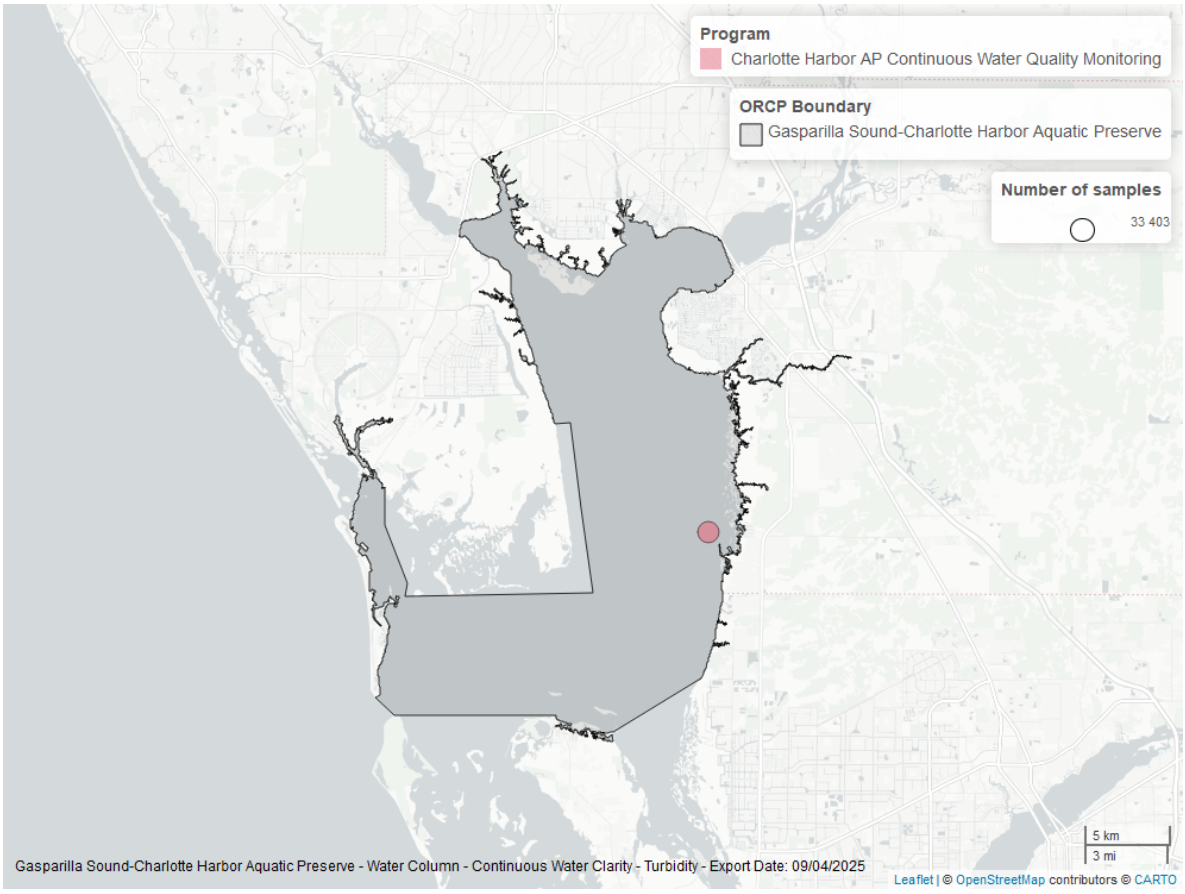

Figure 28: Map showing location of turbidity continuous water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Total Suspended Solids - Discrete

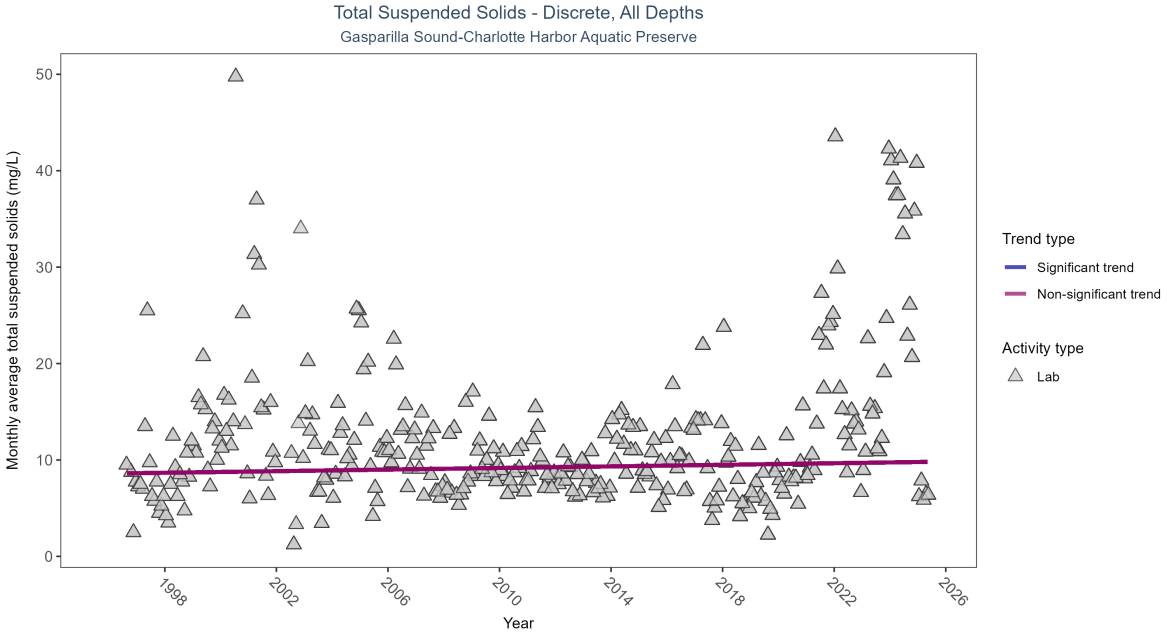

Figure 29: Scatter plot of monthly average total suspended solids (TSS) over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only TSS values obtained from laboratory analyses (triangles) are included 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	No significant trend	7310	30	1996 - 2025	7.75	0.04957	8.58862	0.04122	0.1997

Total suspended solids showed no detectable trend between 1996 and 2025.

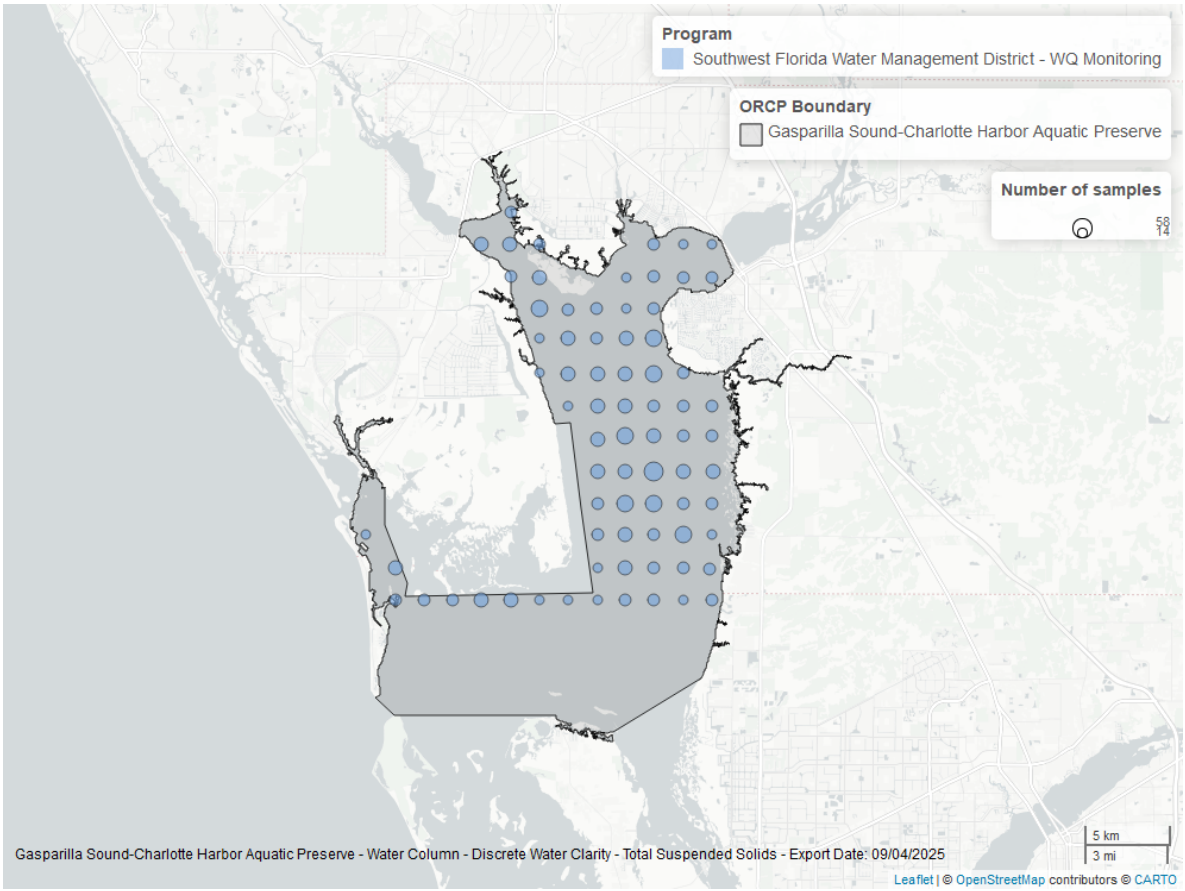

Figure 30: Map showing location of discrete water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Chlorophyll a, Uncorrected for Pheophytin - Discrete

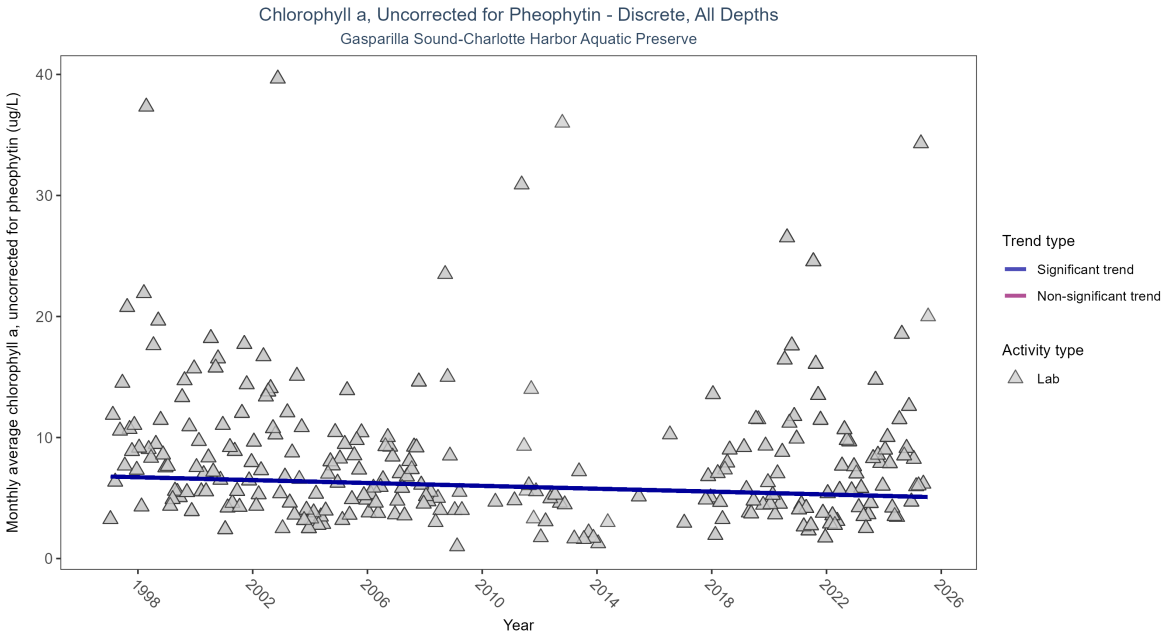

Figure 31: Scatter plot of monthly average levels of chlorophyll a, uncorrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles) 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 decreasing trend	2469	29	1997 - 2025	4.81	-0.1221	6.77682	-0.05932	0.0074

Monthly average chlorophyll a, uncorrected for pheophytin, decreased by 0.06 µg/L per year, indicating an increase in water clarity.

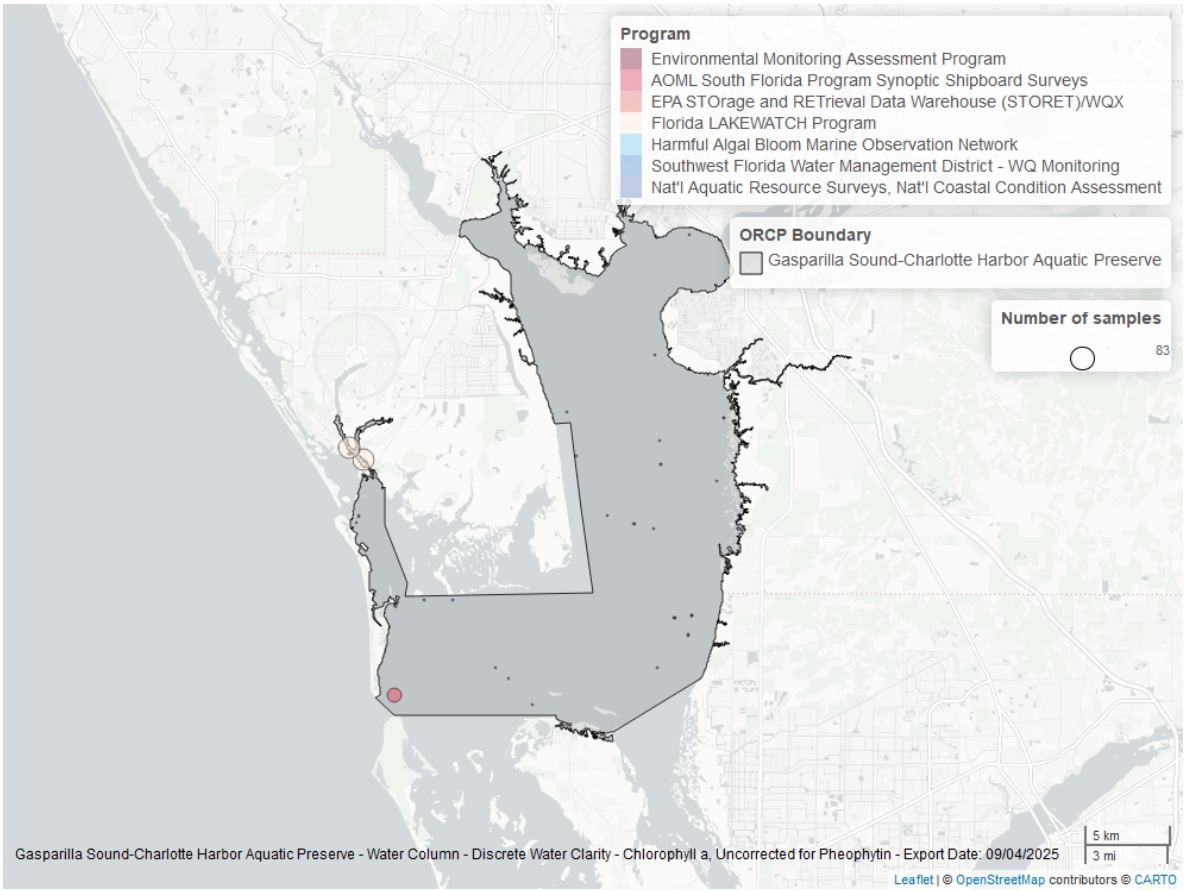

Figure 32: Map showing location of discrete water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Chlorophyll a, Corrected for Pheophytin - Discrete

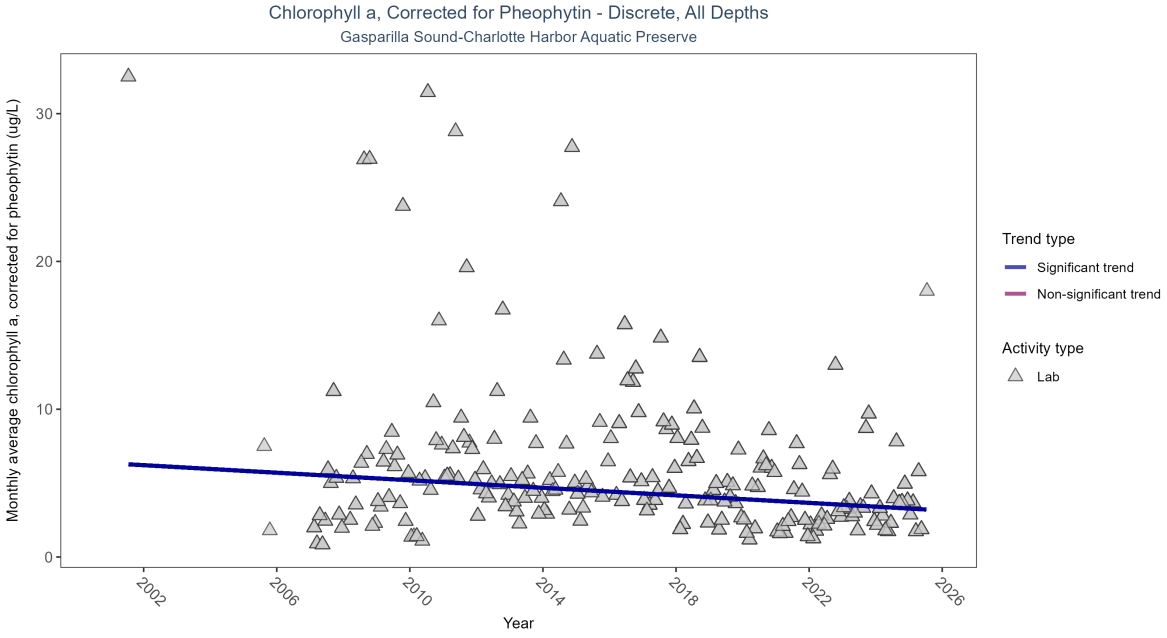

Figure 33: Scatter plot of monthly average levels of chlorophyll a, corrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles) 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 decreasing trend	2889	21	2001 - 2025	3.14	-0.18214	6.34053	-0.12751	2e-04

Monthly average chlorophyll a, corrected for pheophytin, decreased by 0.13 µg/L per year, indicating an increase in water clarity.

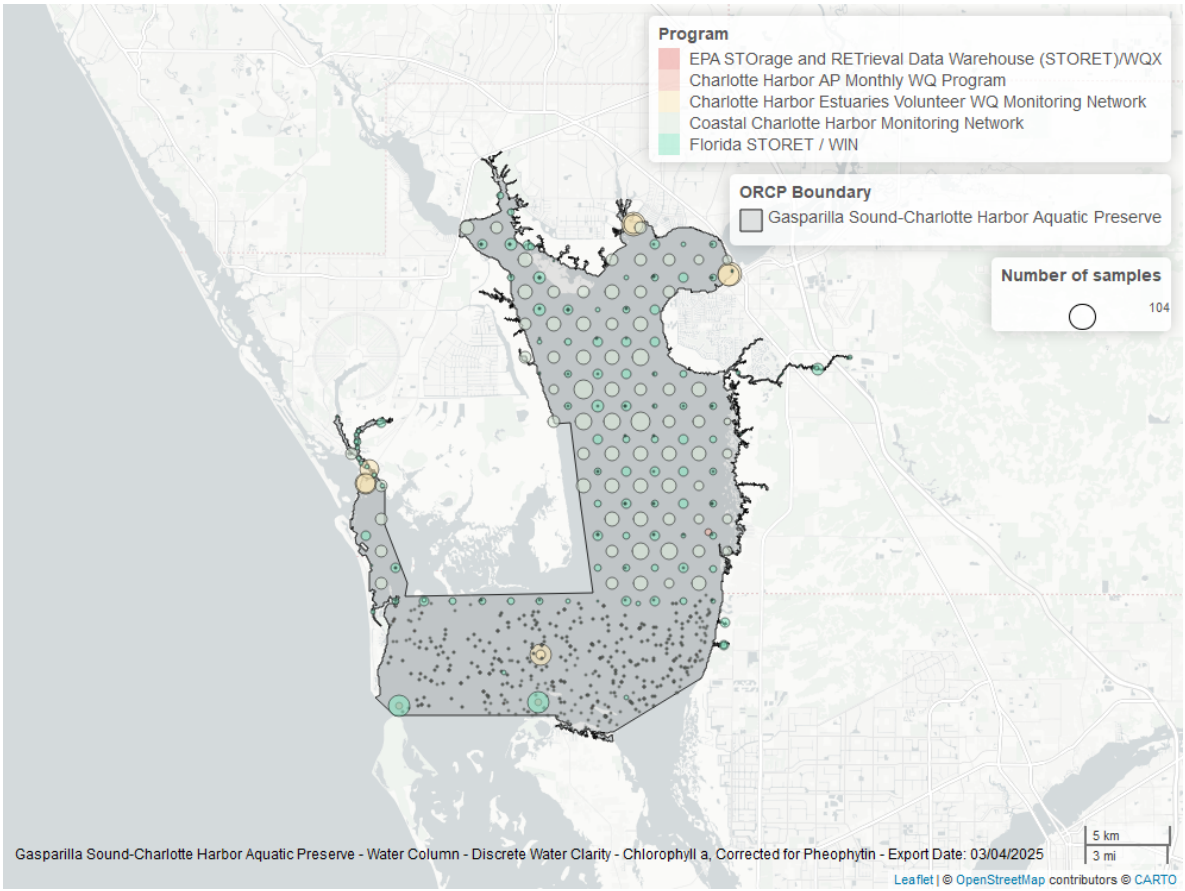

Figure 34: Map showing location of discrete water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Secchi Depth - Discrete

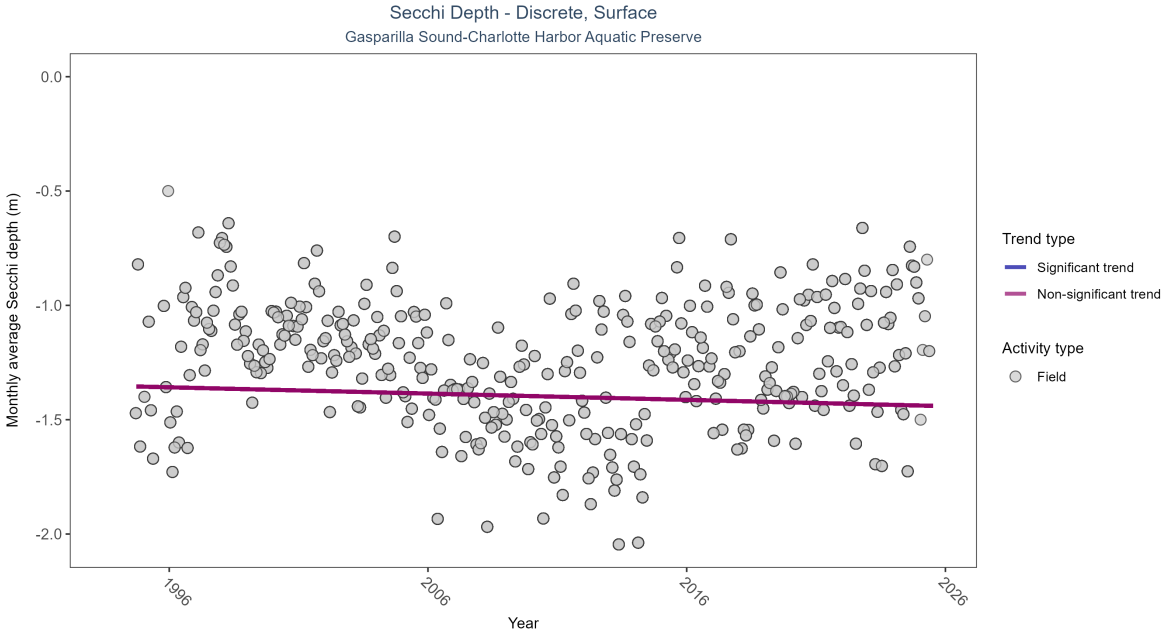

Figure 35: Scatter plot of monthly average Secchi depth over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Secchi depth is only measured in the field (circles).

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	45800	32	1994 - 2025	-1.2	-0.0458	-1.35283	-0.00275	0.2074

Secchi depth showed no detectable trend between 1994 and 2025.

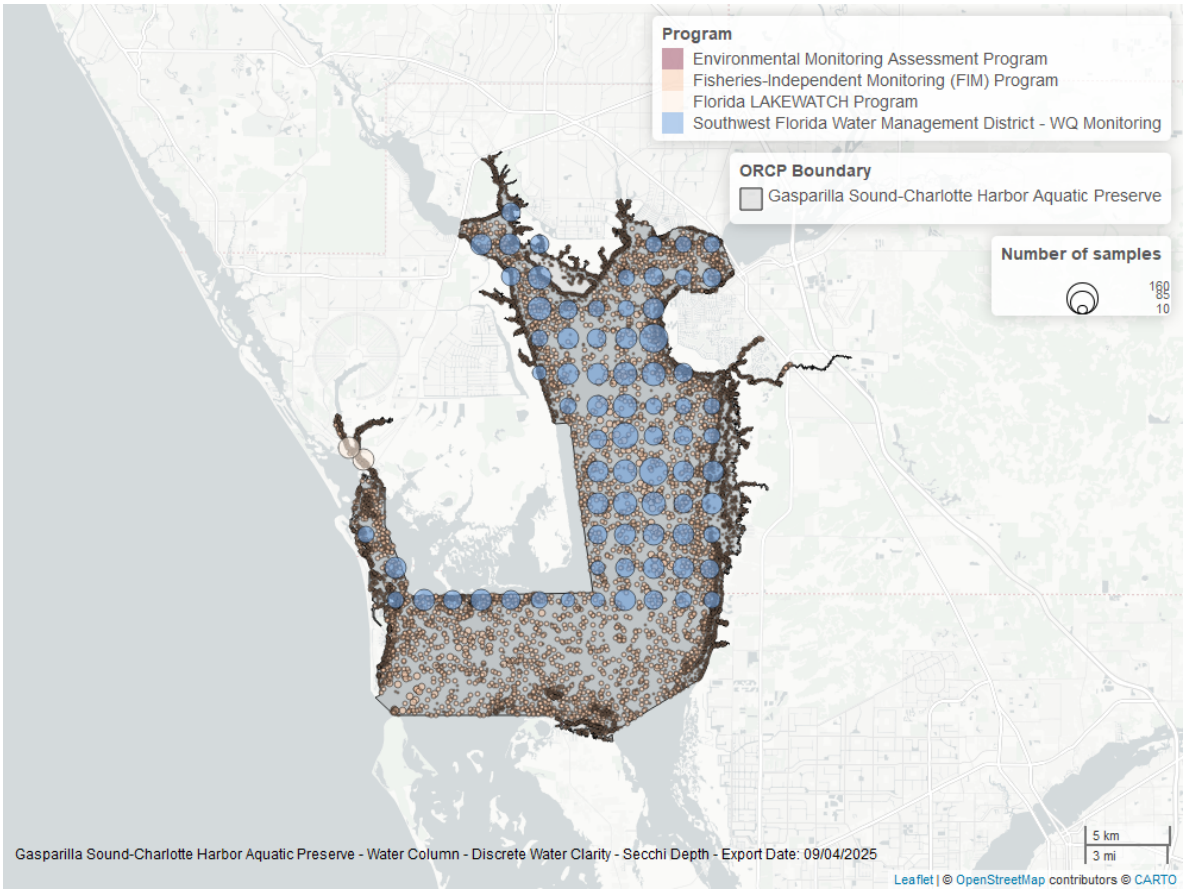

Figure 36: Map showing location of discrete water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Colored Dissolved Organic Matter - Discrete

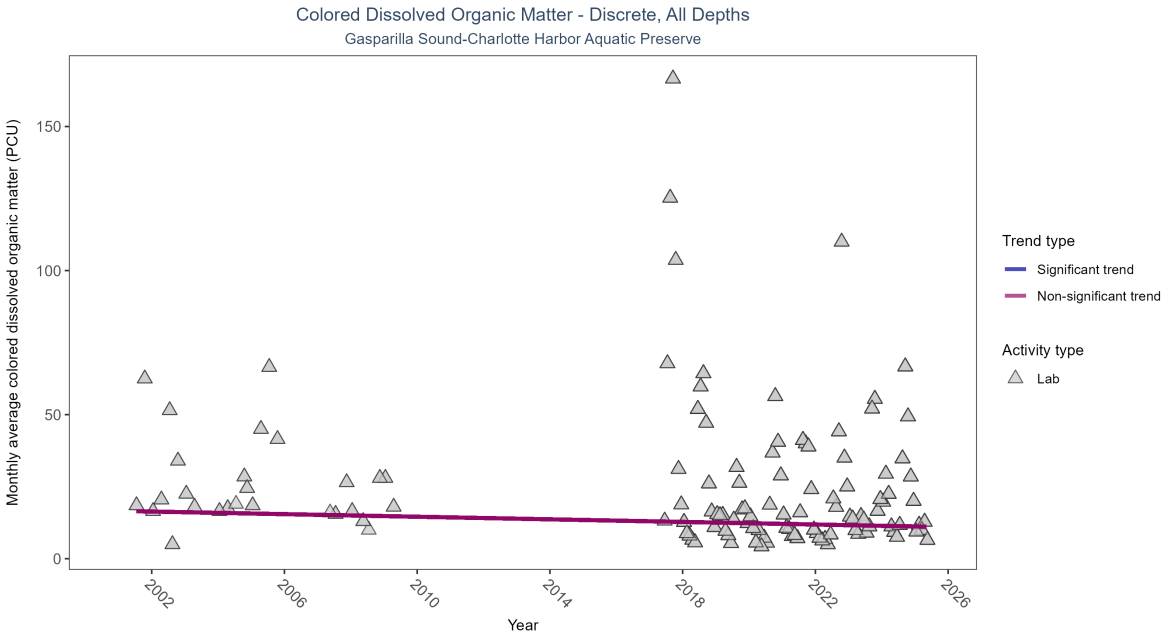

Figure 37: Scatter plot of monthly average colored dissolved organic matter (CDOM) over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed CDOM (triangles) is included in the 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	1201	17	2001 - 2025	11.7	-0.07404	16.58418	-0.22484	0.099

Colored dissolved organic matter showed no detectable trend between 2001 and 2025.

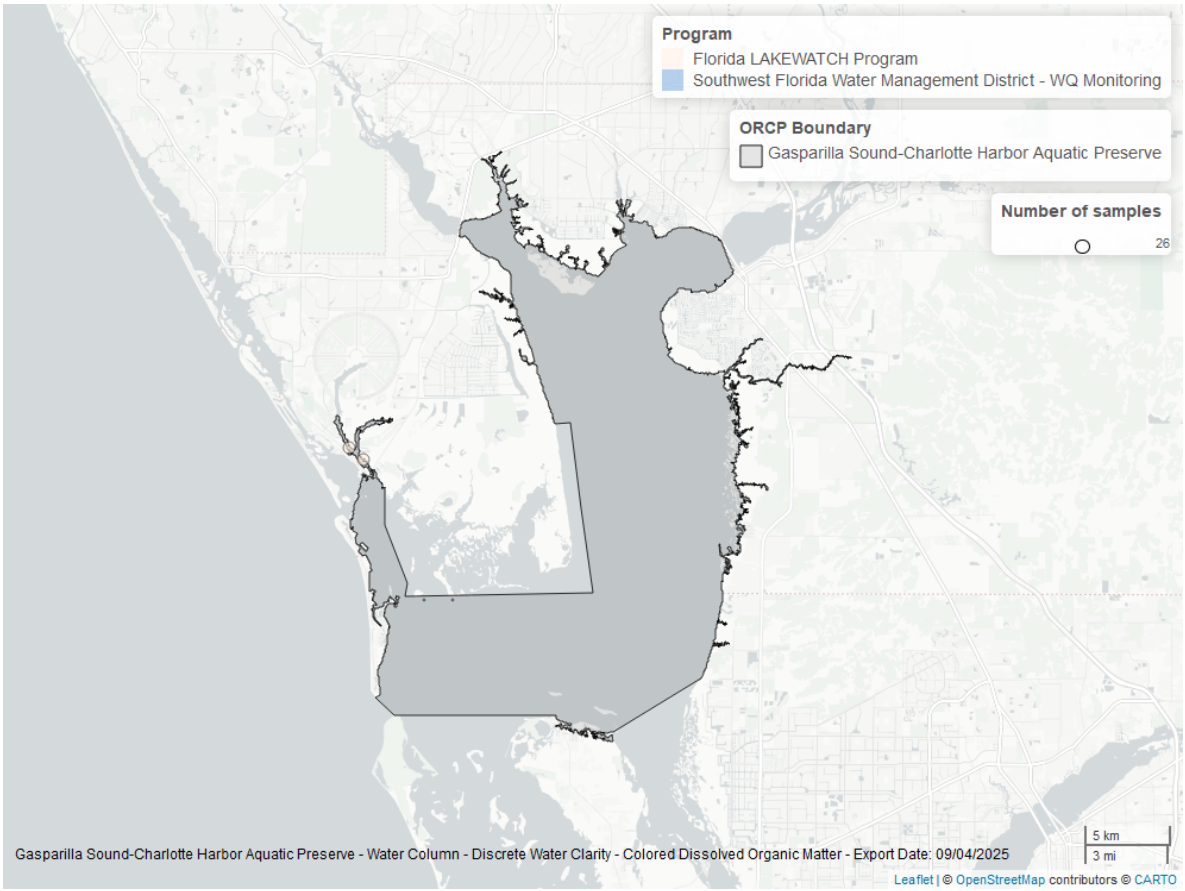

Figure 38: Map showing location of discrete water quality sampling locations within the boundaries of *Gasparilla Sound-Charlotte Harbor Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.