

Cockroach Bay Aquatic Preserve

SEACAR Water Quality Analysis

Last compiled on 30 September, 2025

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Indicators

Nutrients

Total Nitrogen - Discrete

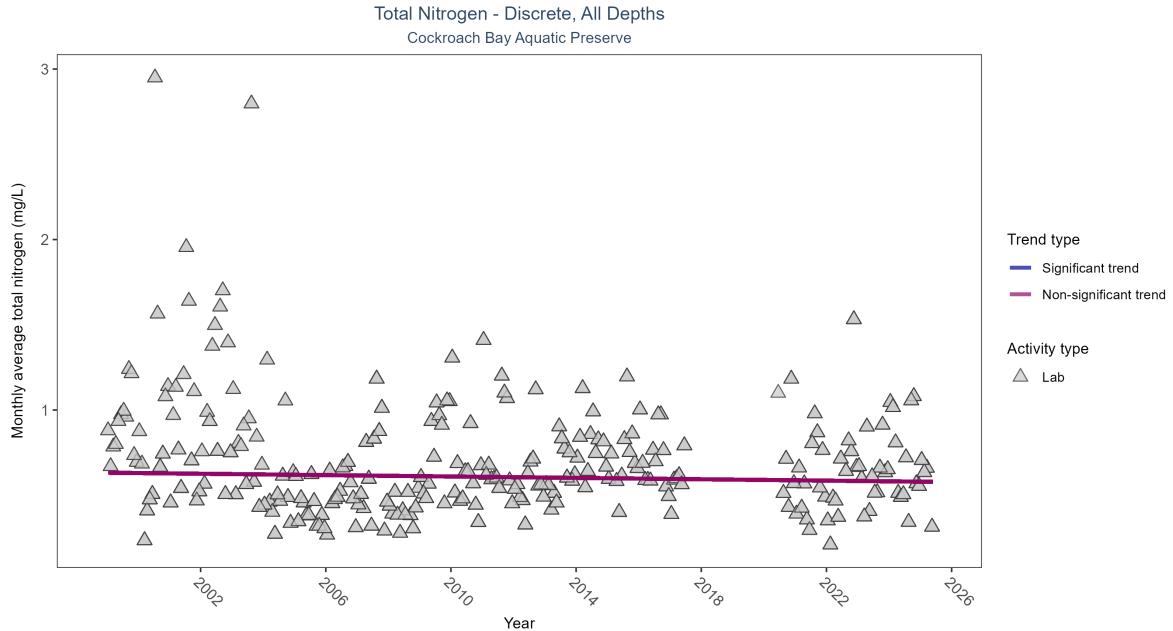


Figure 1: Scatter plot of monthly average total nitrogen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only nitrogen values obtained from laboratory analyses (triangles) are included in the 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	No significant trend	1495	25	1999 - 2025	0.619	-0.05612	0.63223	-0.00202	0.2009

Total nitrogen showed no detectable trend between 1999 and 2025.



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

Total Phosphorus - Discrete

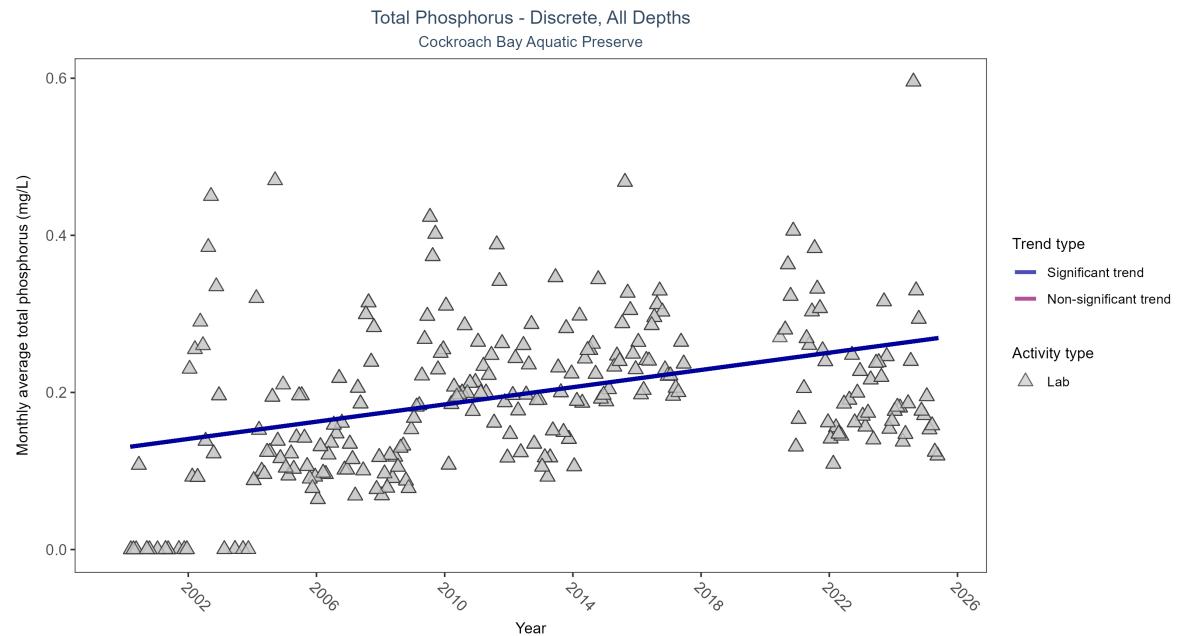


Figure 3: Scatter plot of monthly average total phosphorus over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only phosphorus values obtained from laboratory analyses (triangles) are included in 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 increasing trend	1309	24	2000 - 2025	0.201	0.31537	0.12984	0.00549	0

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



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

Water Quality

Dissolved Oxygen - Discrete

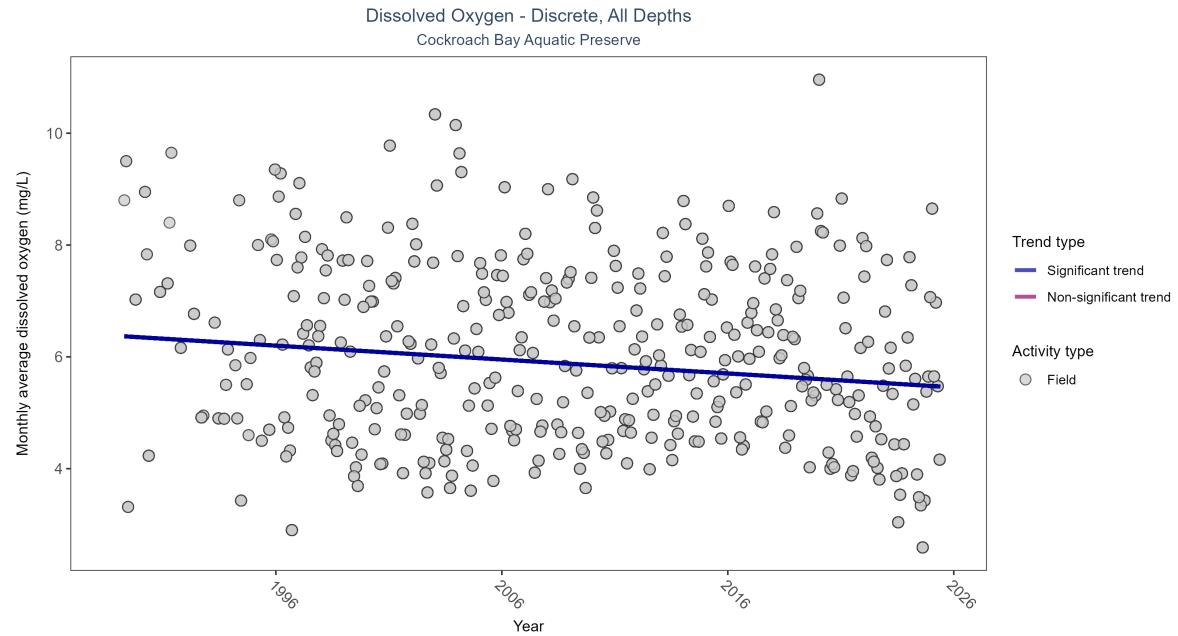


Figure 5: Scatter plot of monthly average dissolved oxygen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen values measured in the field (circles) are included in the plot.

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	26005	37	1989 - 2025	5.3	-0.18339	6.37492	-0.02486	0

Monthly average dissolved oxygen decreased by 0.02 mg/L per year.

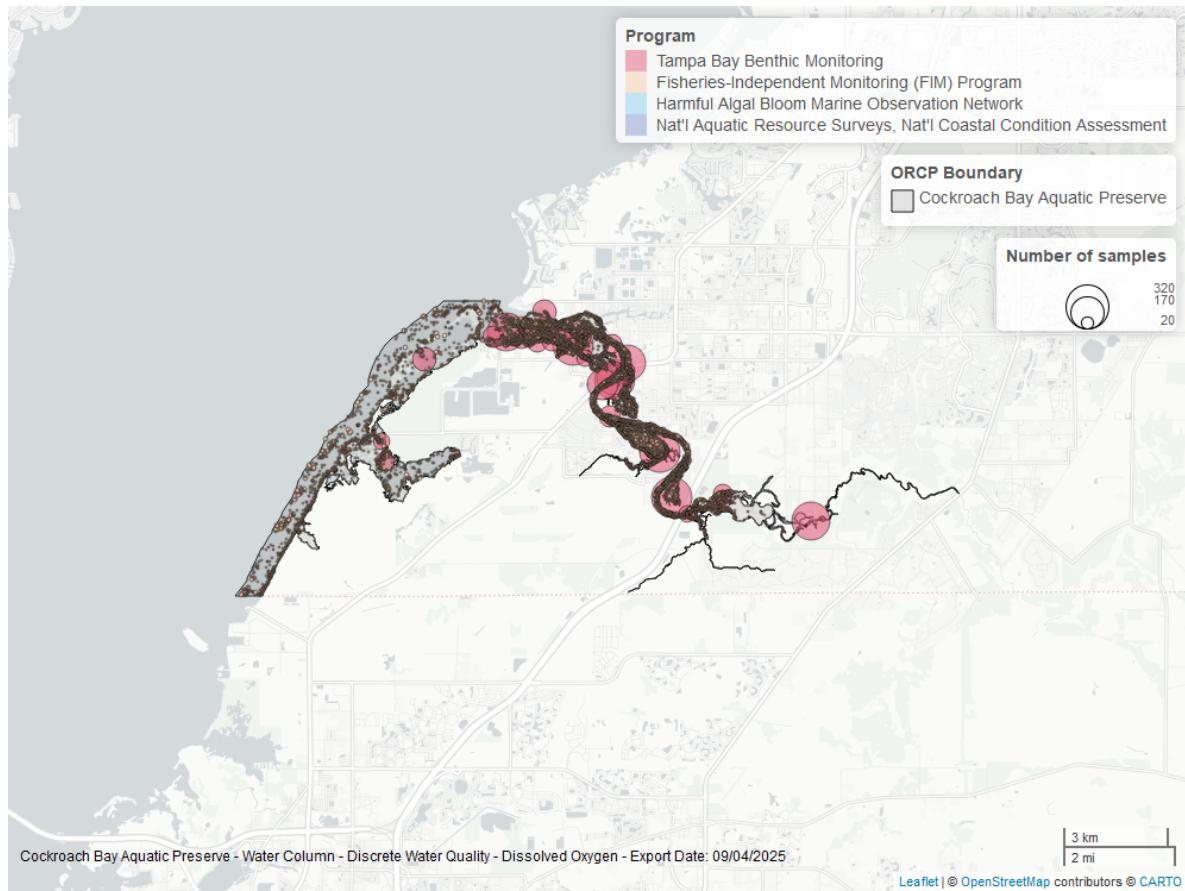


Figure 6: Map showing location of discrete water quality sampling locations within the boundaries of *Cockroach Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Dissolved Oxygen Saturation - Discrete

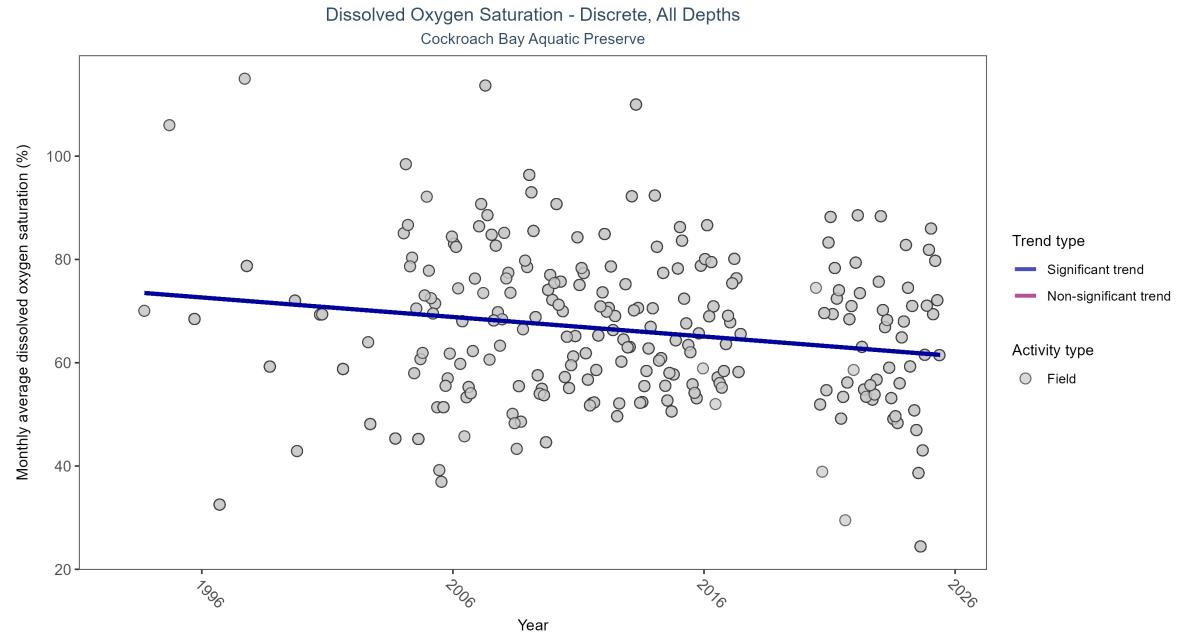


Figure 7: Scatter plot of monthly average dissolved oxygen saturation over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen saturation values measured in the field (circles) are included in the plot.

Table 4: 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 decreasing trend	11190	31	1993 - 2025	59.4	-0.17867	73.77327	-0.37812	1e-04

Monthly average dissolved oxygen saturation decreased by 0.38% per year.

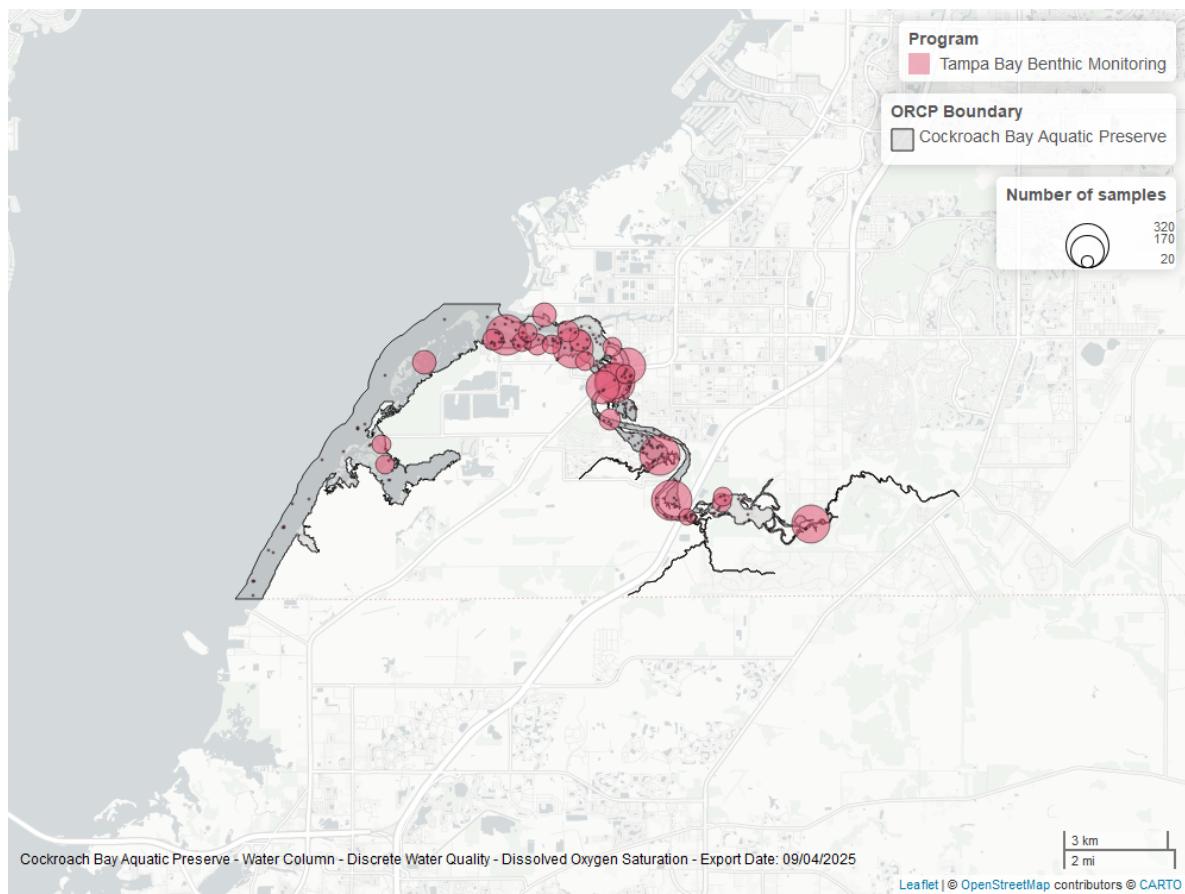


Figure 8: Map showing location of discrete water quality sampling locations within the boundaries of *Cockroach Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Salinity - Discrete

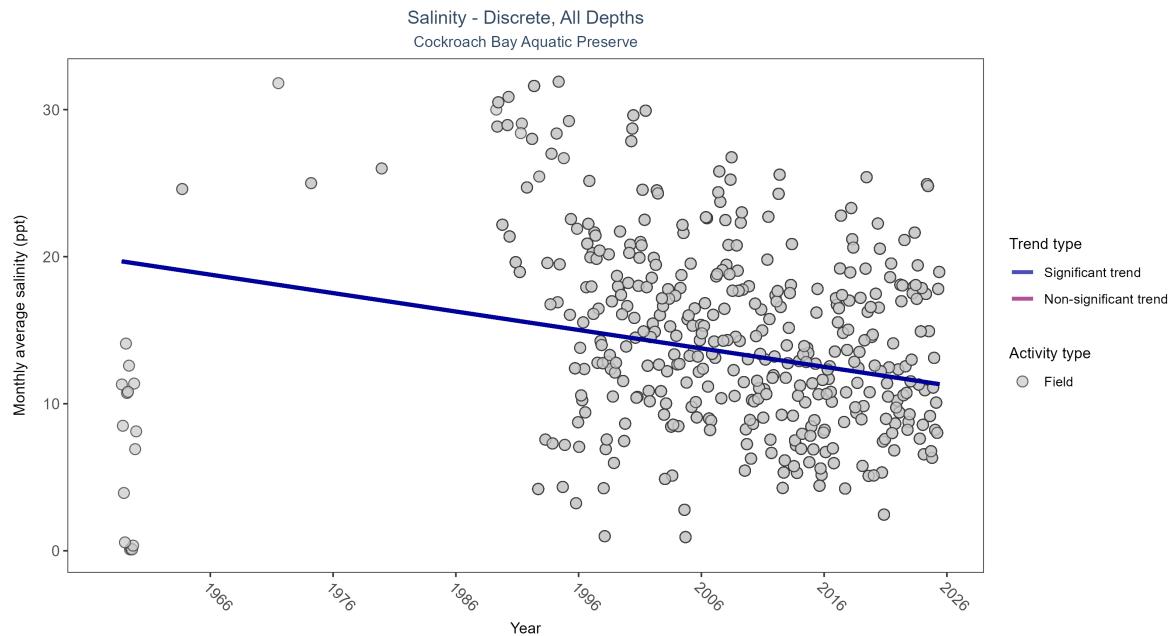


Figure 9: Scatter plot of monthly average salinity over time. If the time series included ten or more years of discrete observations, significant (blue) or non-significant (magenta) trend lines are also shown. Discrete salinity values derived from grab samples analyzed in the field (circles) or the laboratory (triangles) are both included in the plot.

Table 5: 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	26040	43	1958 - 2025	12.3	-0.15295	19.78082	-0.12539	0

Monthly average salinity decreased by 0.13 ppt per year.

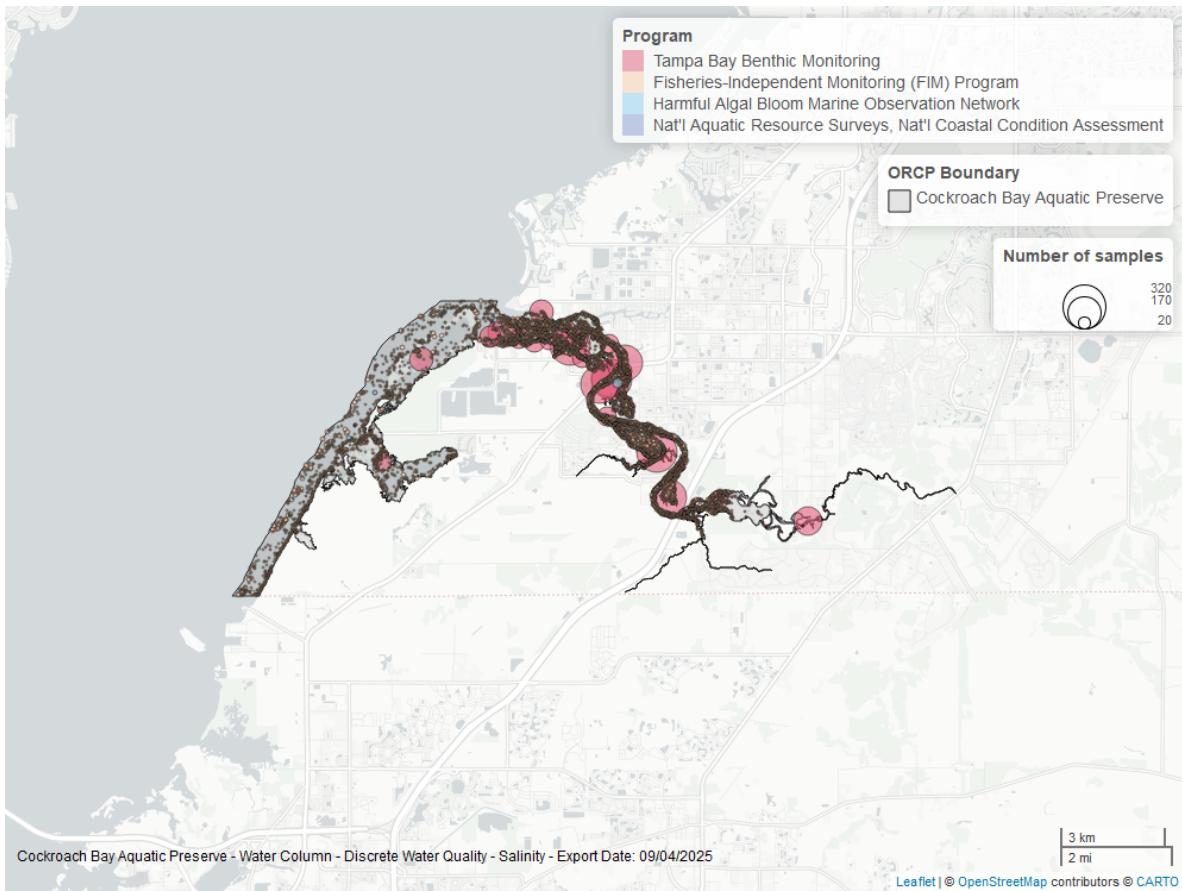


Figure 10: Map showing location of discrete water quality sampling locations within the boundaries of *Cockroach Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Water Temperature - Discrete

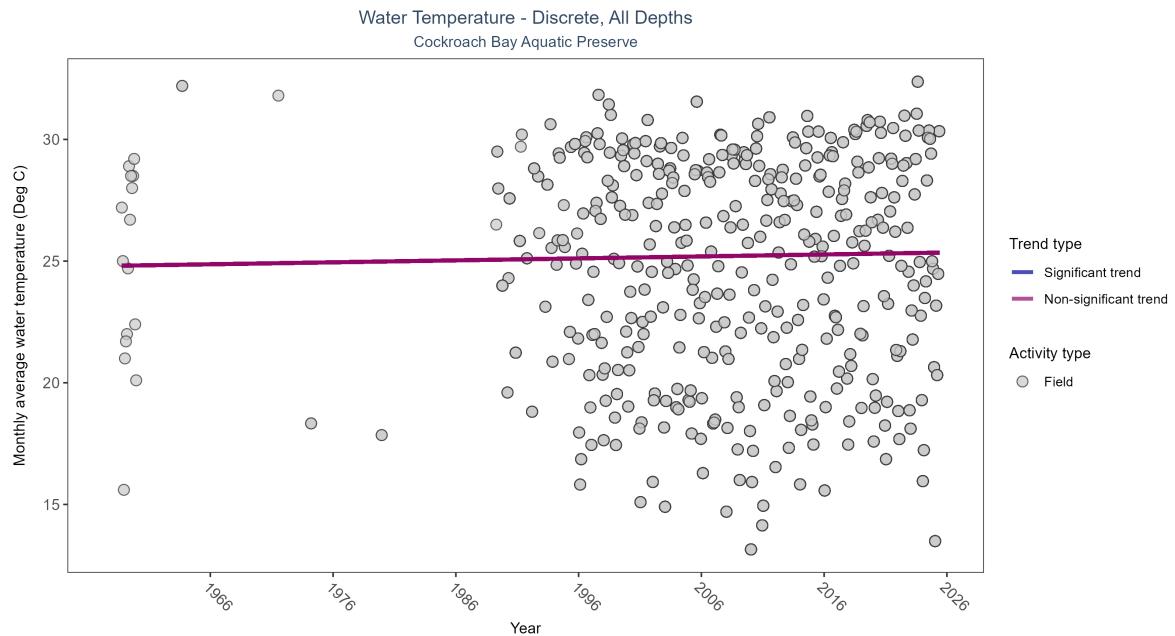


Figure 11: Scatter plot of monthly average water temperature over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only water temperature measurements taken in the field (circles) are included in the plot.

Table 6: 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	No significant trend	26264	43	1958 - 2025	26.48	0.03843	24.80452	0.00806	0.2929

Water temperature showed no detectable trend between 1958 and 2025.

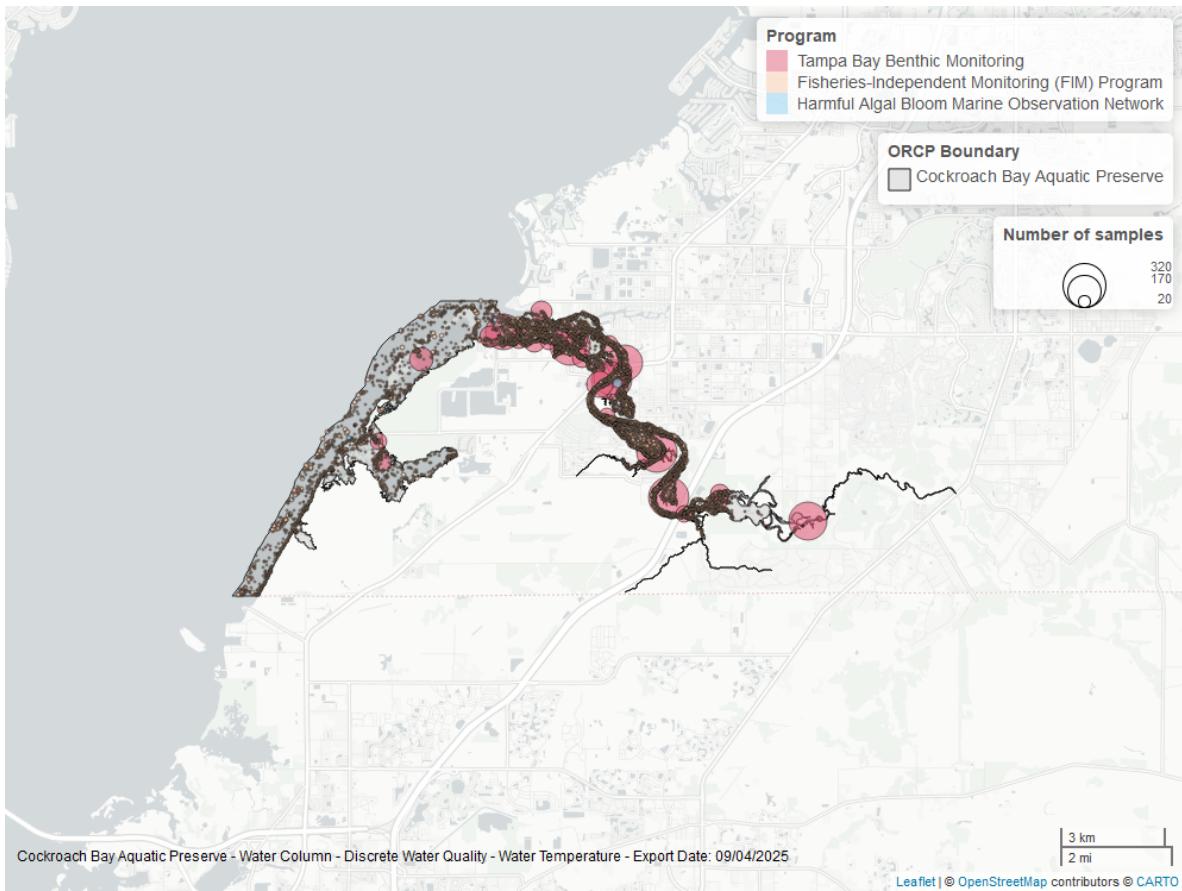


Figure 12: Map showing location of discrete water quality sampling locations within the boundaries of *Cockroach Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

pH - Discrete

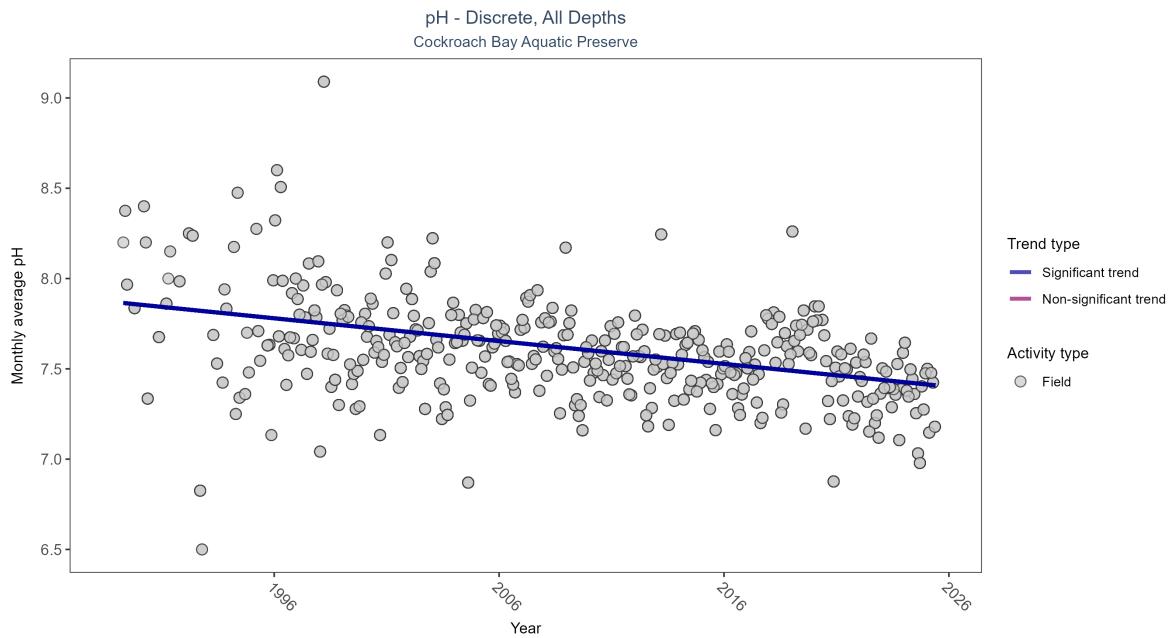


Figure 13: Scatter plot of monthly average pH over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only pH values measured in the field (circles) are included in the plot.

Table 7: 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	25181	37	1989 - 2025	7.5	-0.35255	7.86834	-0.01263	0

Monthly average pH decreased by 0.01 pH units per year.



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

Water Clarity

Turbidity - Discrete

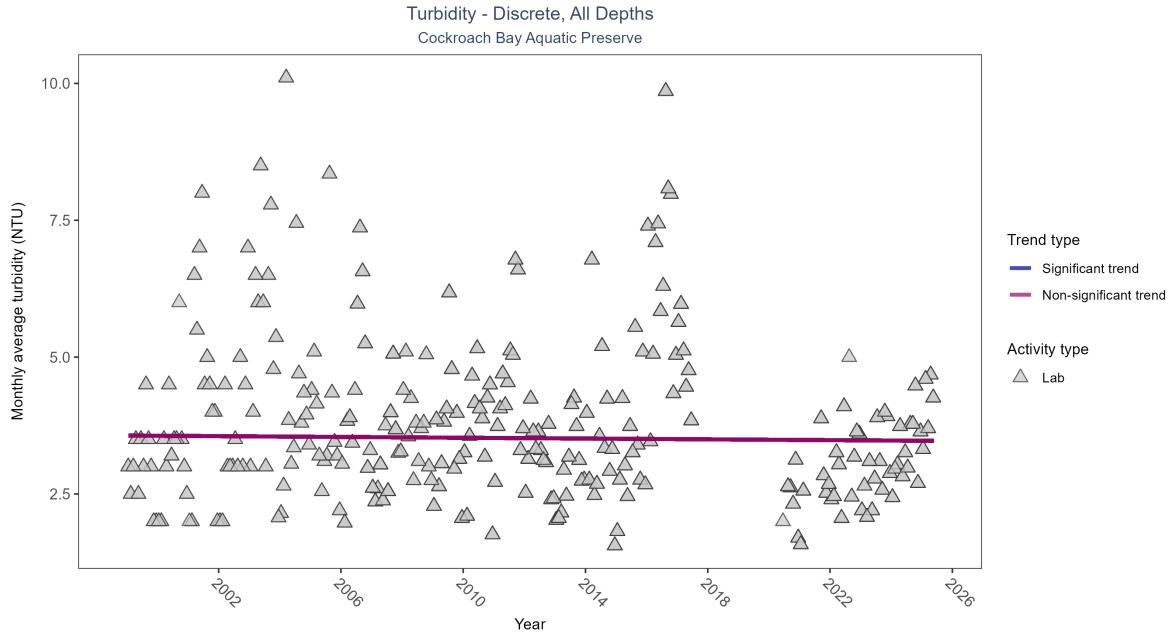


Figure 15: Scatter plot of monthly average turbidity over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only turbidity values measured in the laboratory (triangles) are included in the plot.

Table 8: 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	1074	25	1999 - 2025	3.1	-0.02161	3.56726	-0.00364	0.6335

Turbidity showed no detectable trend between 1999 and 2025.

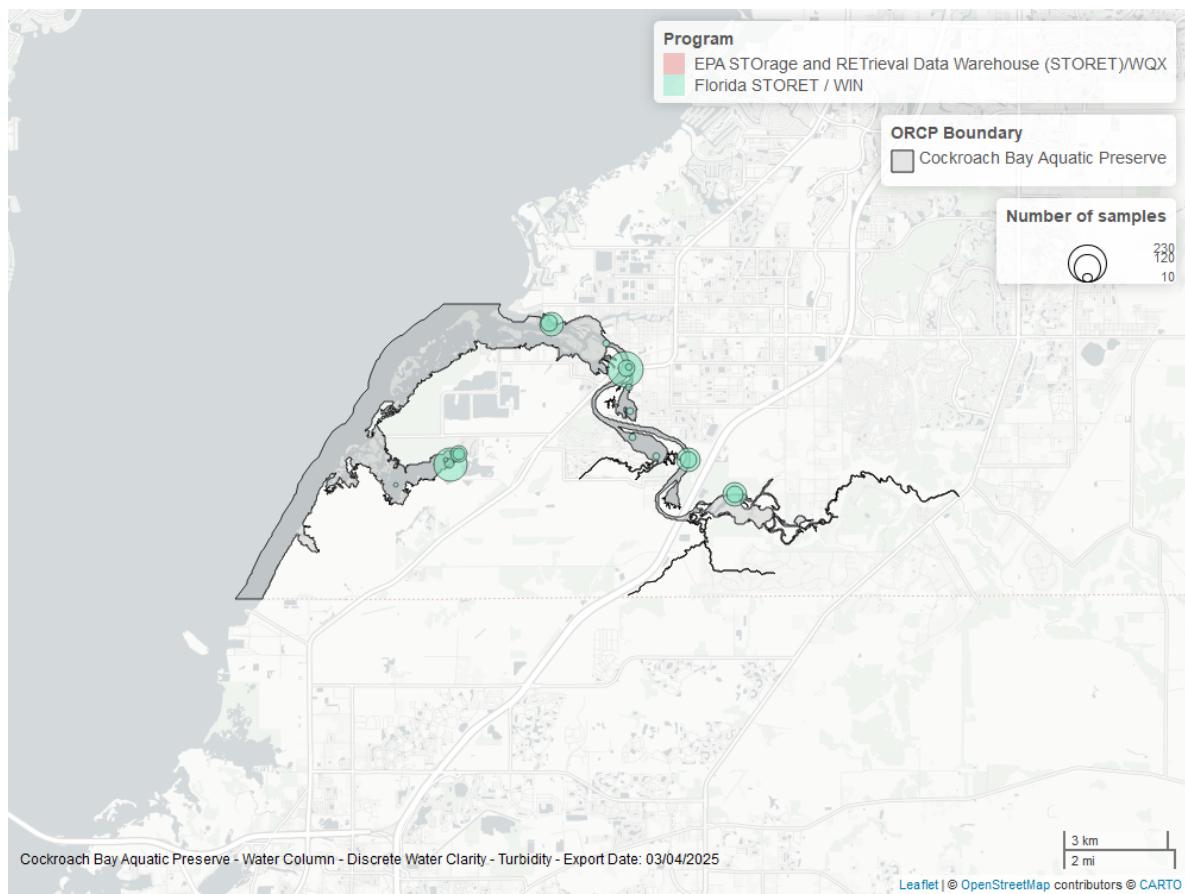


Figure 16: Map showing location of discrete water quality sampling locations within the boundaries of *Cockroach Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Total Suspended Solids - Discrete

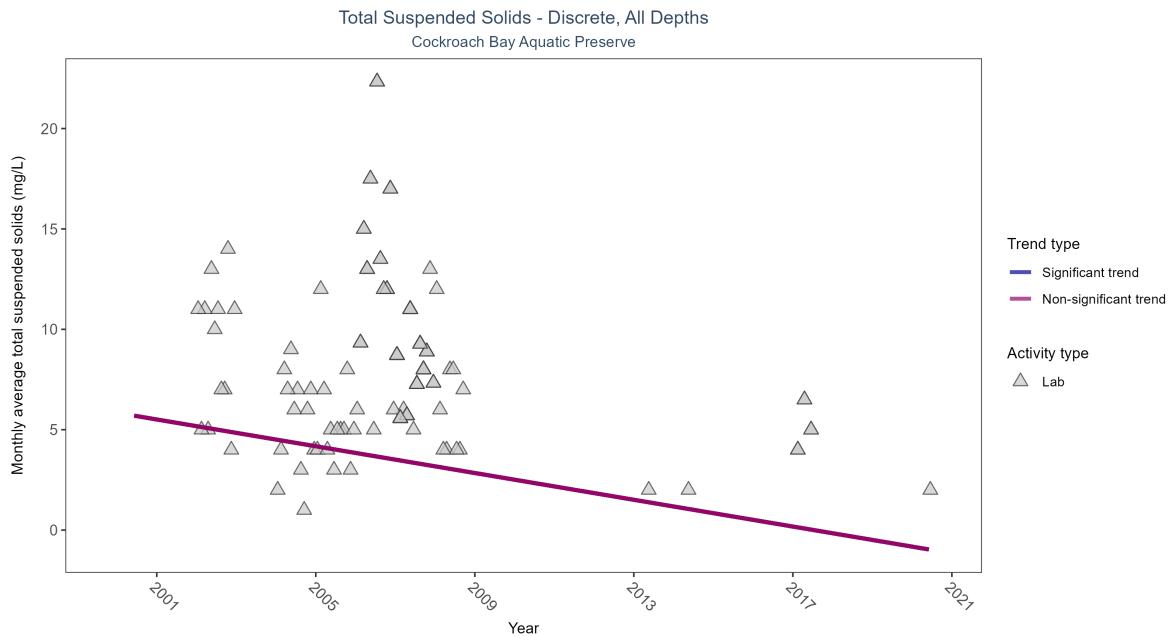


Figure 17: Scatter plot of monthly average total suspended solids (TSS) over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only TSS values obtained from laboratory analyses (triangles) are included in the plot.

Table 9: 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	155	11	2000 - 2020	7	-0.09872	5.84286	-0.33333	0.1349

Total suspended solids showed no detectable trend between 2000 and 2020.

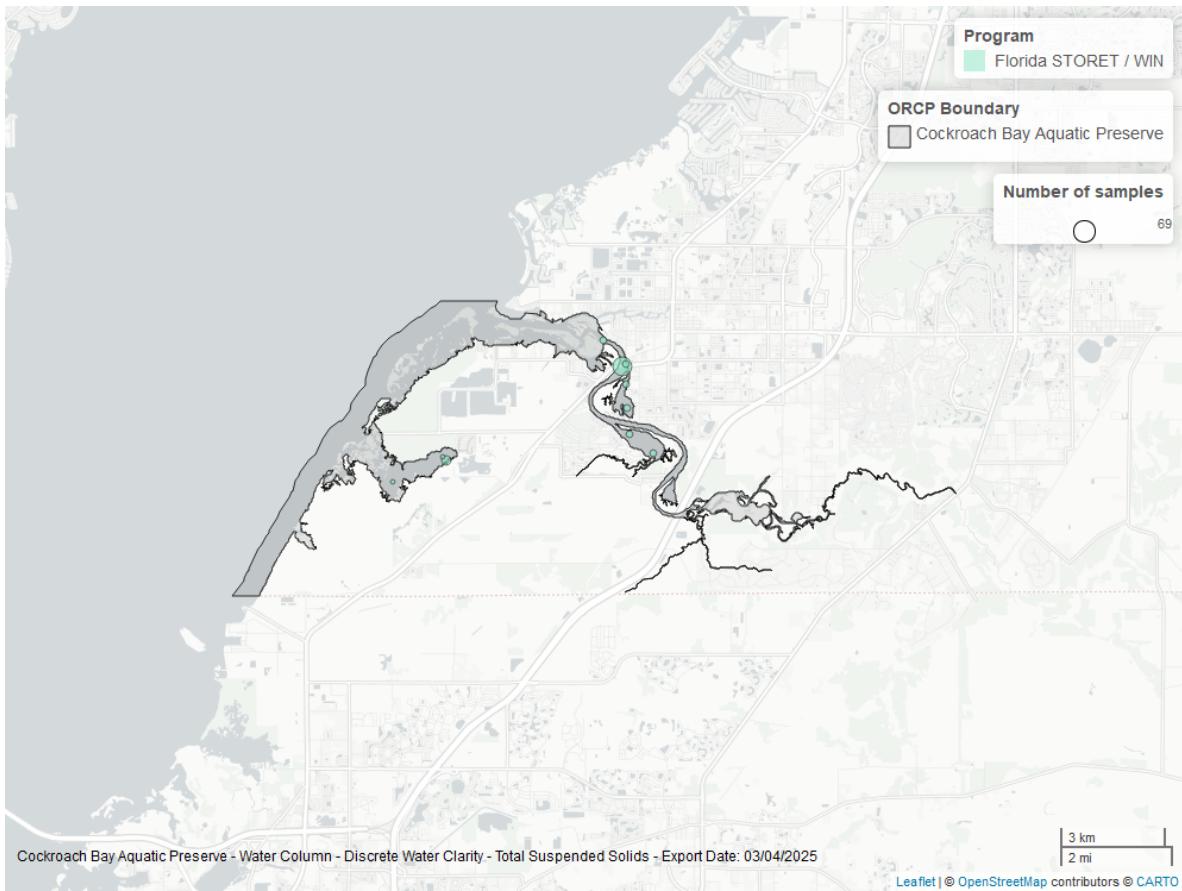


Figure 18: Map showing location of discrete water quality sampling locations within the boundaries of *Cockroach Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Chlorophyll a, Uncorrected for Pheophytin - Discrete

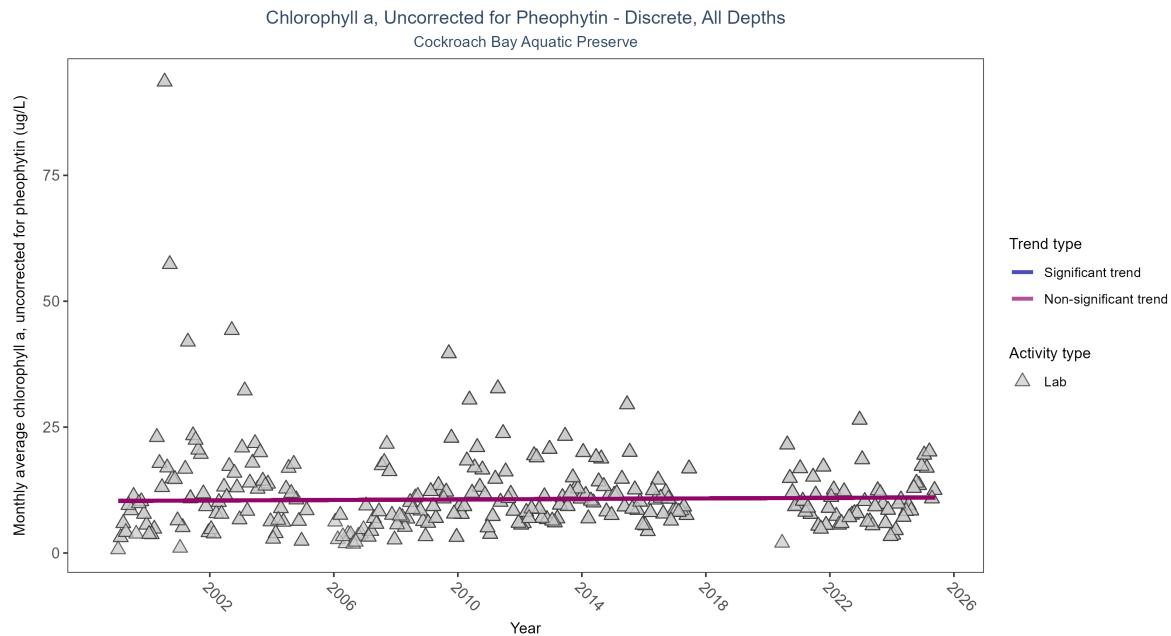


Figure 19: Scatter plot of monthly average levels of chlorophyll a, uncorrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles)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

Table 10: 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	No significant trend	1001	25	1999 - 2025	7.6	0.02644	10.34364	0.02595	0.4874

Chlorophyll a, uncorrected for pheophytin, showed no detectable trend between 1999 and 2025.

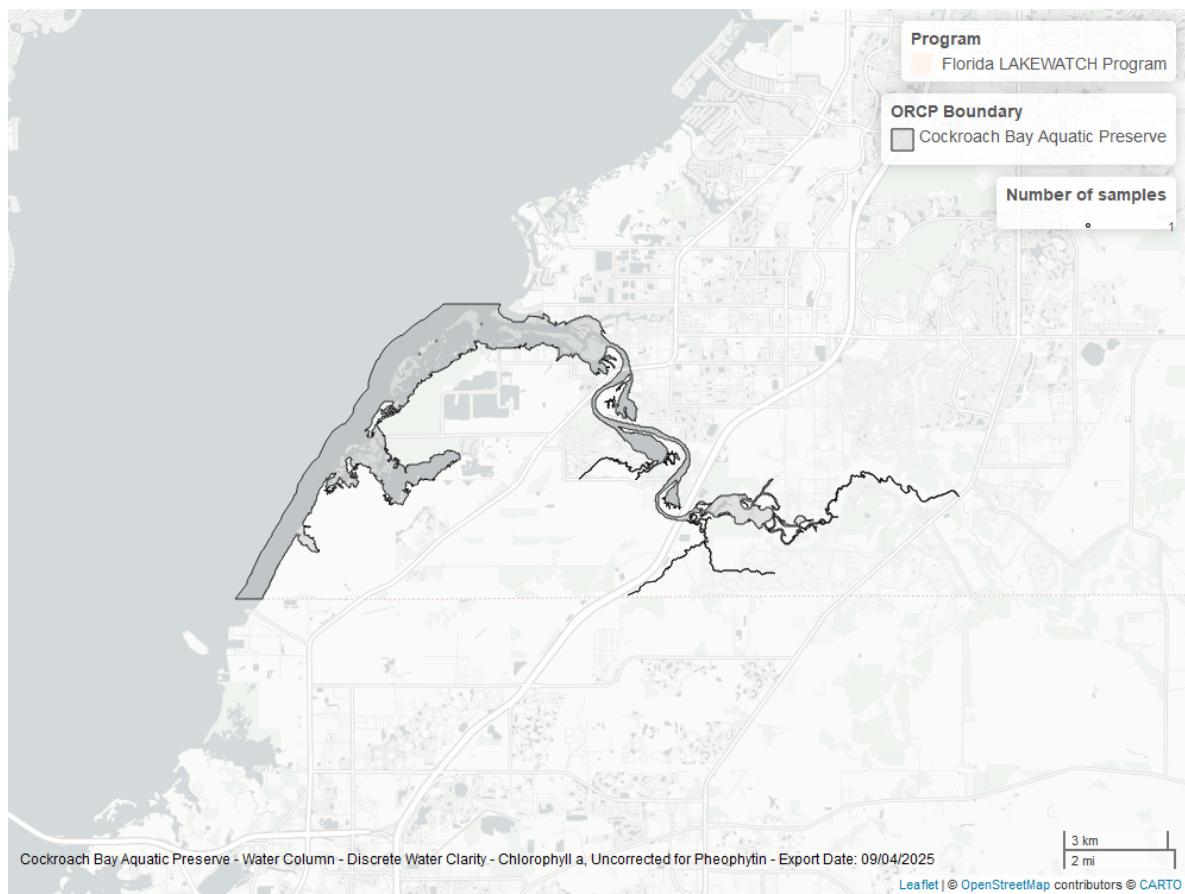


Figure 20: Map showing location of discrete water quality sampling locations within the boundaries of *Cockroach Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Chlorophyll a, Corrected for Pheophytin - Discrete

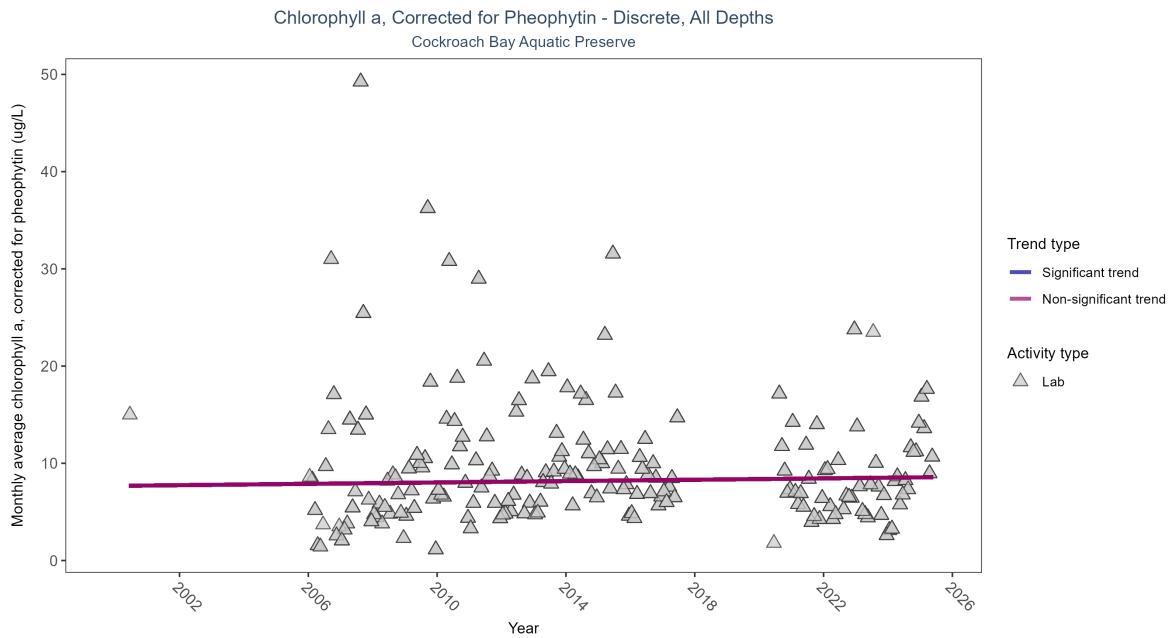


Figure 21: Scatter plot of monthly average levels of chlorophyll a, corrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles) is included in the plot.

Table 11: 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	914	19	2000 - 2025	6.4	0.0361	7.67785	0.035	0.4903

Chlorophyll a, corrected for pheophytin, showed no detectable trend between 2000 and 2025.

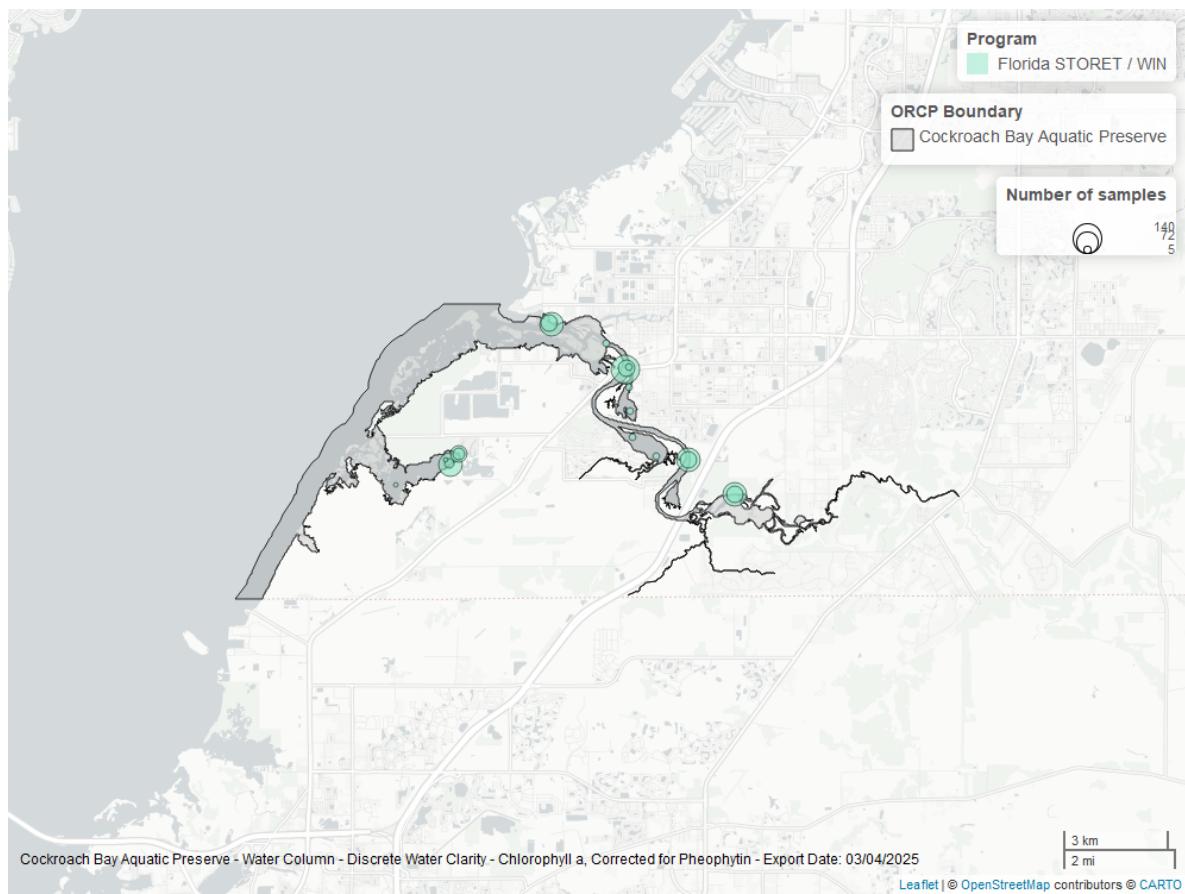


Figure 22: Map showing location of discrete water quality sampling locations within the boundaries of *Cockroach Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Secchi Depth - Discrete

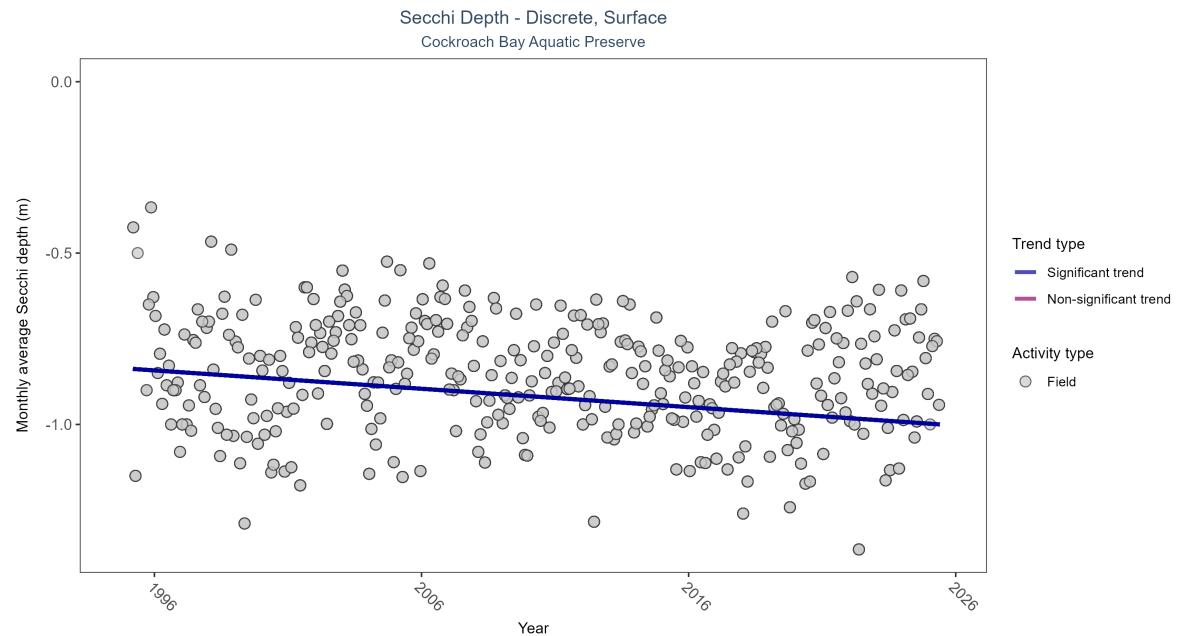


Figure 23: Scatter plot of monthly average Secchi depth over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Secchi depth is only measured in the field (circles).

Table 12: 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	14685	31	1995 - 2025	-0.8	-0.17127	-0.83698	-0.00536	0

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



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

Colored Dissolved Organic Matter - Discrete

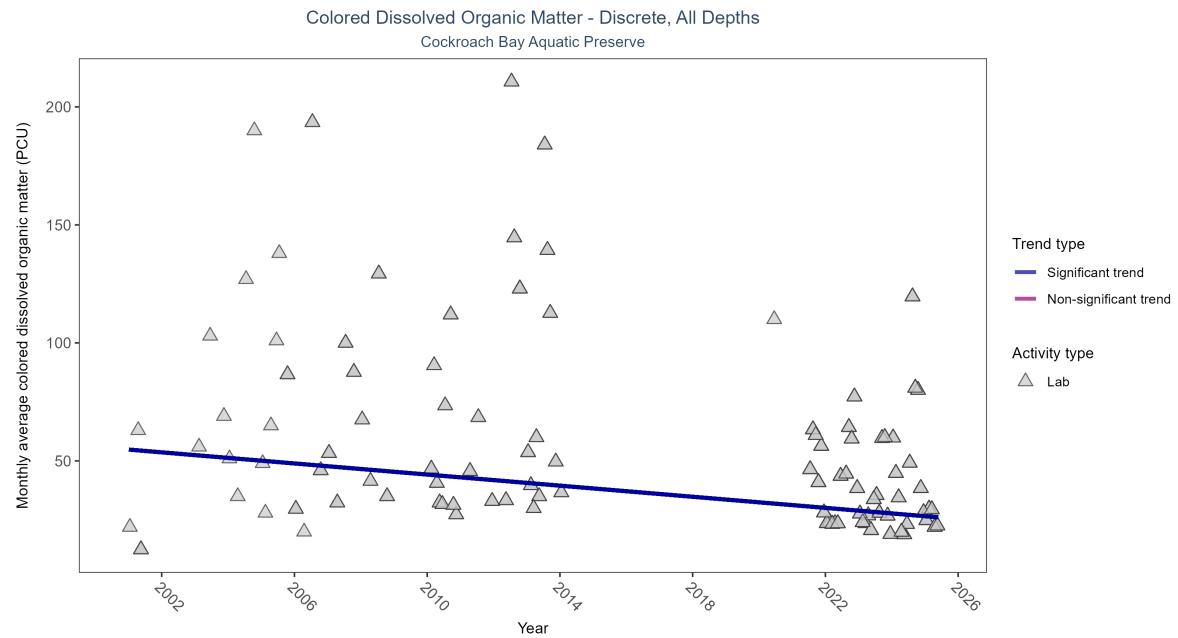


Figure 25: Scatter plot of monthly average colored dissolved organic matter (CDOM) over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed CDOM (triangles) is included in the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

Table 13: 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	Significantly decreasing trend	360	18	2001 - 2025	36.95	-0.26991	54.81304	-1.17611	0.0018

Monthly average colored dissolved organic matter decreased by 1.18 PCU per year, indicating an increase in water clarity.

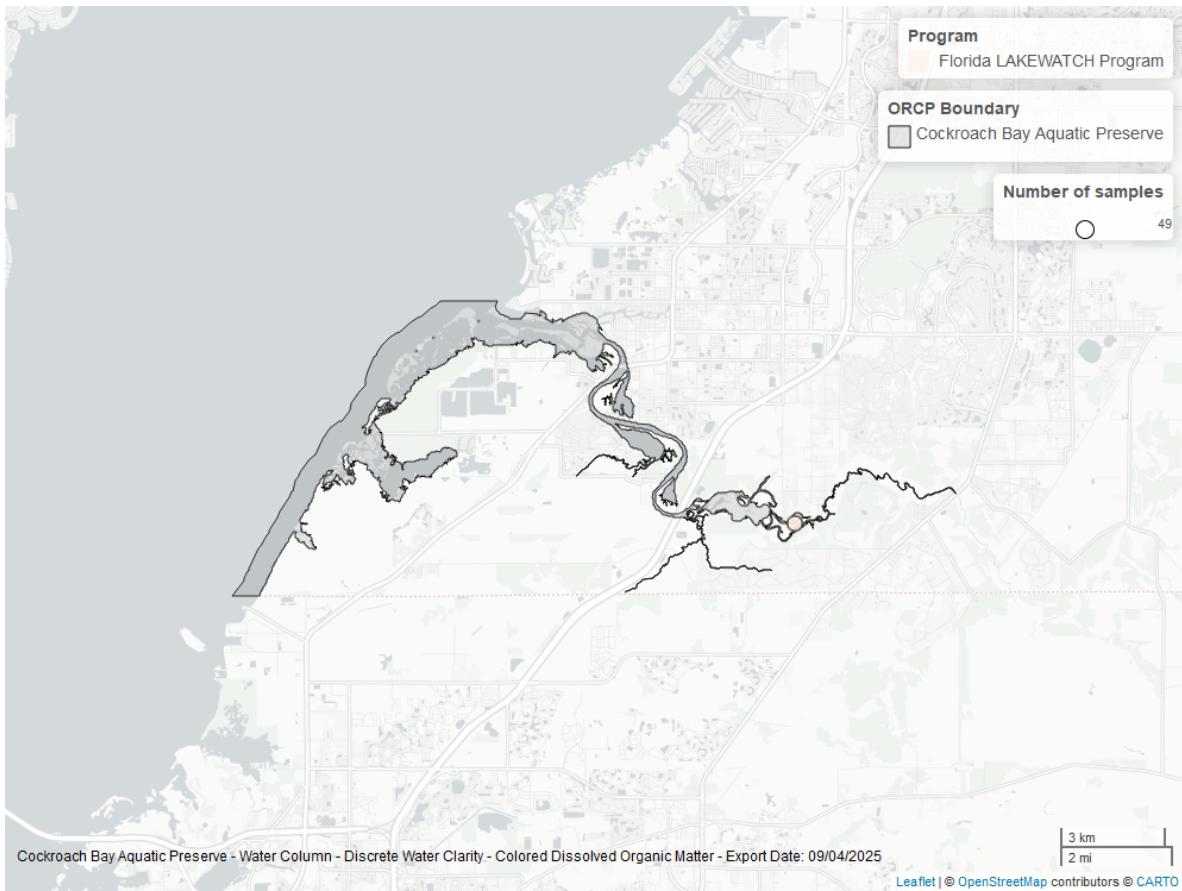


Figure 26: Map showing location of discrete water quality sampling locations within the boundaries of *Cockroach Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.