

Kristin Jacobs Coral Aquatic Preserve

SEACAR Water Quality Analysis

Last compiled on 10 July, 2025

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Indicators

Nutrients

Total Nitrogen - Discrete

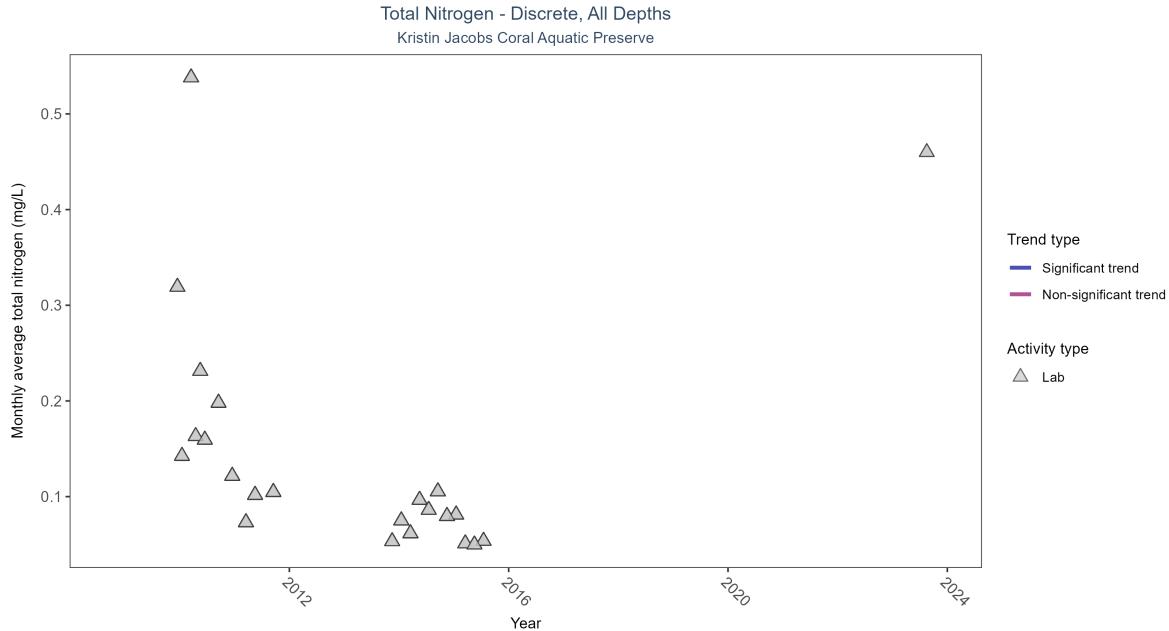


Figure 1: Scatter plot of monthly average total nitrogen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only nitrogen values obtained from laboratory analyses (triangles) are included in the 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	Insufficient data to calculate trend	890	7	2009 - 2023	0.071	-	-	-	-

There was insufficient data to fit a model for total nitrogen.

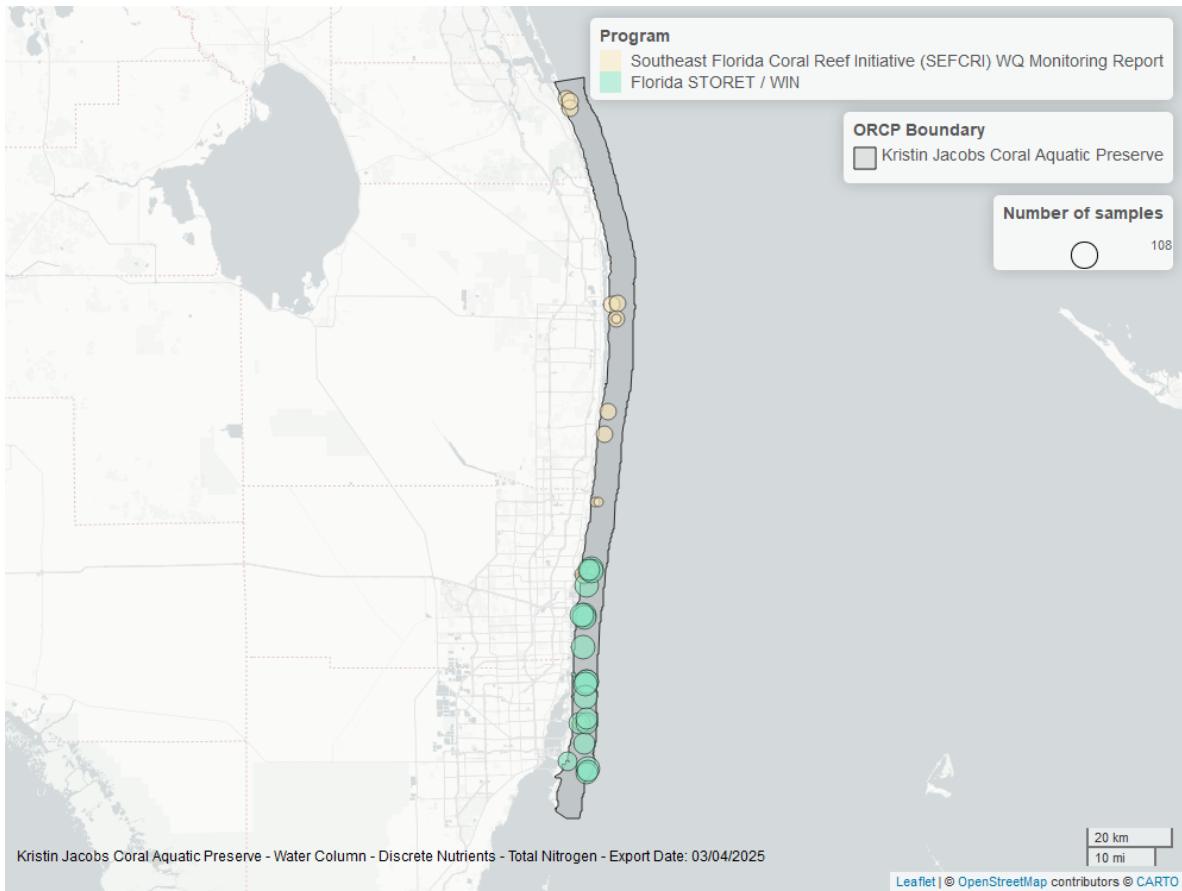


Figure 2: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Total Phosphorus - Discrete

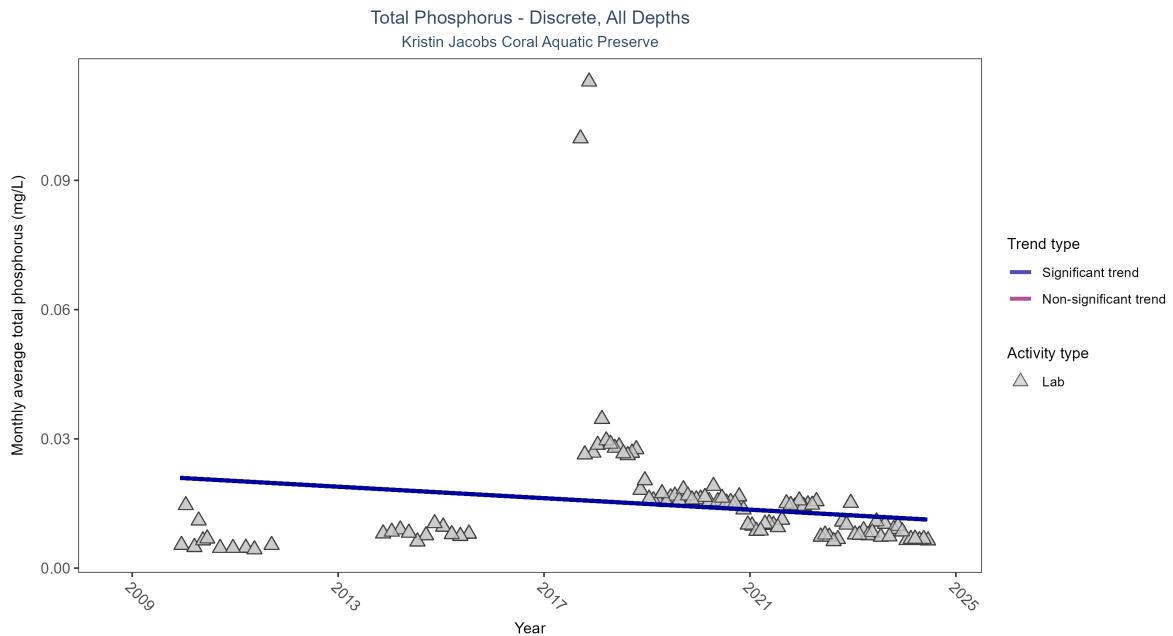


Figure 3: Scatter plot of monthly average total phosphorus over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only phosphorus values obtained from laboratory analyses (triangles) are included in 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	17322	14	2009 - 2024	0.014	-0.29405	0.02156	-0.00067	0.0034

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

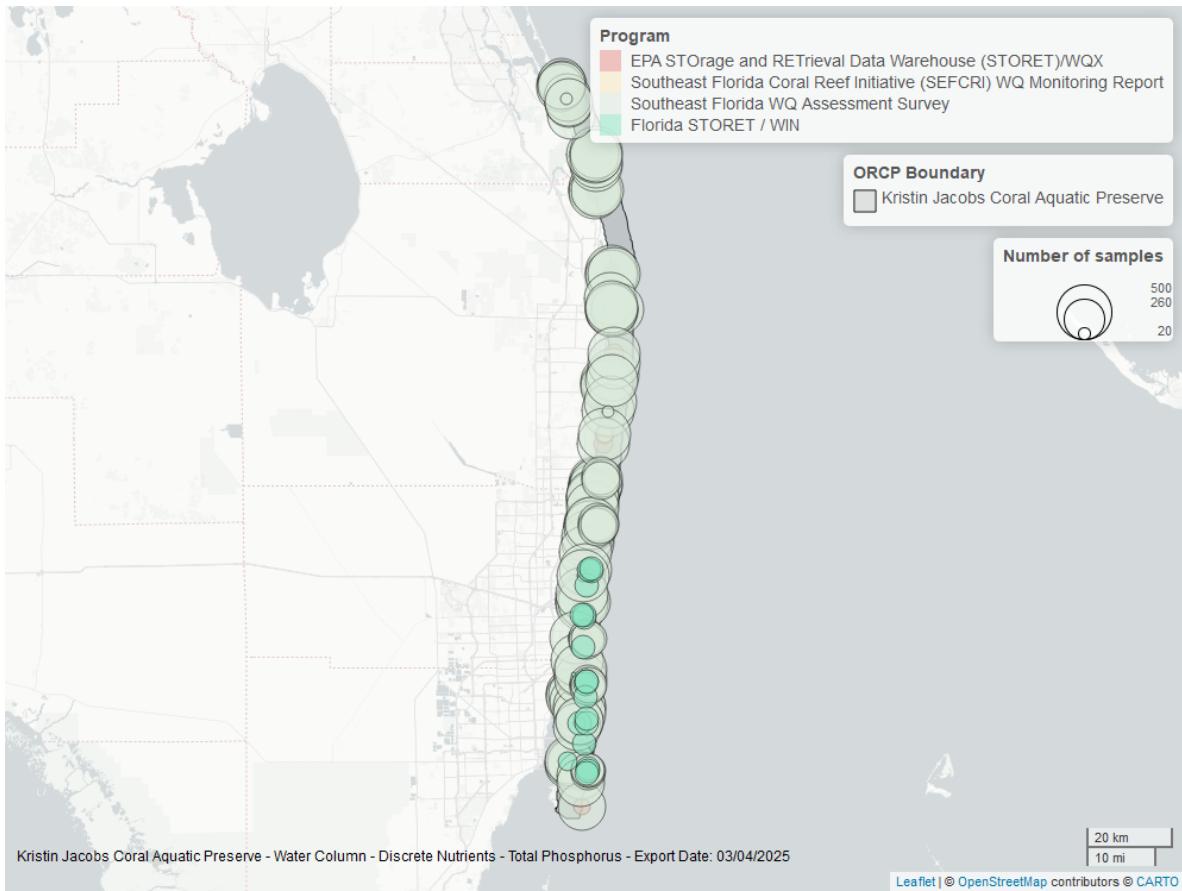


Figure 4: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Water Quality

Dissolved Oxygen - Discrete

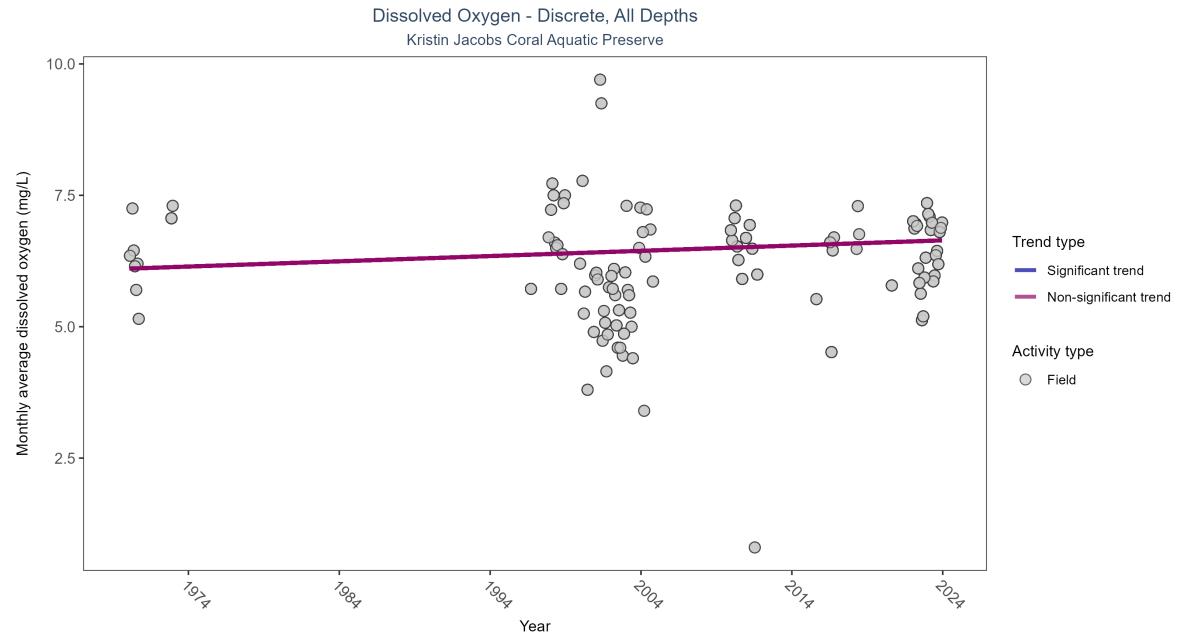


Figure 5: Scatter plot of monthly average dissolved oxygen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen values measured in the field (circles) are included in the plot.

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	742	20	1970 - 2023	6.49	0.09583	6.10456	0.00998	0.3066

Dissolved oxygen showed no detectable trend between 1970 and 2023.

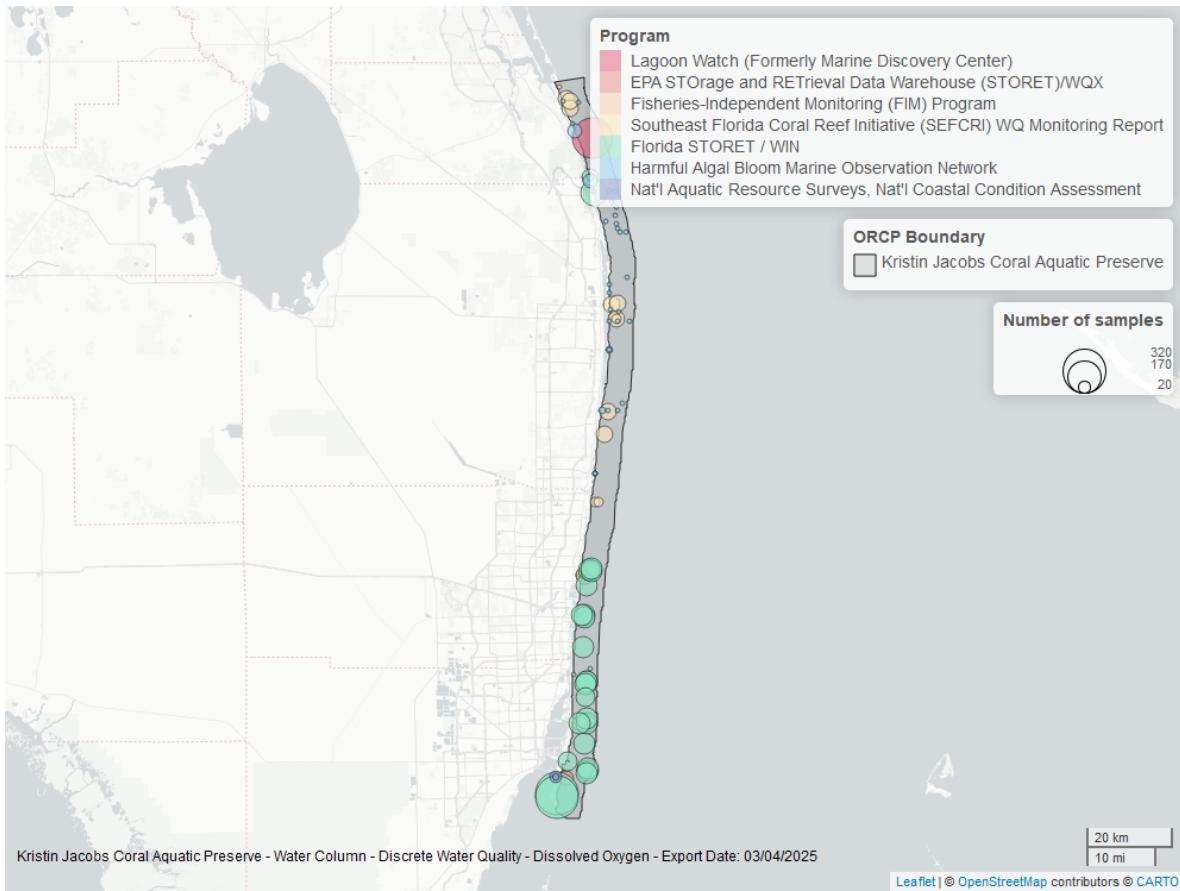


Figure 6: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Dissolved Oxygen Saturation - Discrete

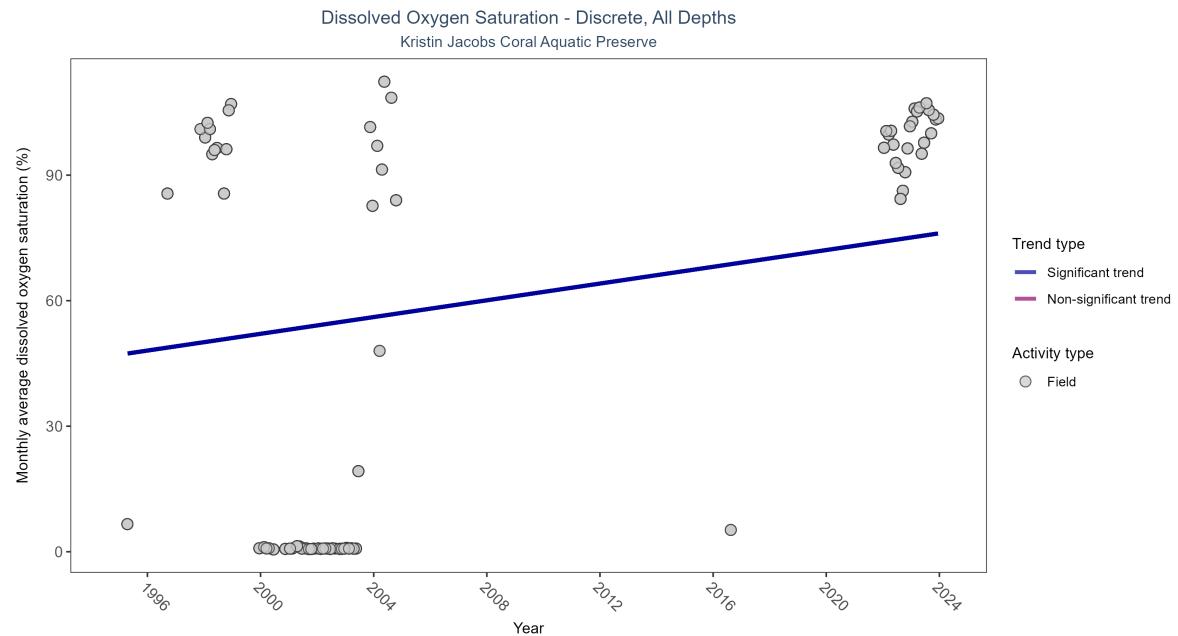


Figure 7: Scatter plot of monthly average dissolved oxygen saturation over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen saturation values measured in the field (circles) 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 increasing trend	378	13	1995 - 2023	97.85	0.32857	47.07696	1.00088	0.0019

Monthly average dissolved oxygen saturation increased by 1% per year.

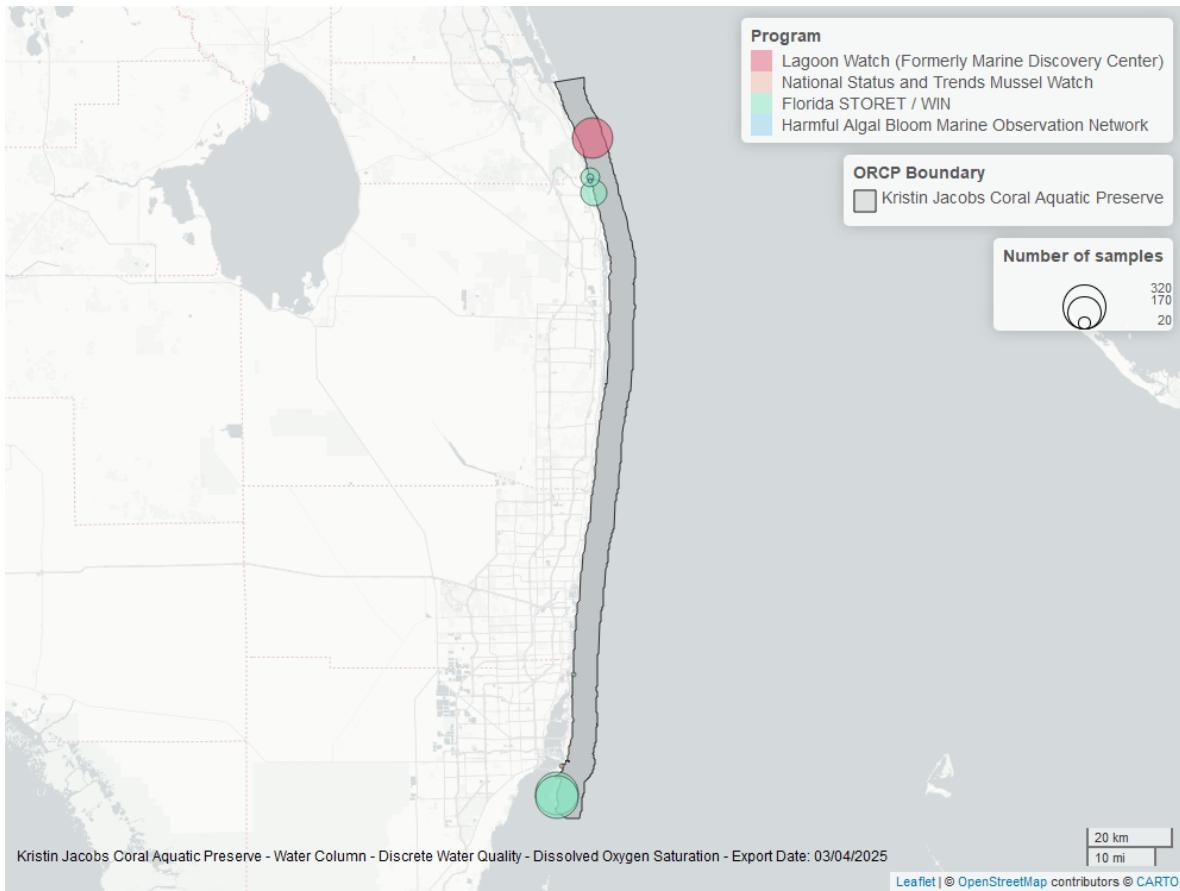


Figure 8: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Salinity - Discrete

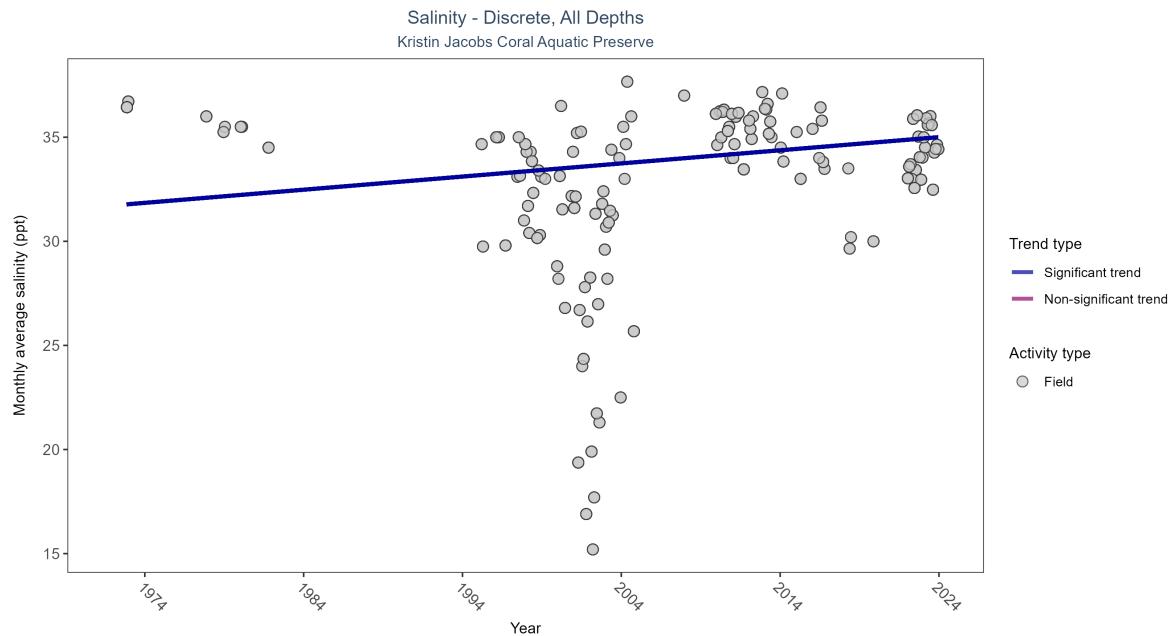


Figure 9: Scatter plot of monthly average salinity over time. If the time series included ten or more years of discrete observations, significant (blue) or non-significant (magenta) trend lines are also shown. Discrete salinity values derived from grab samples analyzed in the field (circles) or the laboratory (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 increasing trend	908	30	1972 - 2023	35.5	0.17608	31.721	0.06312	0.0138

Monthly average salinity increased by 0.06 ppt per year.

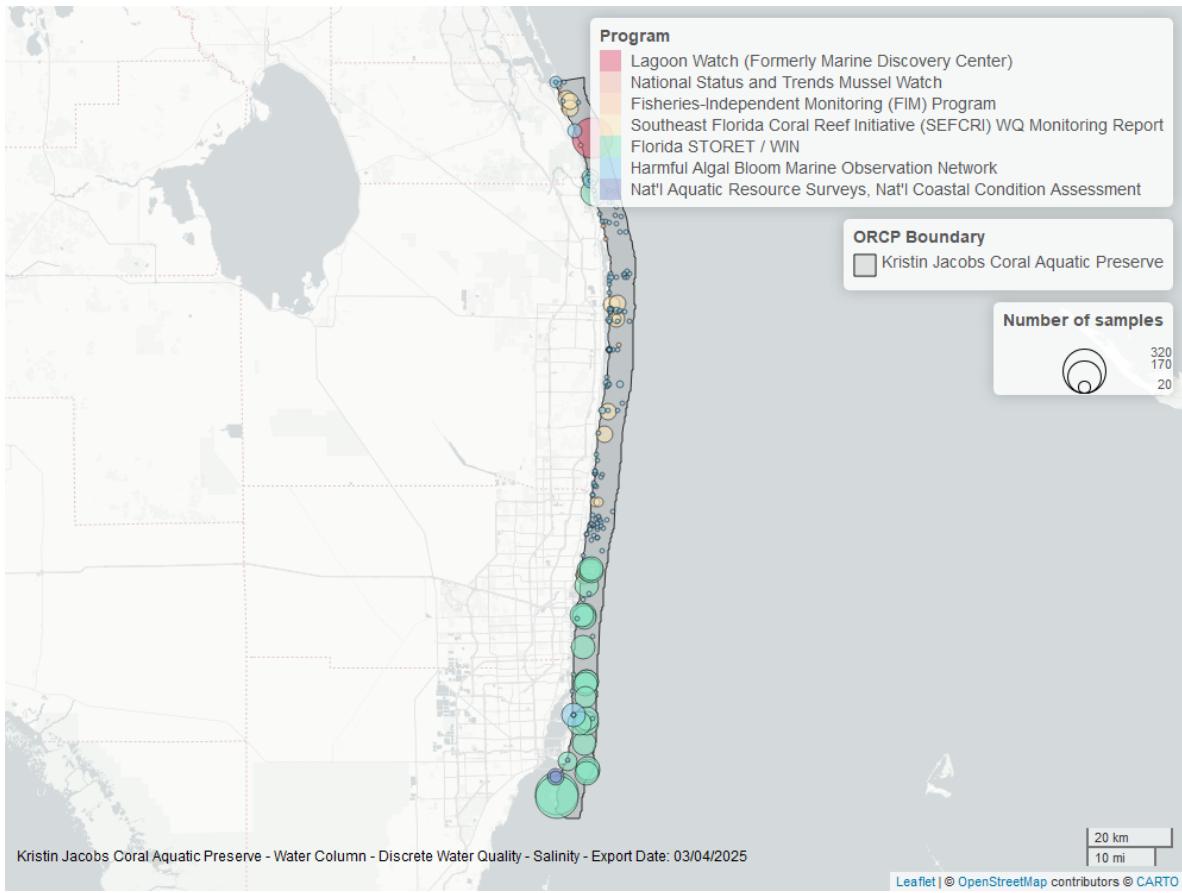


Figure 10: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Water Temperature - Discrete

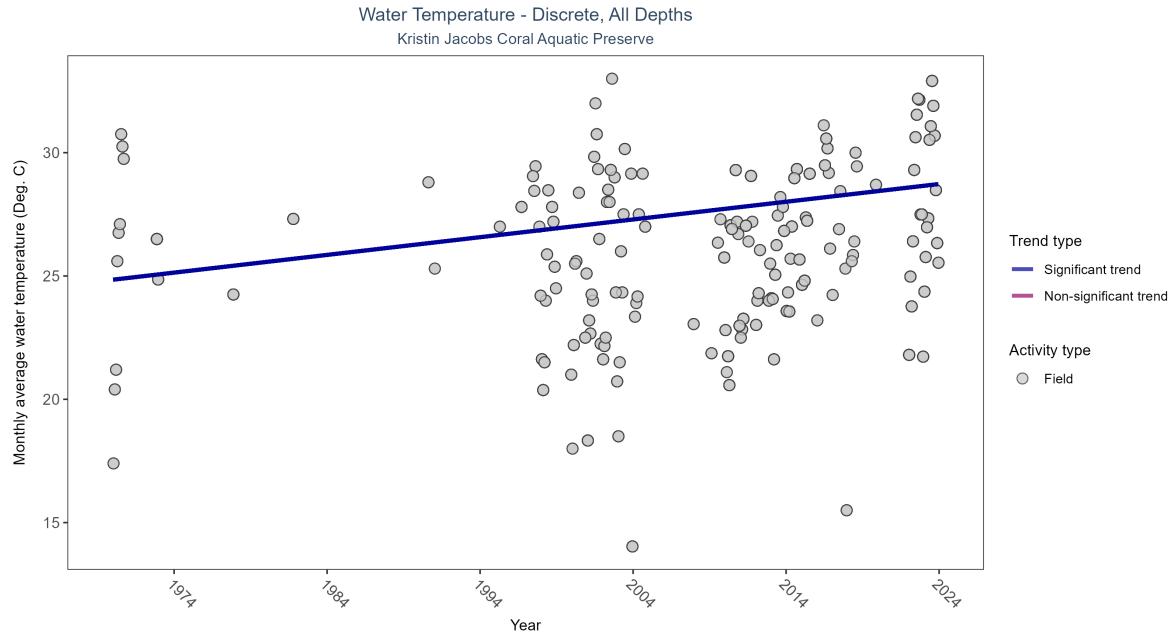


Figure 11: Scatter plot of monthly average water temperature over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only water temperature measurements taken in the field (circles) are included in 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	Significantly increasing trend	1580	30	1970 - 2023	26.58235	0.28935	24.84913	0.07184	0

Monthly average water temperature increased by 0.07°C per year.

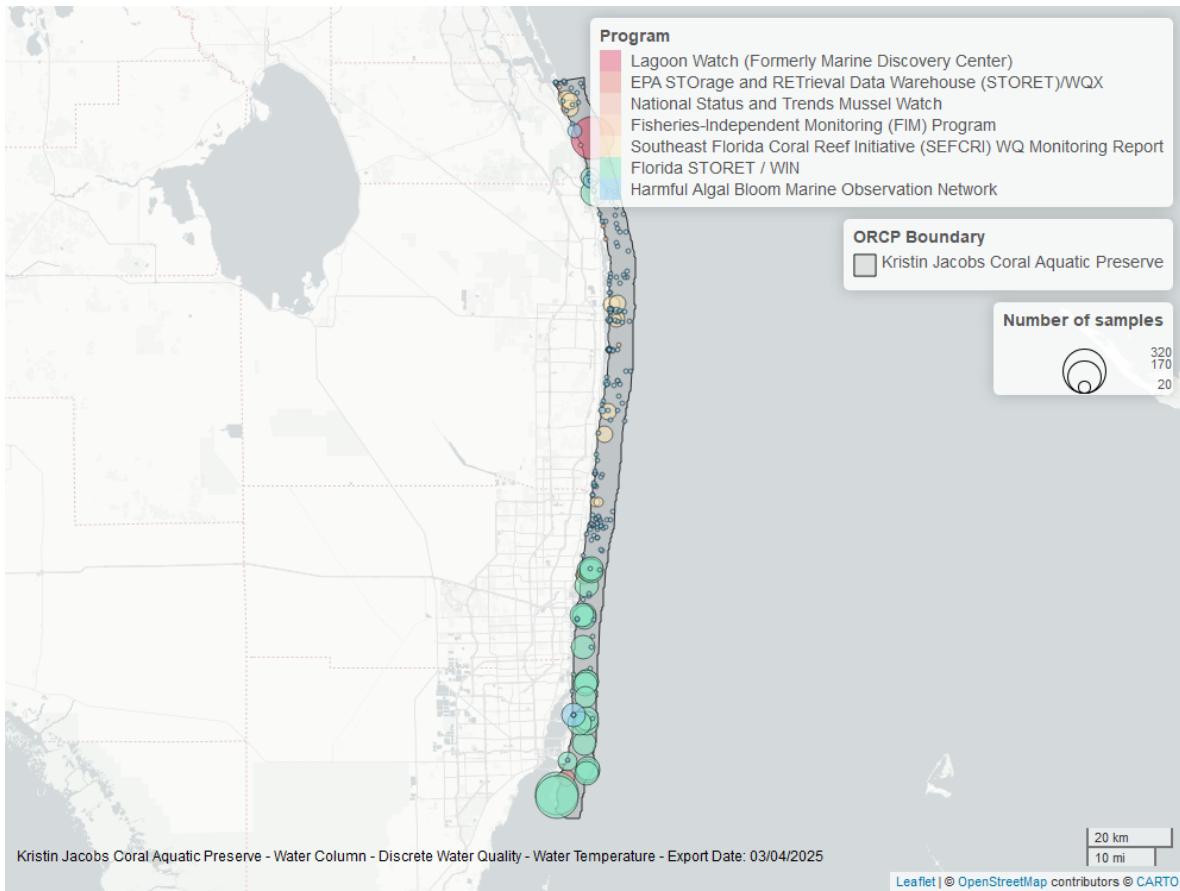


Figure 12: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Water Temperature - Continuous

National Data Buoy Center - 5

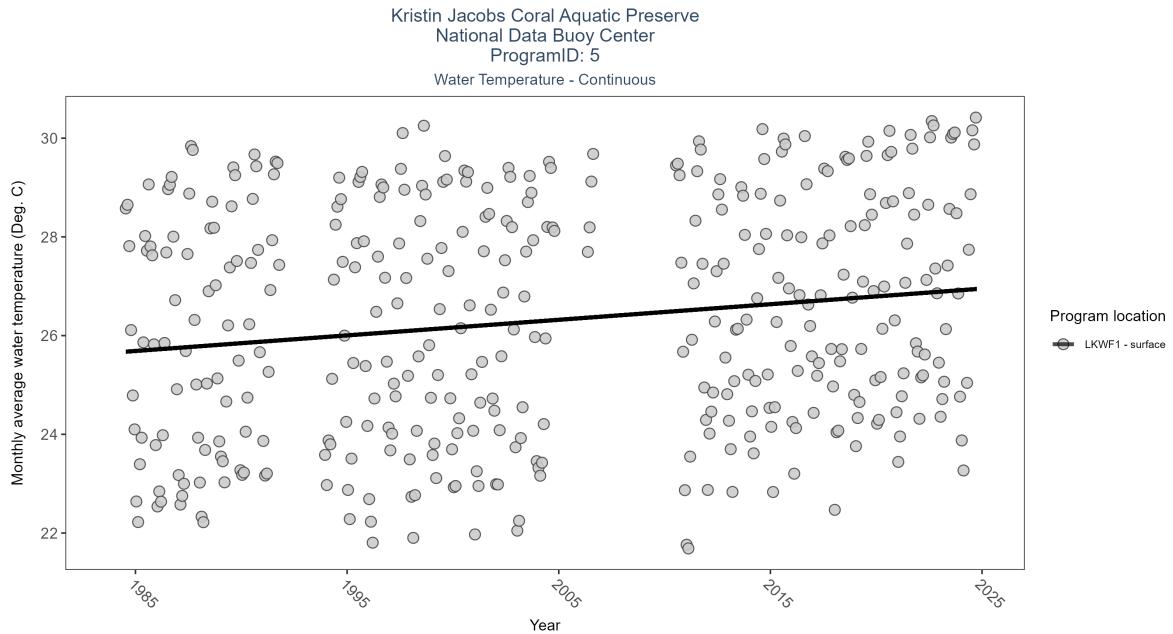


Figure 13: Scatter plot of monthly average water temperature over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 7: Seasonal Kendall-Tau Results for All Stations - Water Temperature

Program Location	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
LKWF1	Significantly increasing trend	1268849	36	1984 - 2024	26.5	0.42	25.66	0.03	0

At nineteen program locations, monthly average water temperature increased between 0.03 and 0.09°C per year. No detectable change in monthly average water temperature was observed at three locations.

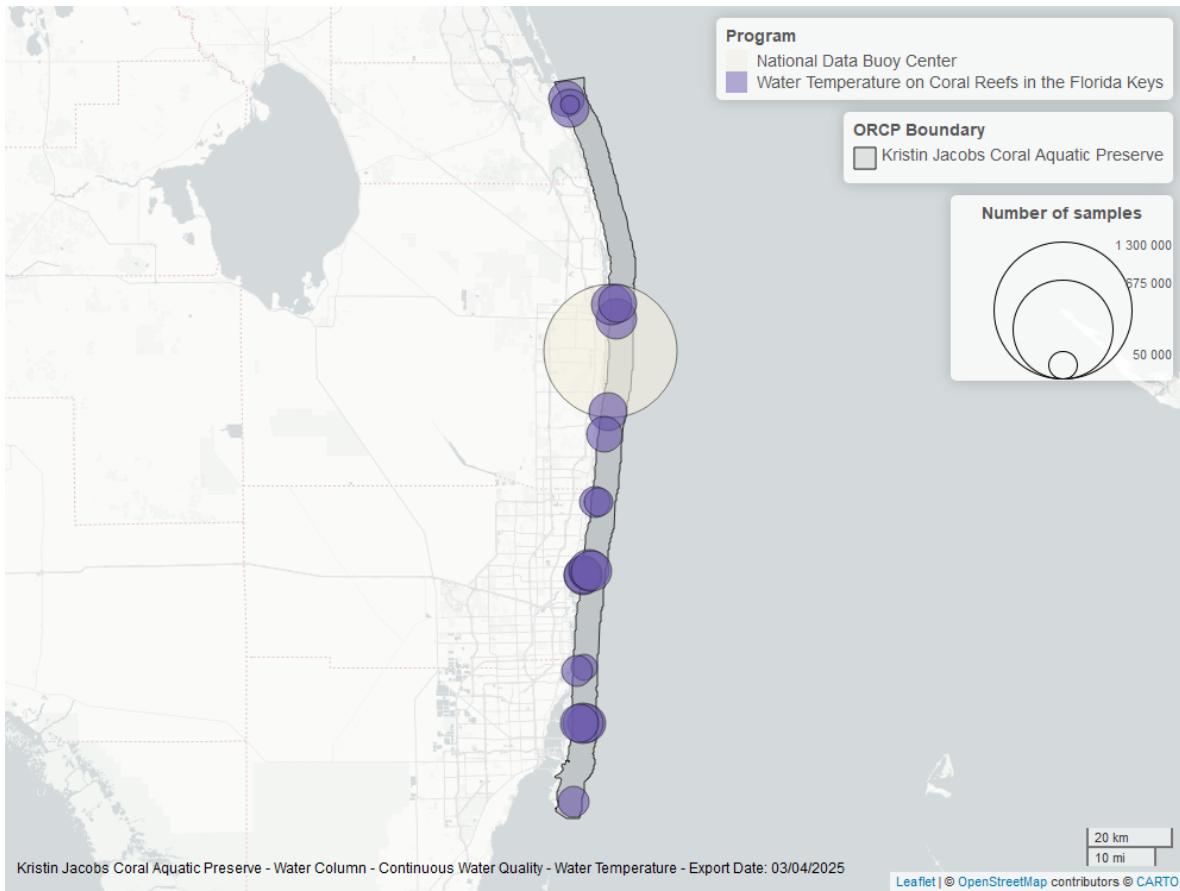


Figure 14: Map showing location of water temperature continuous water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Water Temperature on Coral Reefs in the Florida Keys - 986

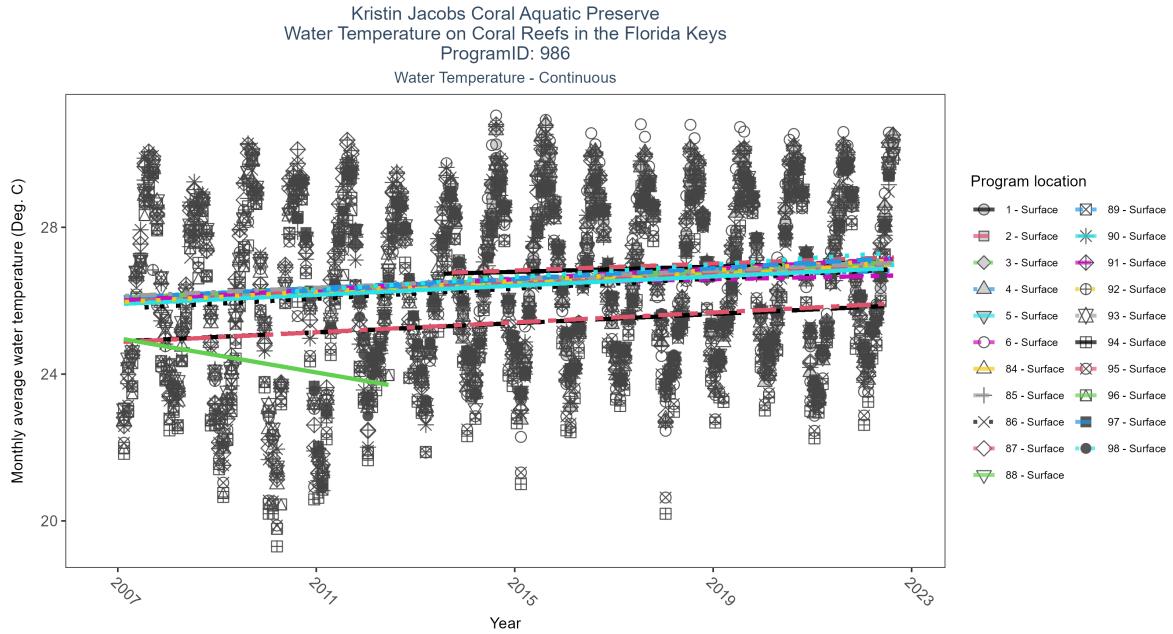


Figure 15: Scatter plot of monthly average water temperature over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 8: Seasonal Kendall-Tau Results for All Stations - Water Temperature

Program Location	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
94	Significantly increasing trend	90265	16	2007 - 2022	25.55	0.28	24.89	0.06	0
87	Significantly increasing trend	108339	16	2007 - 2022	26.44	0.31	25.99	0.06	0
85	Significantly increasing trend	114214	16	2007 - 2022	26.26	0.34	25.99	0.07	0
1	No significant trend	65108	10	2013 - 2022	26.40	0.13	26.72	0.04	0.1158
2	Significantly increasing trend	64486	10	2013 - 2022	26.72	0.26	26.73	0.05	0.0007
90	Significantly increasing trend	97006	16	2007 - 2022	26.43	0.33	25.91	0.06	0
88	Significantly increasing trend	115305	16	2007 - 2022	26.35	0.34	26.08	0.06	0
95	Significantly increasing trend	102279	16	2007 - 2022	25.58	0.30	24.87	0.07	0
84	Significantly increasing trend	111153	16	2007 - 2022	26.32	0.36	25.94	0.07	0
93	Significantly increasing trend	106903	16	2007 - 2022	26.47	0.35	26.12	0.06	0
89	Significantly increasing trend	113809	16	2007 - 2022	26.28	0.35	26.08	0.07	0
5	Significantly increasing trend	51977	10	2013 - 2022	26.62	0.21	26.46	0.05	0.0067
97	Significantly increasing trend	97533	13	2010 - 2022	26.45	0.38	26.21	0.08	0
92	Significantly increasing trend	111826	16	2007 - 2022	26.45	0.37	25.96	0.07	0
86	Significantly increasing trend	104767	16	2007 - 2022	26.16	0.36	25.78	0.07	0
91	Significantly increasing trend	102406	16	2007 - 2022	26.54	0.33	26.01	0.07	0
3	Significantly increasing trend	60887	10	2013 - 2022	26.65	0.25	26.54	0.06	0.001
4	Significantly increasing trend	68937	10	2013 - 2022	26.59	0.17	26.46	0.04	0.0305
98	Significantly increasing trend	87973	13	2010 - 2022	26.40	0.39	26.21	0.09	0
96	No significant trend	25550	6	2007 - 2012	24.87	-0.25	24.98	-0.23	0.0801
6	No significant trend	63582	10	2013 - 2022	26.77	0.09	26.42	0.03	0.2598

At nineteen program locations, monthly average water temperature increased between 0.03 and 0.09°C per year. No detectable change in monthly average water temperature was observed at three locations.

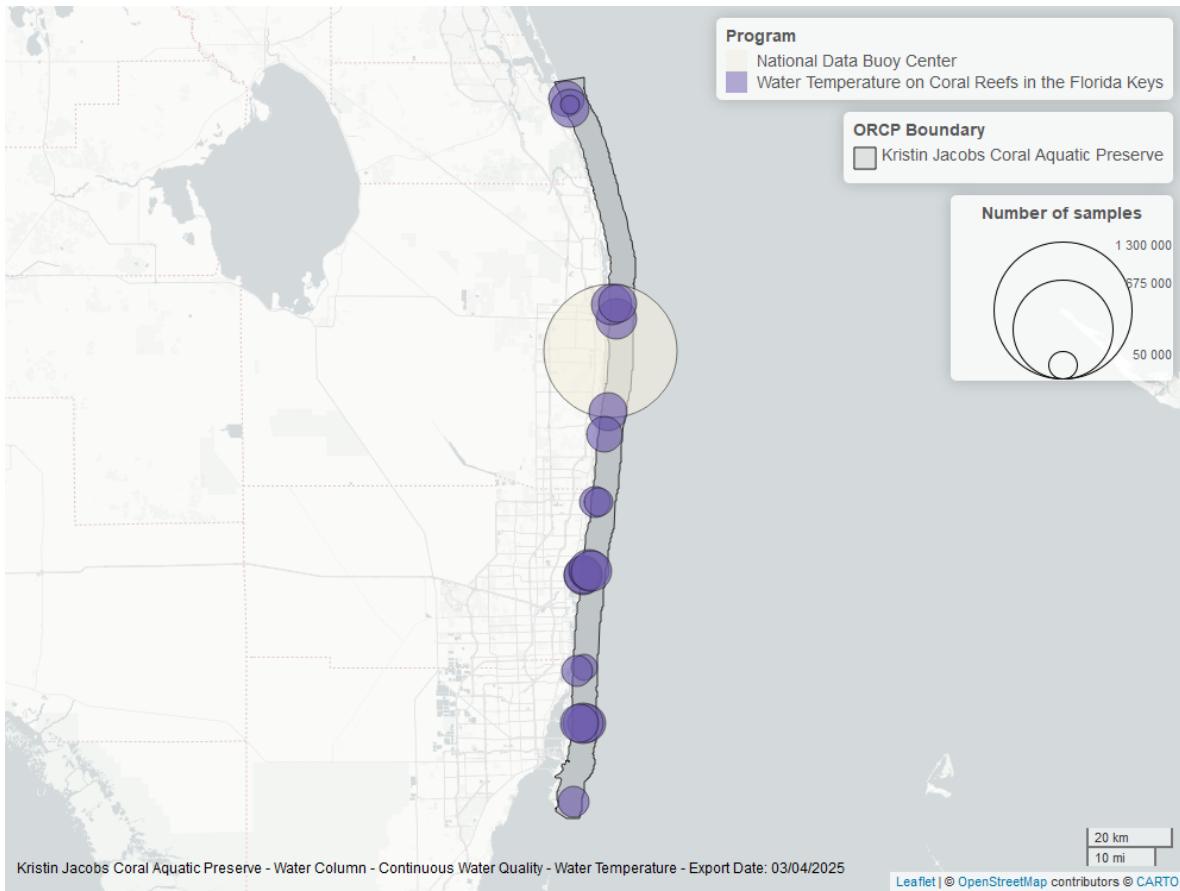


Figure 16: Map showing location of water temperature continuous water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

pH - Discrete

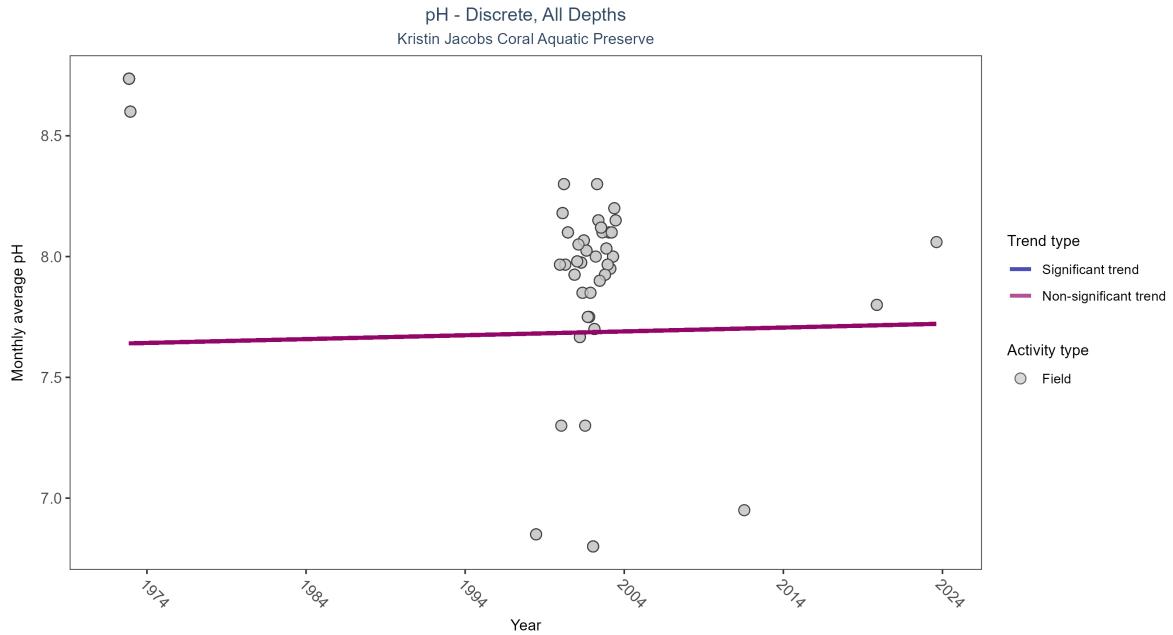


Figure 17: Scatter plot of monthly average pH over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only pH values measured in the field (circles) are included in the plot.

Table 9: 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	172	10	1972 - 2023	8.2	0.08333	7.63924	0.00159	0.9124

pH showed no detectable trend between 1972 and 2023.

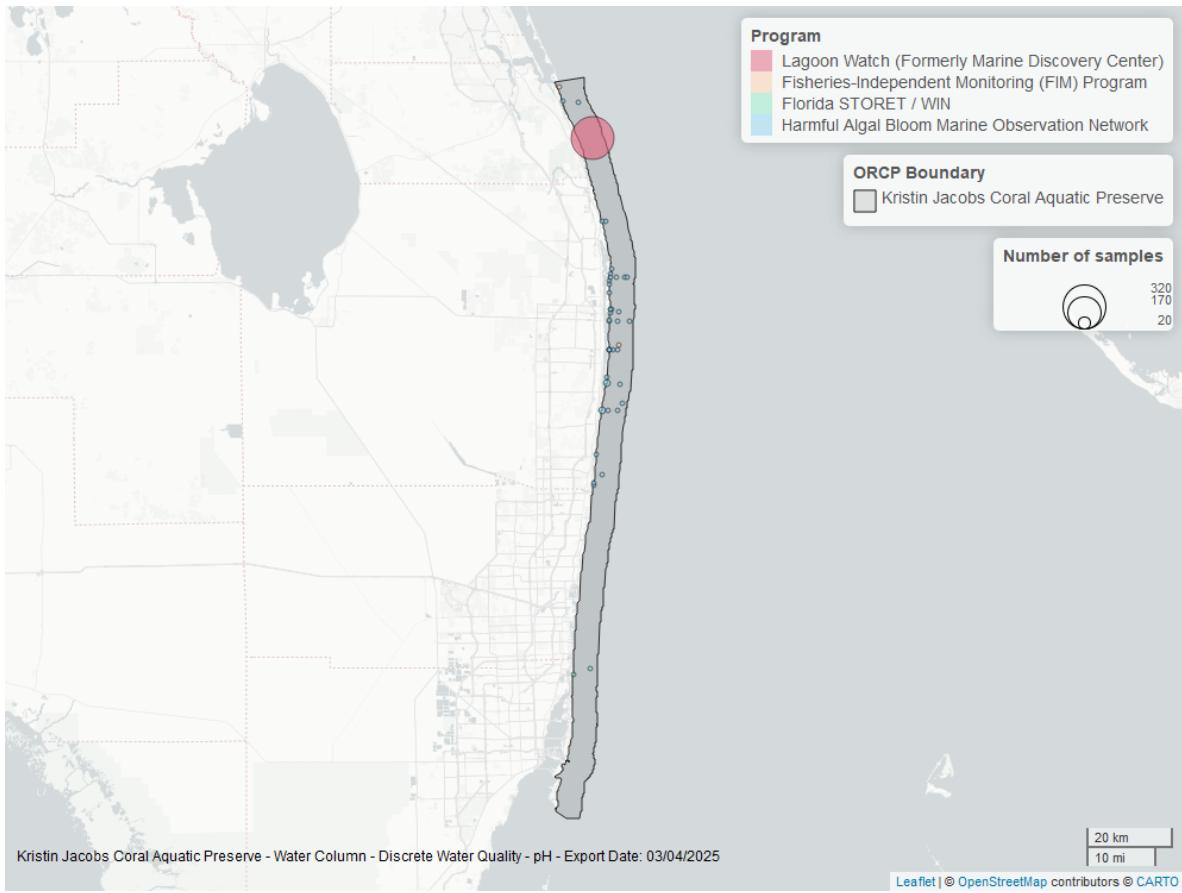


Figure 18: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Water Clarity

Turbidity - Discrete

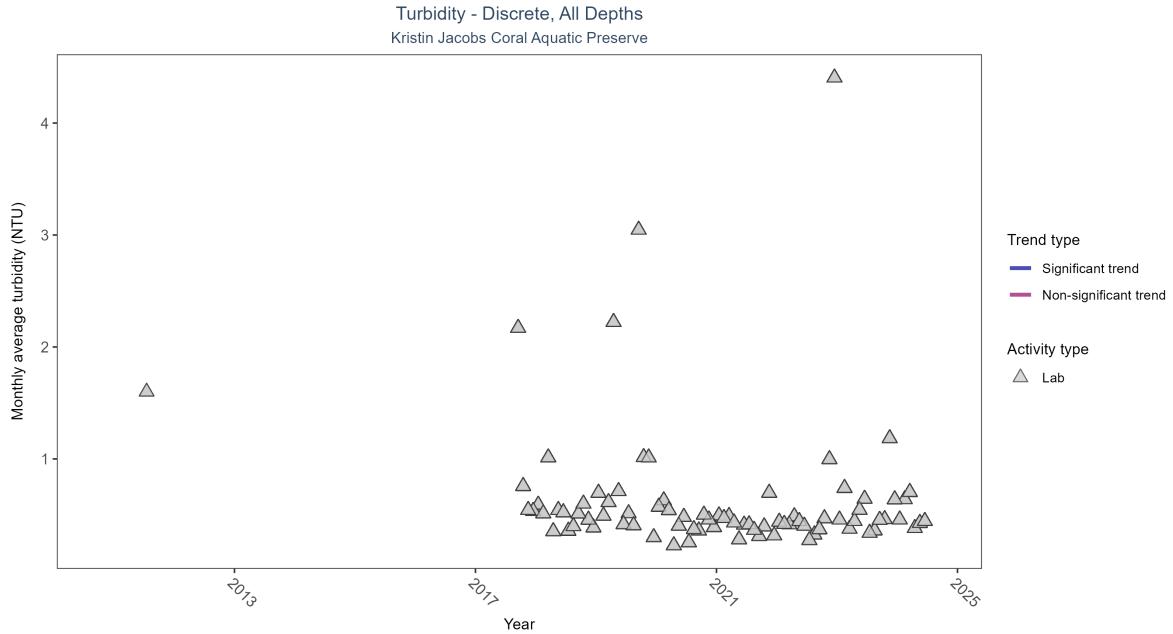


Figure 19: Scatter plot of monthly average turbidity over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only turbidity values measured in the laboratory (triangles) are included in the plot.

Table 10: 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	Insufficient data to calculate trend	15580	9	2011 - 2024	0.3	-	-	-	-

There was insufficient data to fit a model for turbidity.

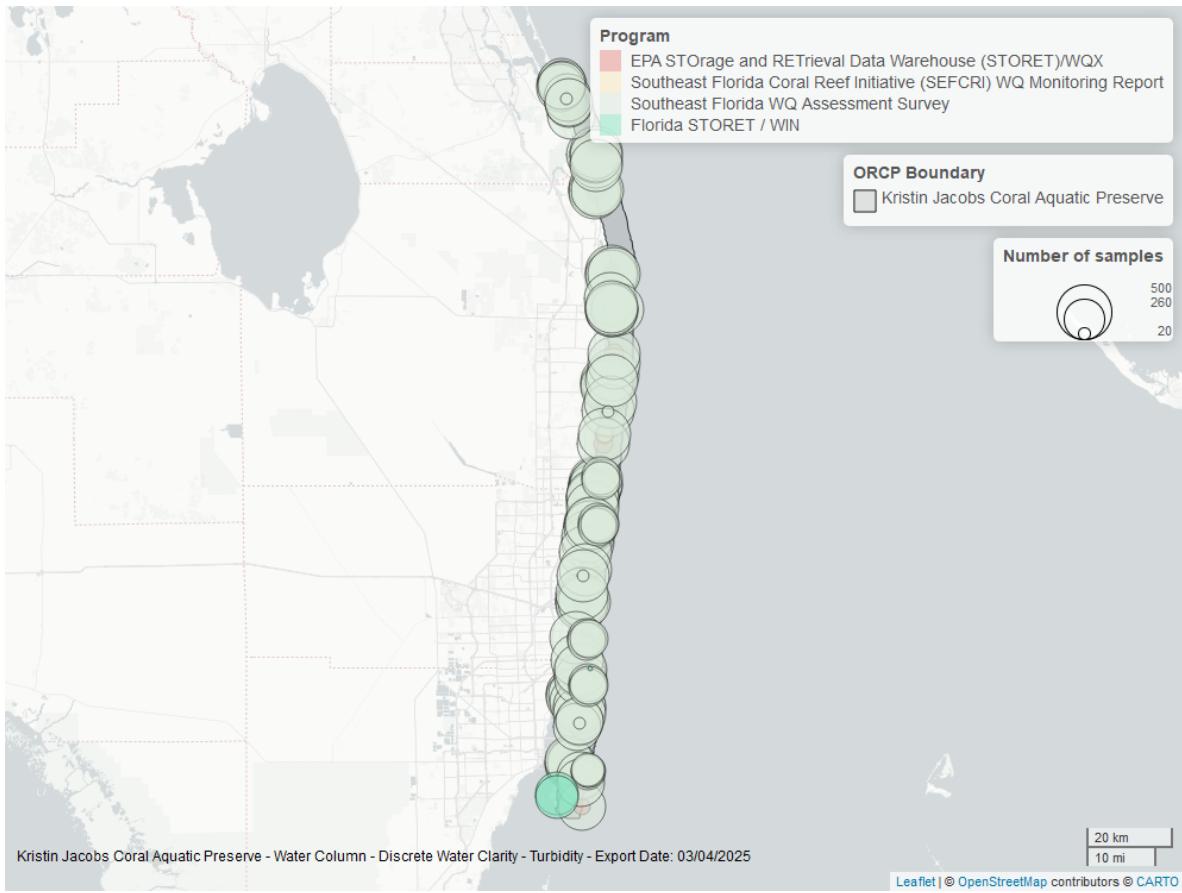


Figure 20: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Total Suspended Solids - Discrete

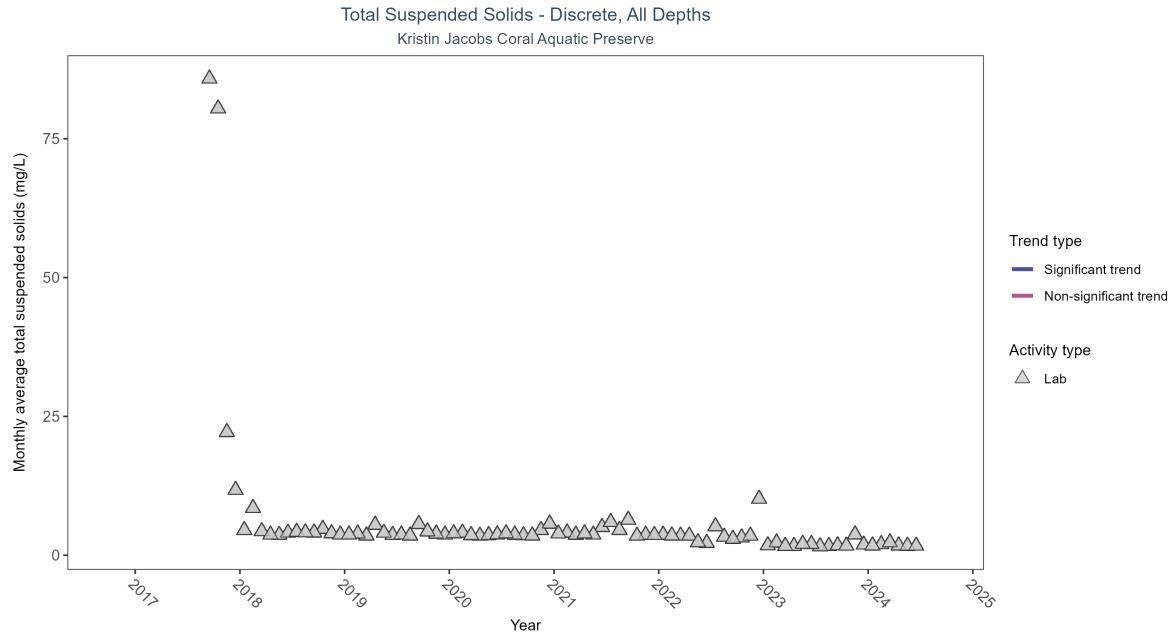


Figure 21: Scatter plot of monthly average total suspended solids (TSS) over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only TSS values obtained from laboratory analyses (triangles) are included in the plot.

Table 11: 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	Insufficient data to calculate trend	15025	8	2017 - 2024	3.47	-	-	-	-

There was insufficient data to fit a model for total suspended solids.

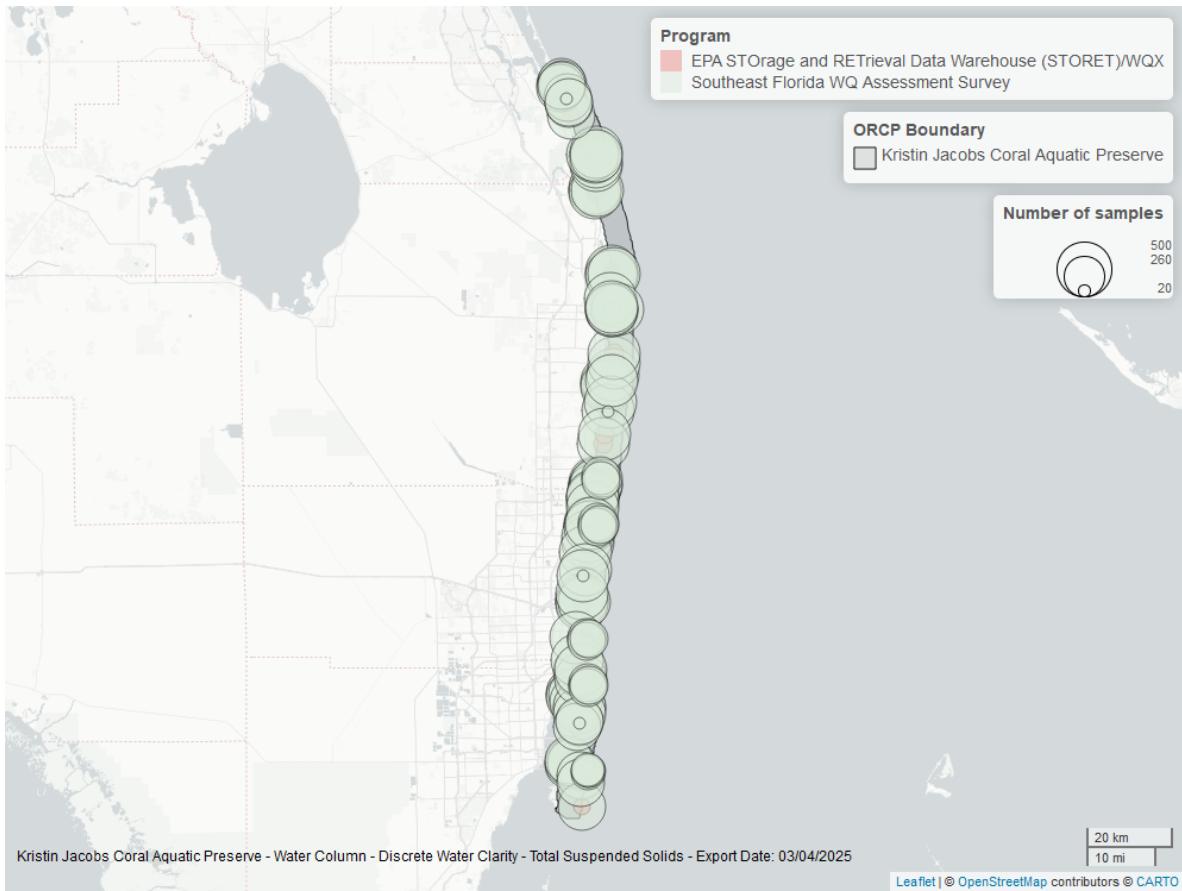


Figure 22: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Chlorophyll a, Uncorrected for Pheophytin - Discrete

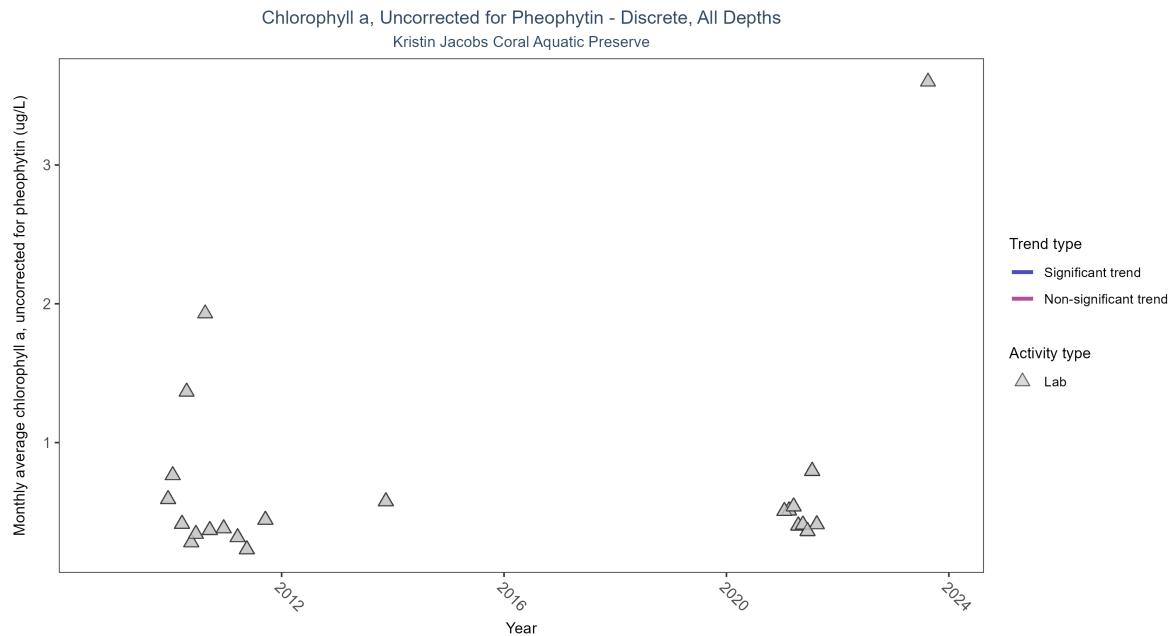


Figure 23: Scatter plot of monthly average levels of chlorophyll a, uncorrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles) is included in the plot.

Table 12: 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	Insufficient data to calculate trend	1930	6	2009 - 2023	0.3844	-	-	-	-

There was insufficient data to fit a model for chlorophyll a, uncorrected for pheophytin.

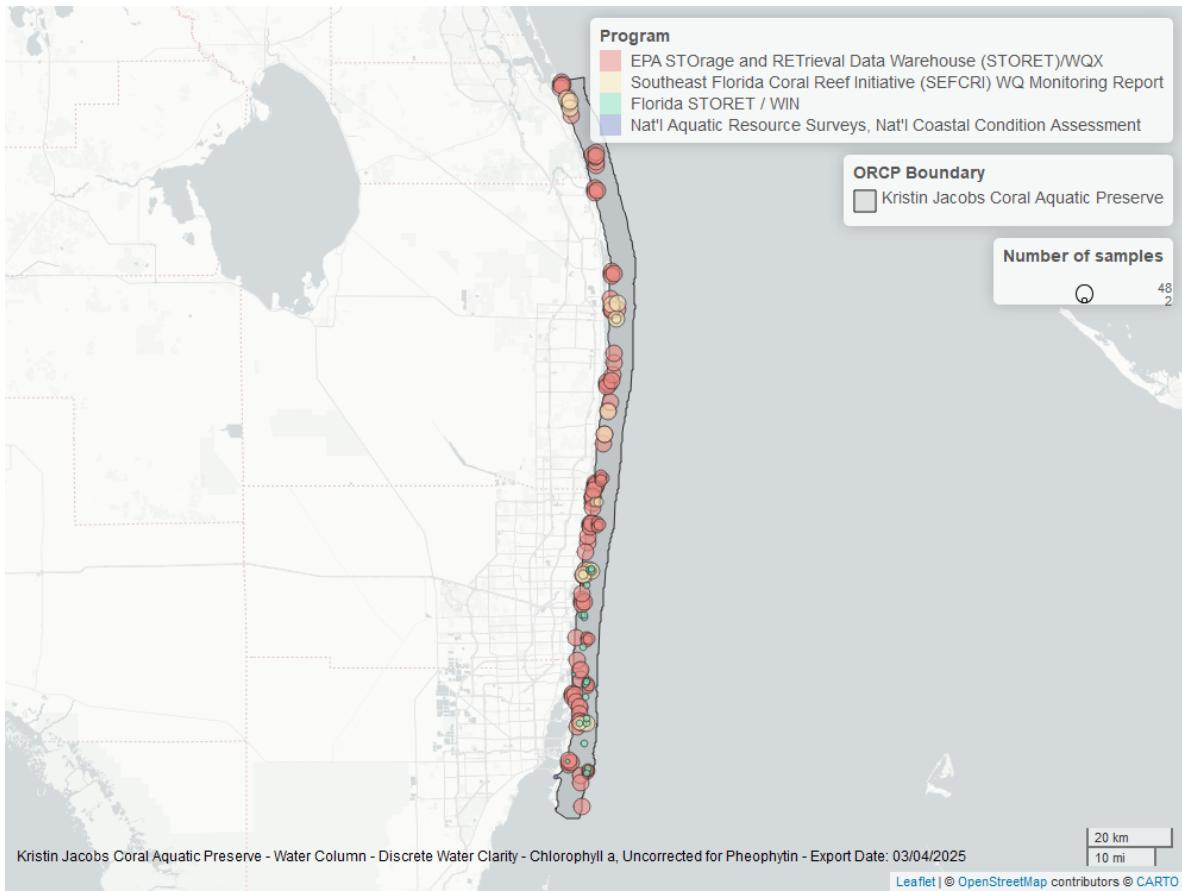


Figure 24: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Chlorophyll a, Corrected for Pheophytin - Discrete

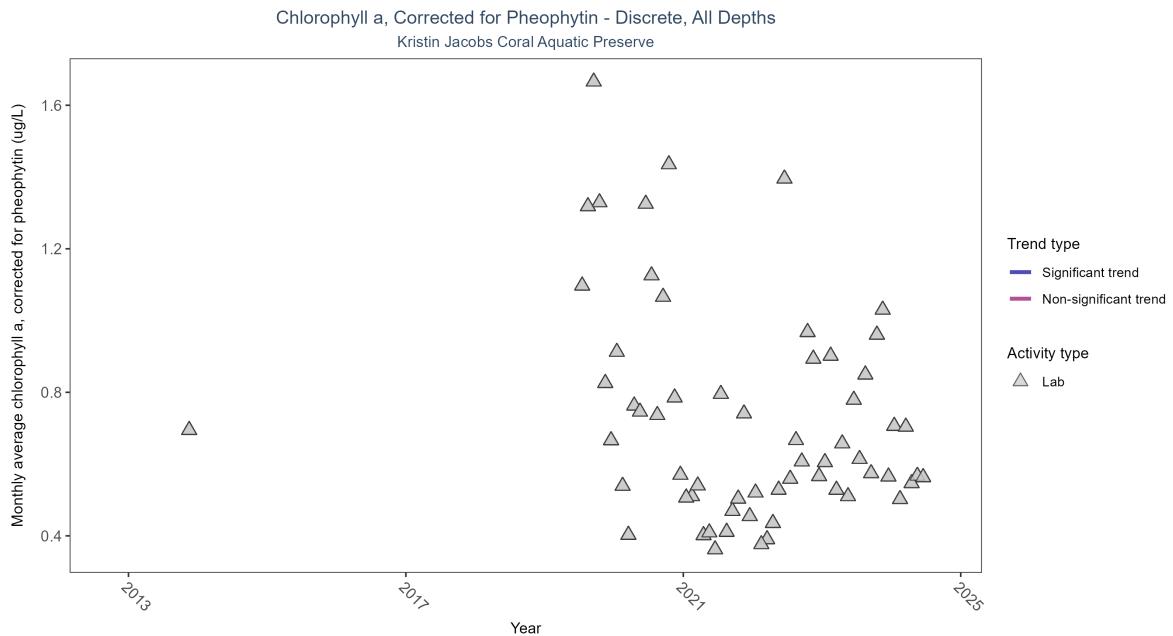


Figure 25: Scatter plot of monthly average levels of chlorophyll a, corrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles)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

Table 13: 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	Insufficient data to calculate trend	10009	7	2013 - 2024	0.464	-	-	-	-

There was insufficient data to fit a model for chlorophyll a, corrected for pheophytin.

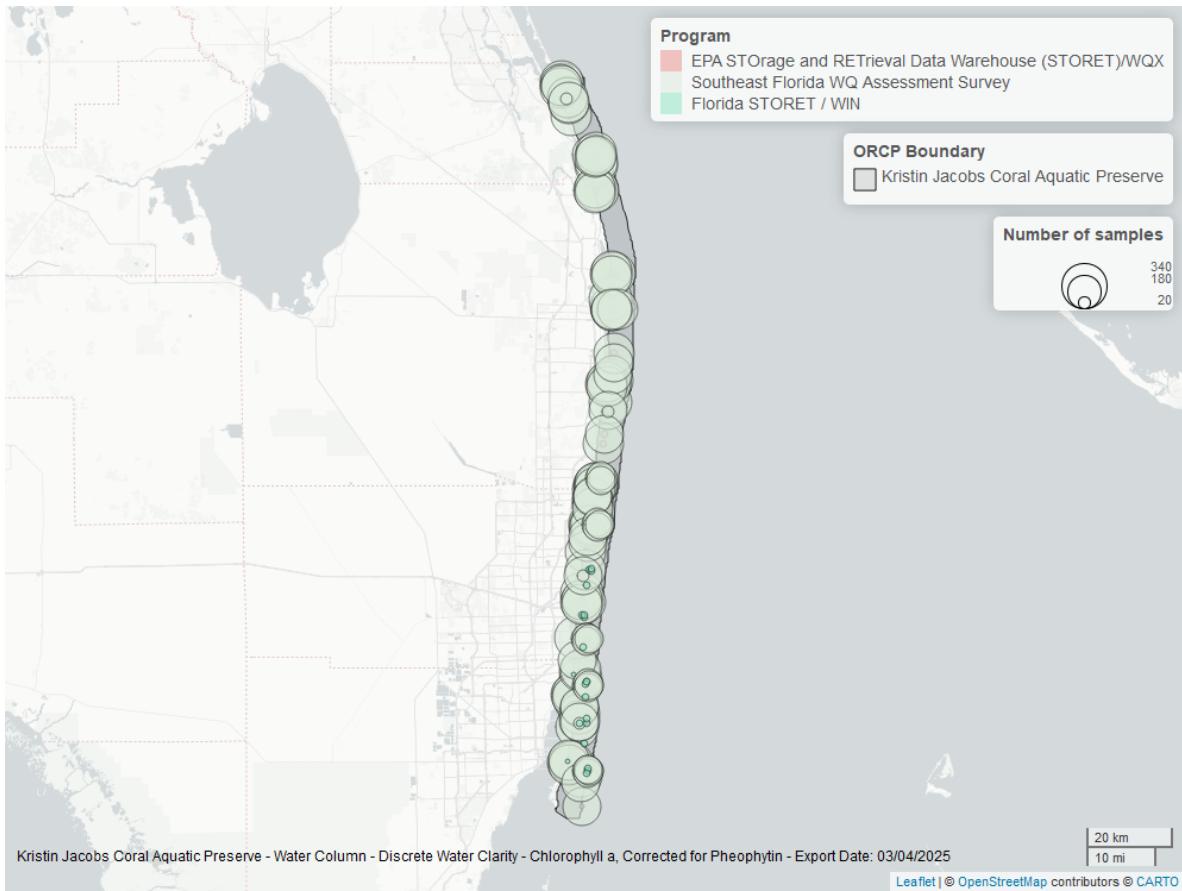


Figure 26: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Secchi Depth - Discrete

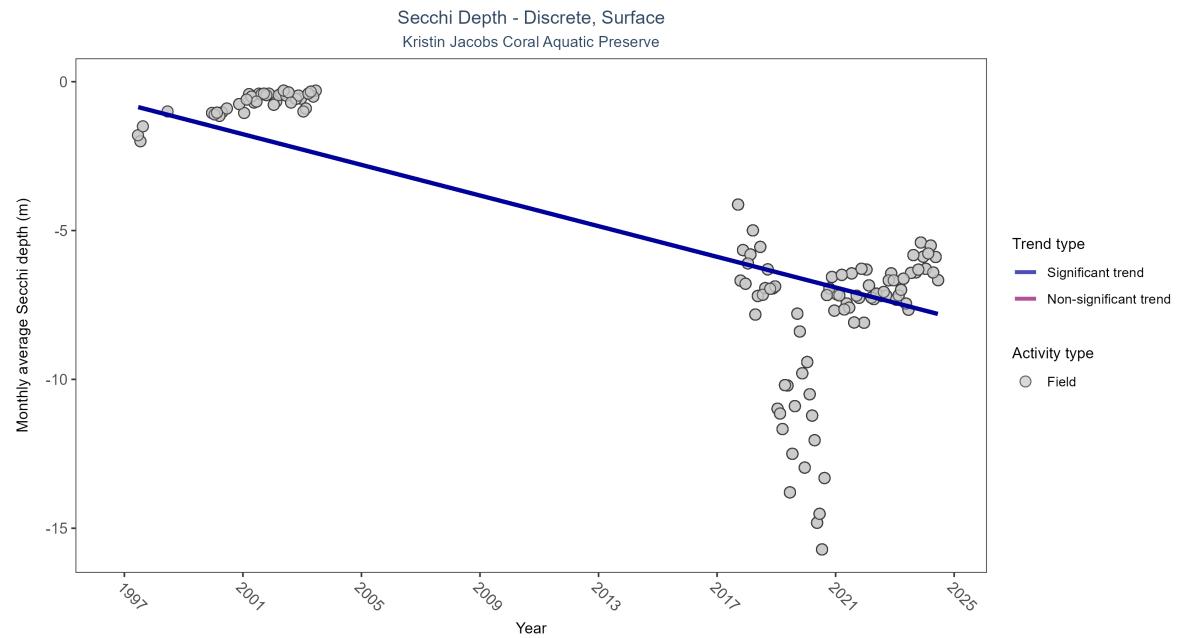


Figure 27: Scatter plot of monthly average Secchi depth over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Secchi depth is only measured in the field (circles).

Table 14: 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	8962	15	1997 - 2024	-6.1	-0.29757	-0.73362	-0.25747	0

Monthly average Secchi depth became deeper by 0.26 m per year, indicating an increase in water clarity.

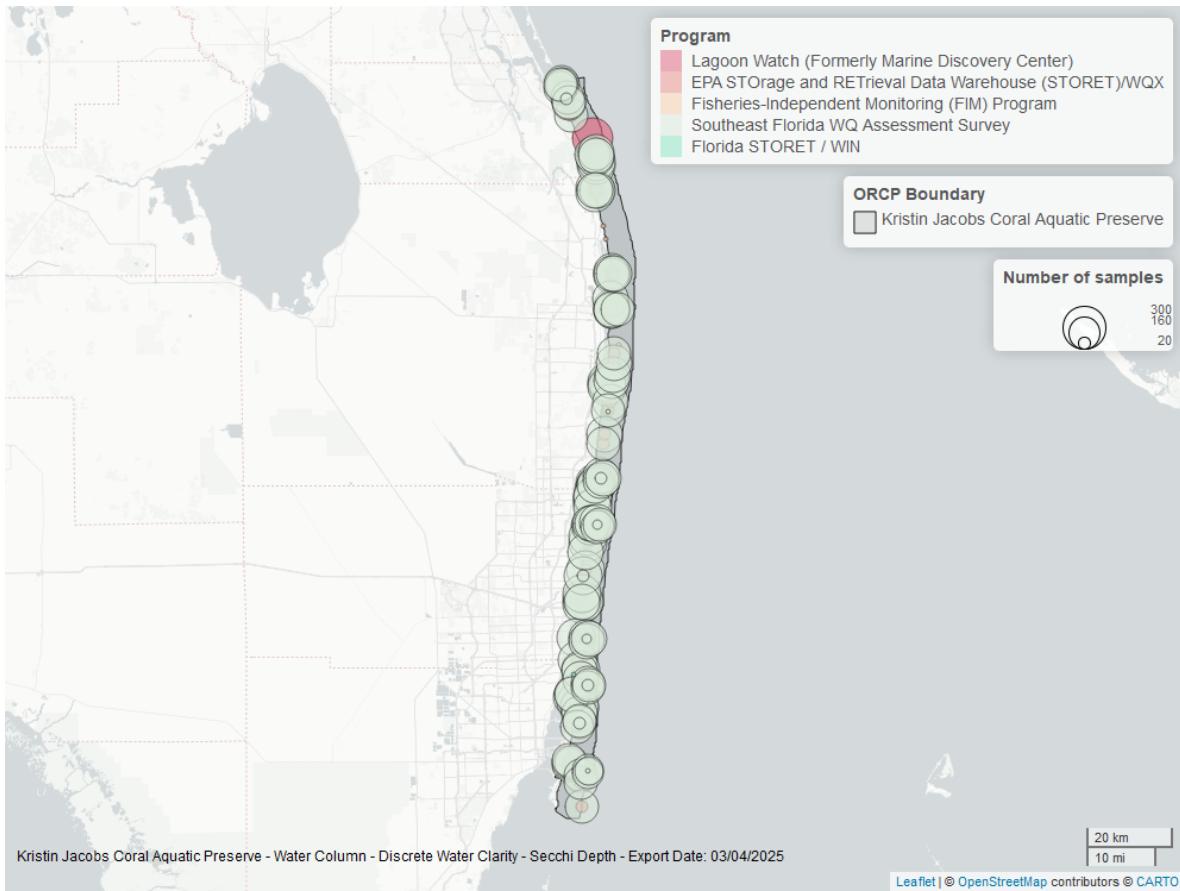


Figure 28: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Colored Dissolved Organic Matter - Discrete

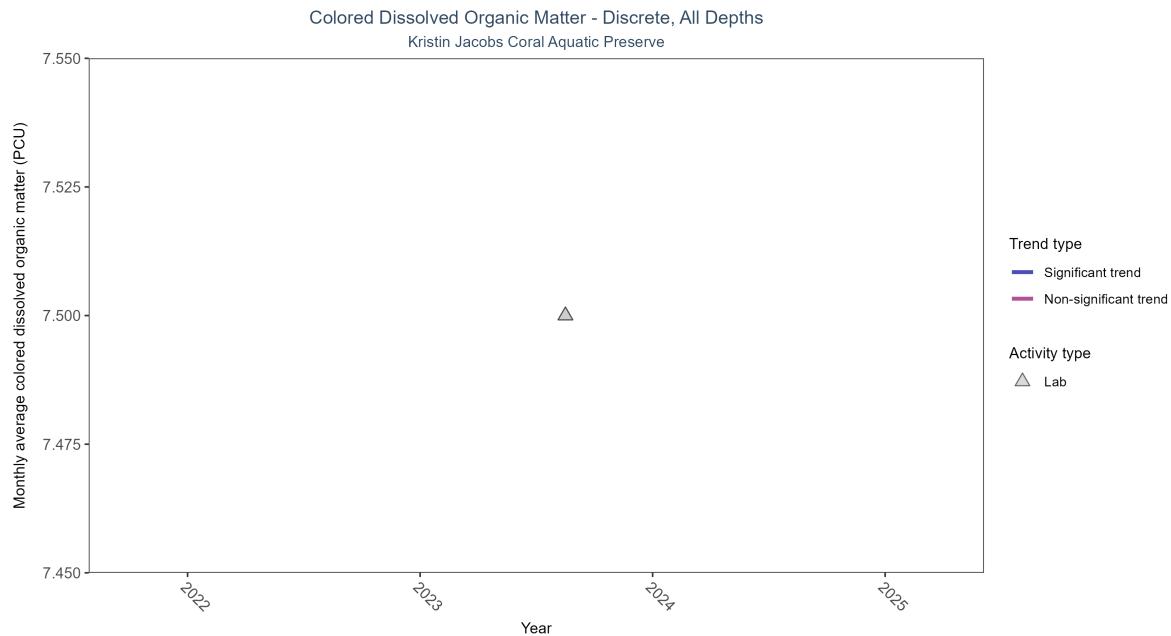


Figure 29: Scatter plot of monthly average colored dissolved organic matter (CDOM) over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed CDOM (triangles) is included in the plot.

Table 15: 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	1	1	2023 - 2023	7.5	-	-	-	-

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

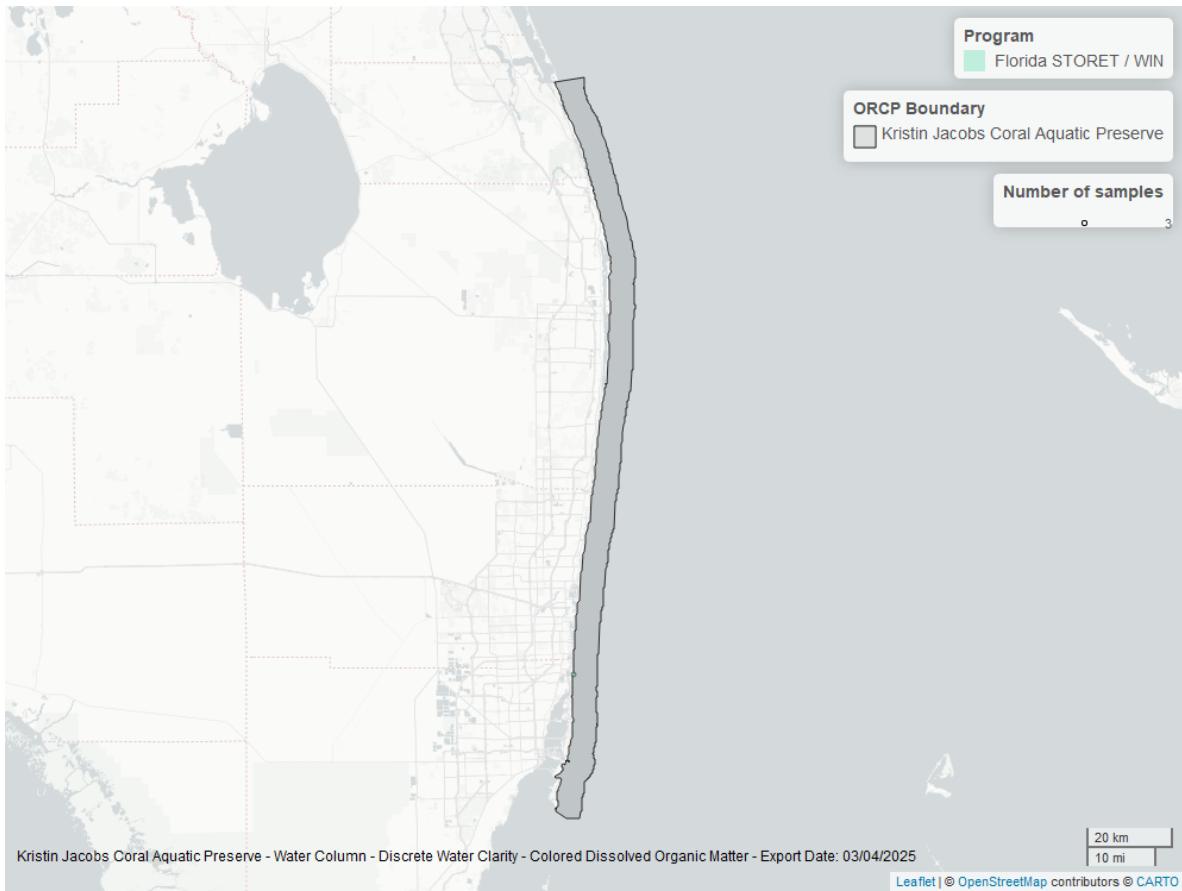


Figure 30: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.