

# Apalachicola Bay Aquatic Preserve

## SEACAR Water Quality Analysis

Last compiled on 30 September, 2025

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# Indicators

## Nutrients

### Total Nitrogen - Discrete

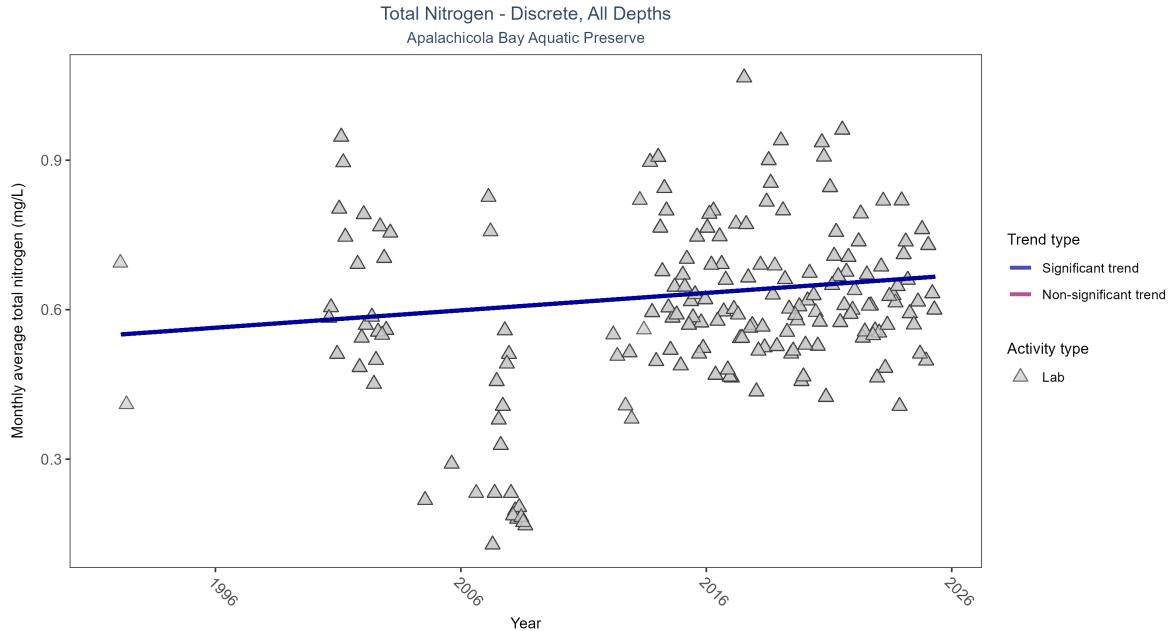


Figure 1: Scatter plot of monthly average total nitrogen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only nitrogen values obtained from laboratory analyses (triangles) are included in the 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	Significantly increasing trend	3337	24	1992 - 2025		0.62	0.1331	0.54976	0.00349	0.0157

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

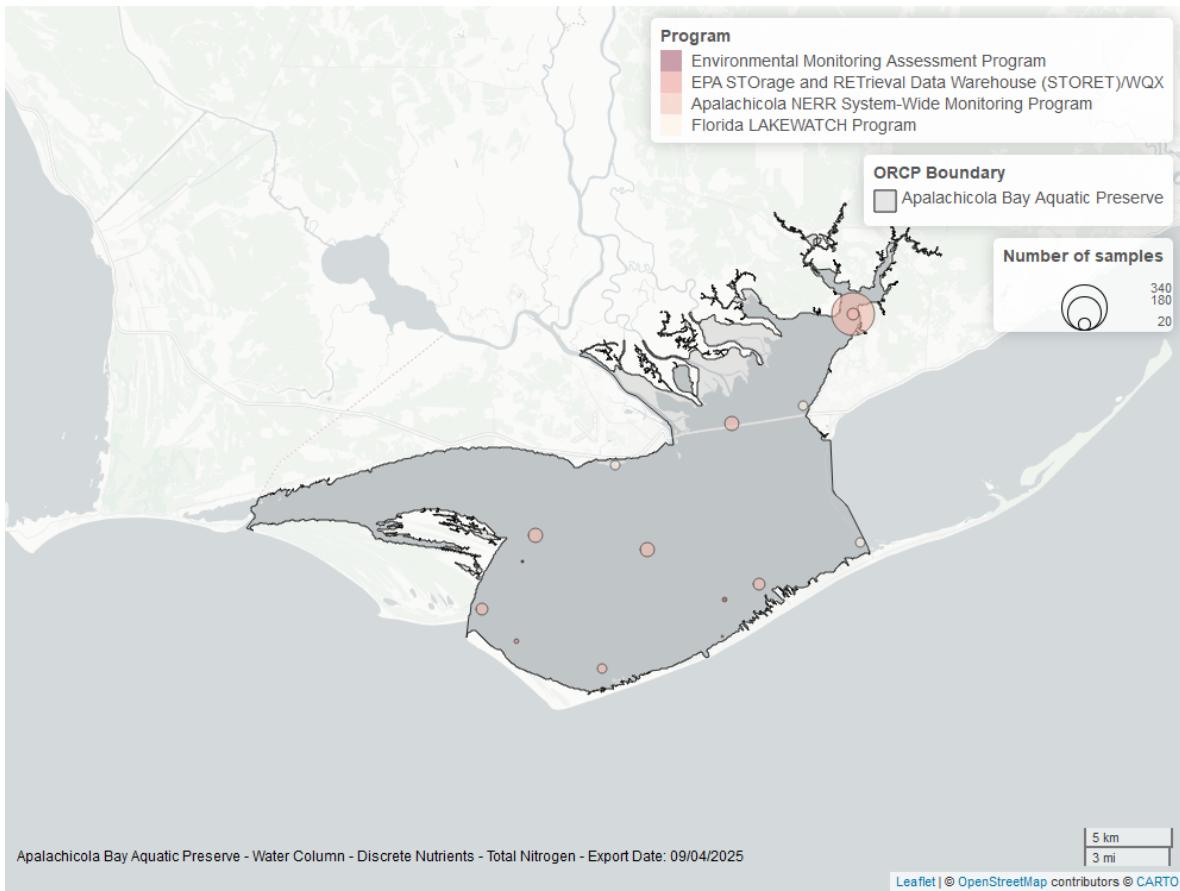


Figure 2: Map showing location of discrete water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Total Phosphorus - Discrete

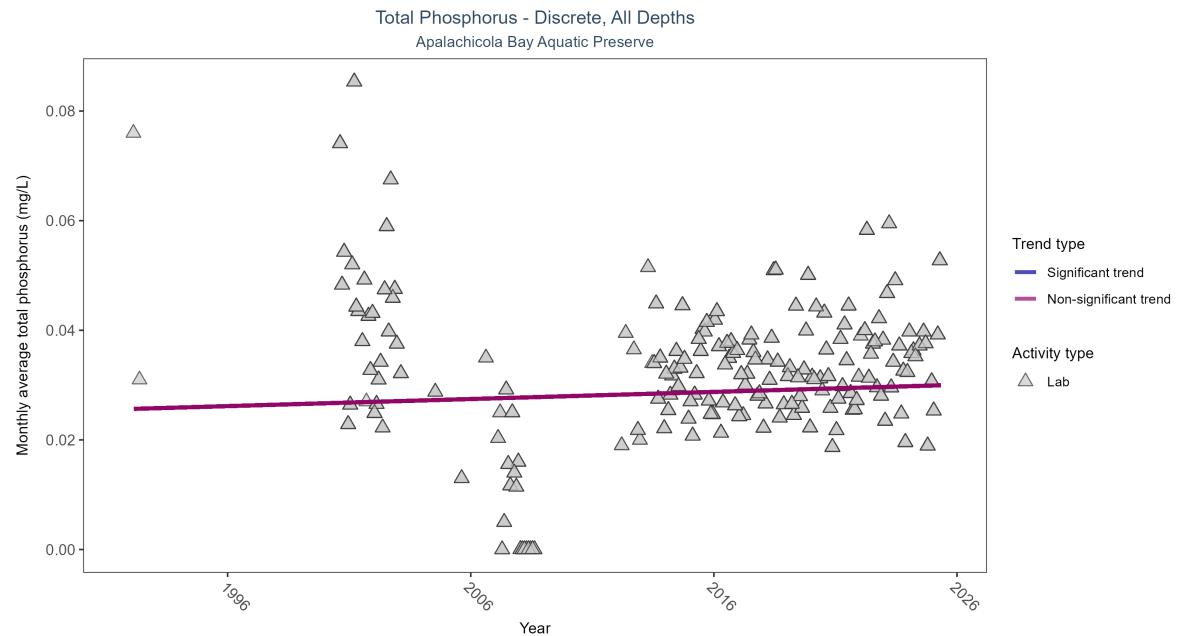


Figure 3: Scatter plot of monthly average total phosphorus over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only phosphorus values obtained from laboratory analyses (triangles) are included in 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	No significant trend	3625	24	1992 - 2025	0.031	0.05838	0.02564	0.00013	0.3311

Total phosphorus showed no detectable trend between 1992 and 2025.

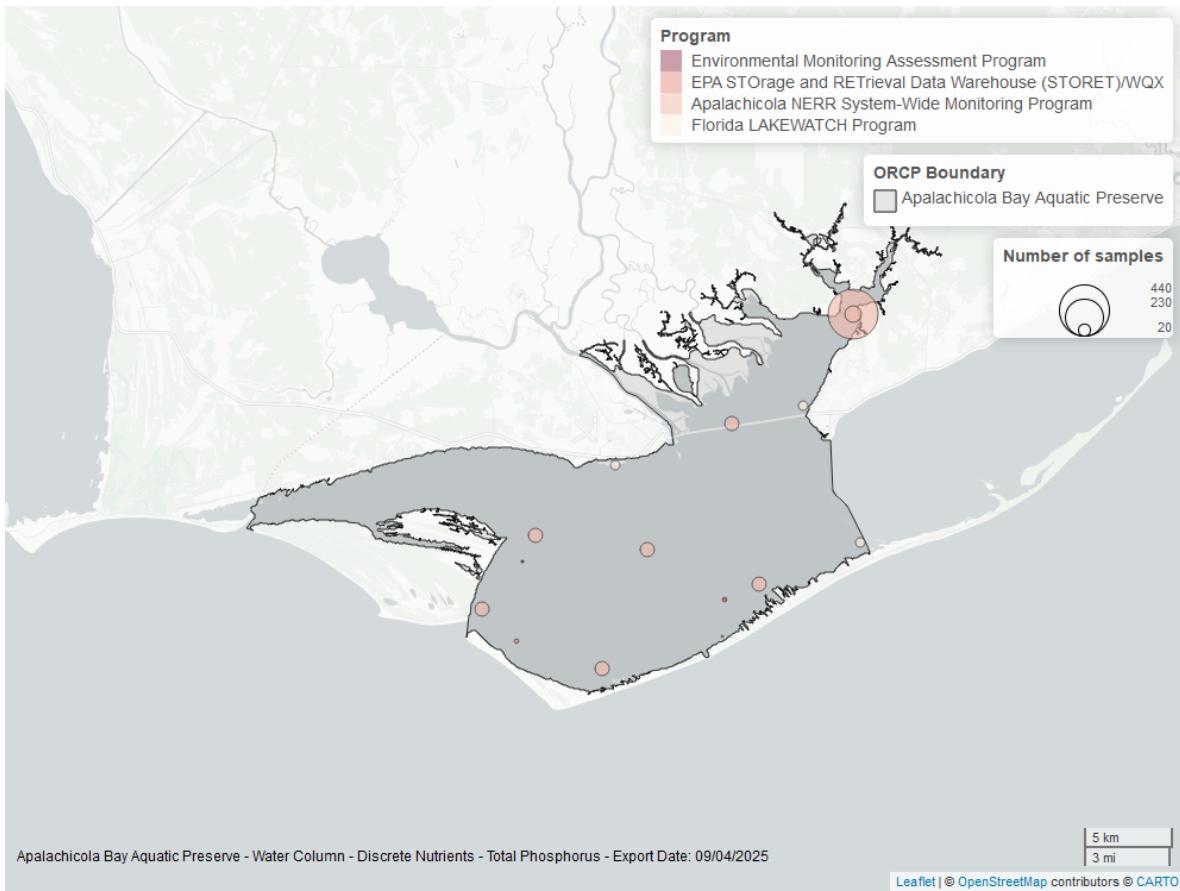


Figure 4: Map showing location of discrete water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Water Quality

### Dissolved Oxygen - Discrete

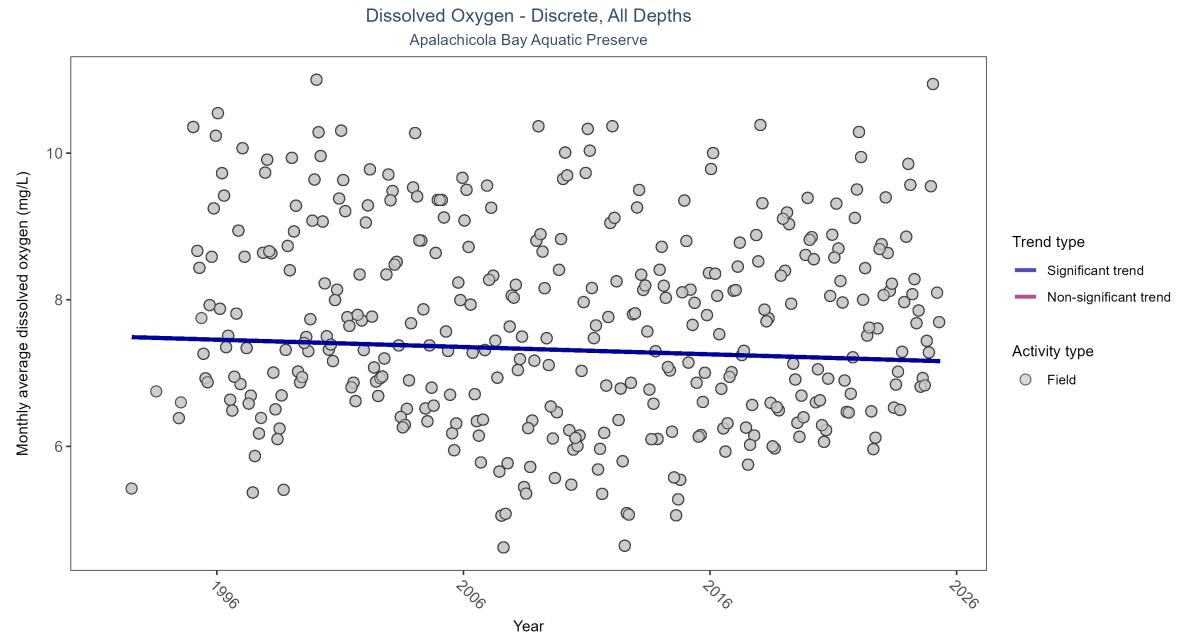


Figure 5: Scatter plot of monthly average dissolved oxygen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen values measured in the field (circles) are included in the plot.

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	54142	34	1992 - 2025	7.5	-0.08491	7.49505	-0.00998	0.0216

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

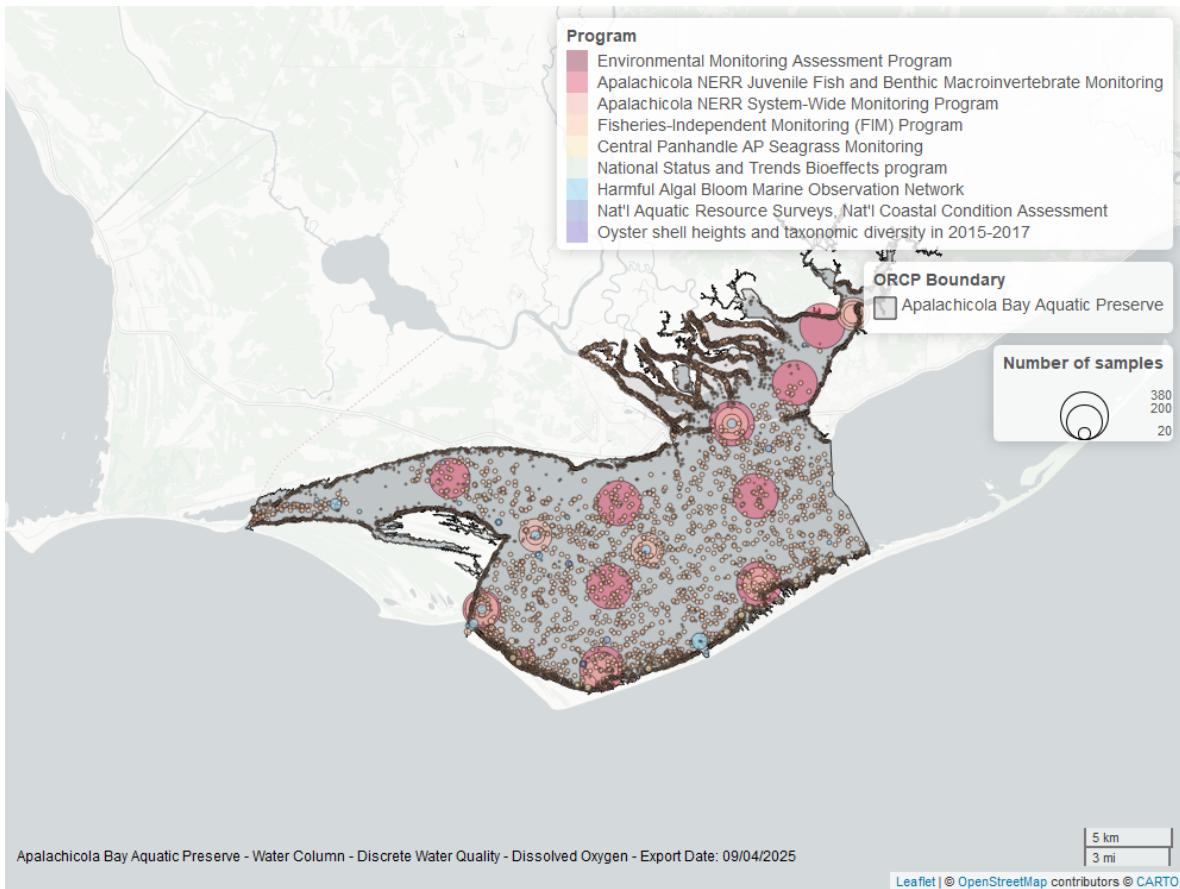


Figure 6: Map showing location of discrete water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Dissolved Oxygen - Continuous

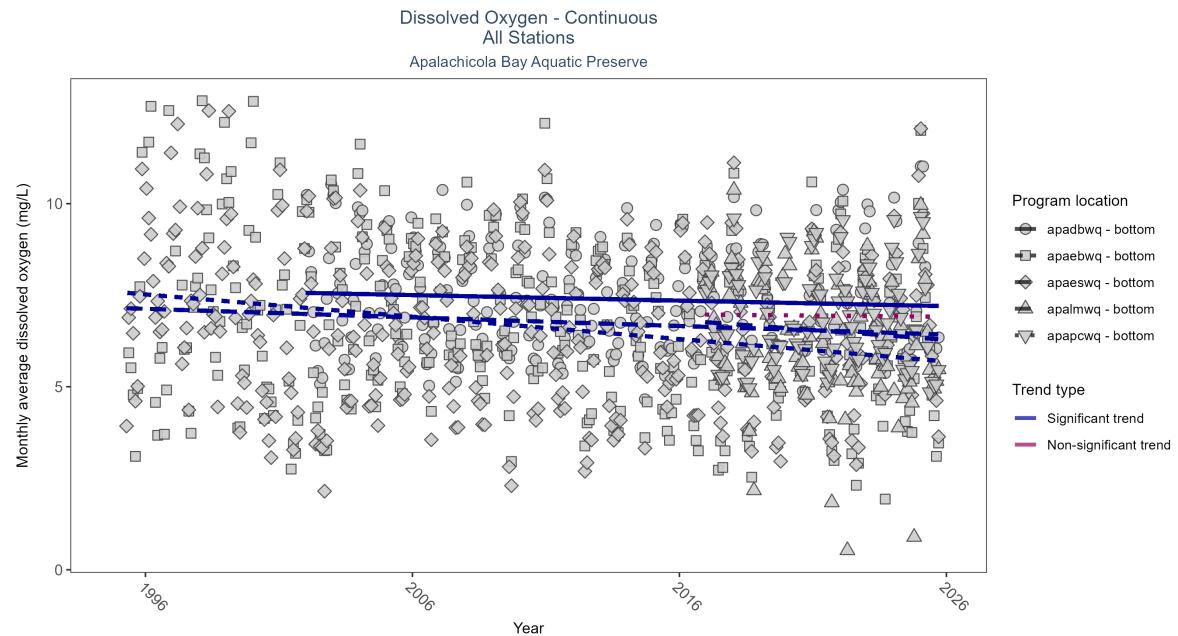


Figure 7: Scatter plot of monthly average dissolved oxygen over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
apapcwq	No significant trend	289558	10	2016 - 2025	6.8	-0.02	6.98	-0.01	0.8774
apaeswq	Significantly decreasing trend	733356	31	1995 - 2025	6.8	-0.13	7.15	-0.02	6e-04
apalmwq	Significantly decreasing trend	275414	10	2016 - 2025	6.3	-0.20	6.81	-0.05	0.0104
apadbwq	Significantly decreasing trend	641801	24	2002 - 2025	7.2	-0.14	7.56	-0.02	0.0012
apaebwq	Significantly decreasing trend	685348	31	1995 - 2025	6.8	-0.30	7.58	-0.06	0

At four program locations, monthly average dissolved oxygen decreased between 0.02 and 0.06 mg/L per year. No detectable change in monthly average dissolved oxygen was observed at one location.

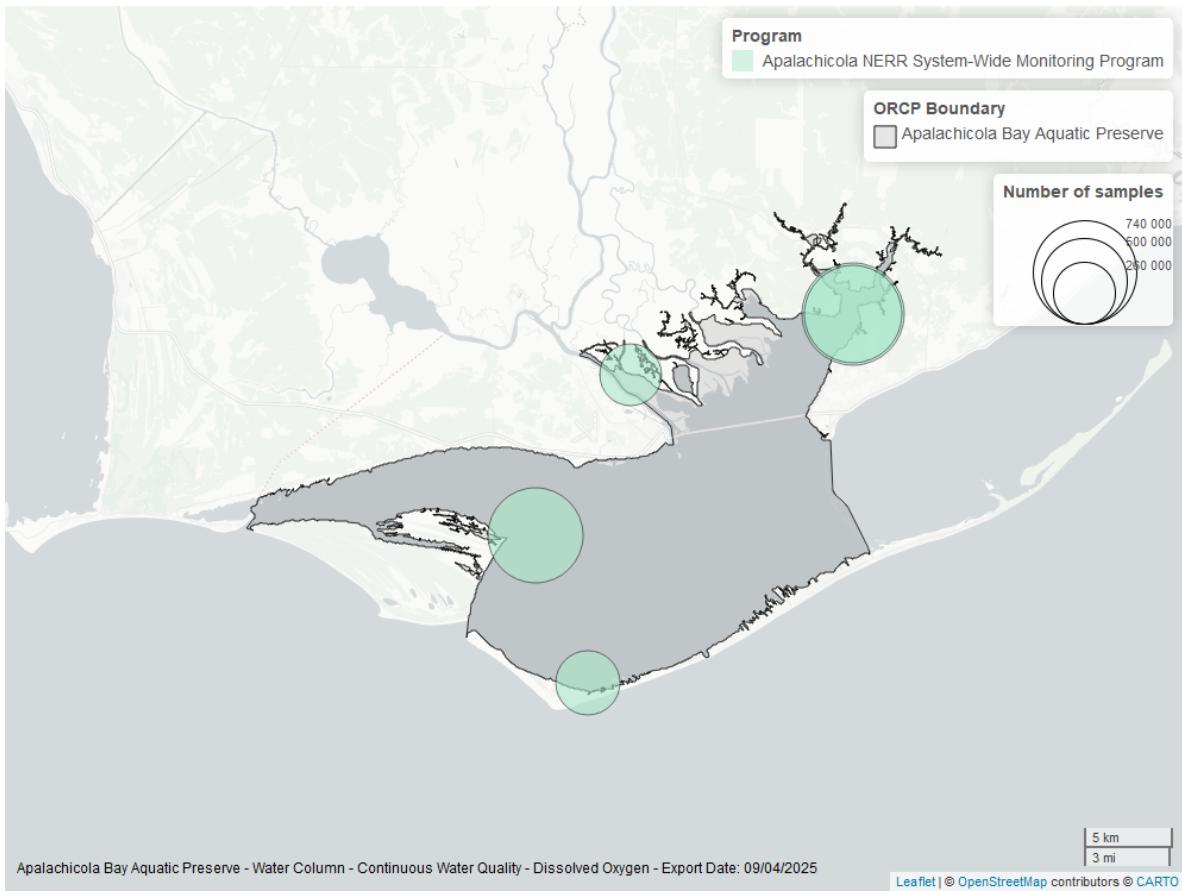


Figure 8: Map showing location of dissolved oxygen continuous water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Dissolved Oxygen Saturation - Discrete

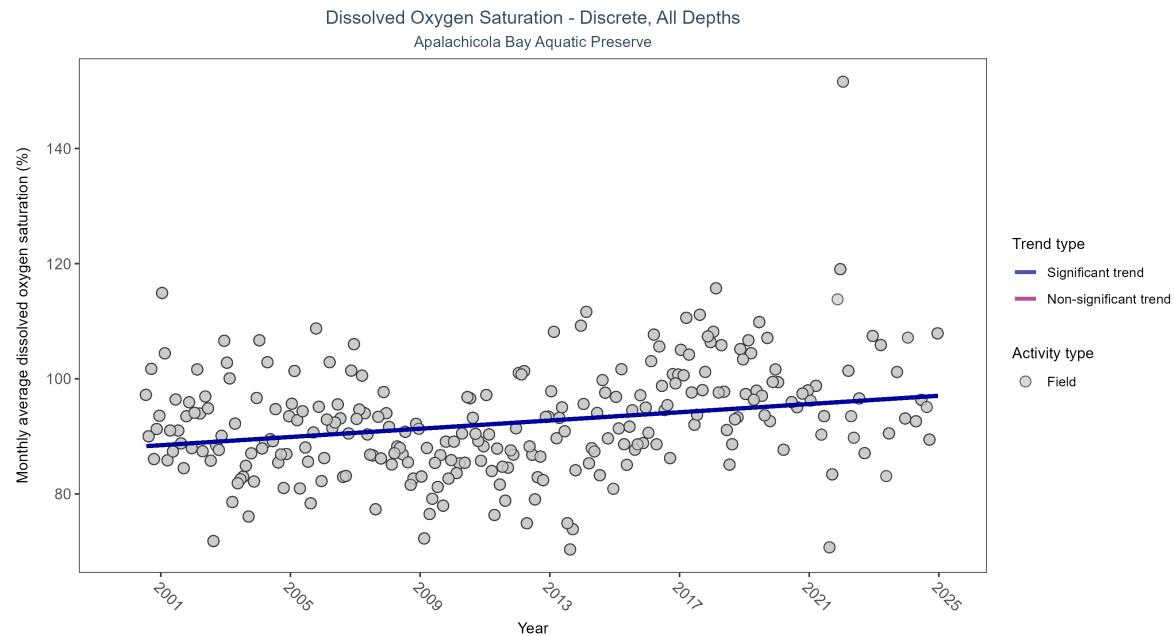


Figure 9: Scatter plot of monthly average dissolved oxygen saturation over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen saturation values measured in the field (circles) 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	5544	25	2000 - 2024	92.8	0.21816	88.10573	0.35786	0

Monthly average dissolved oxygen saturation increased by 0.36% per year.

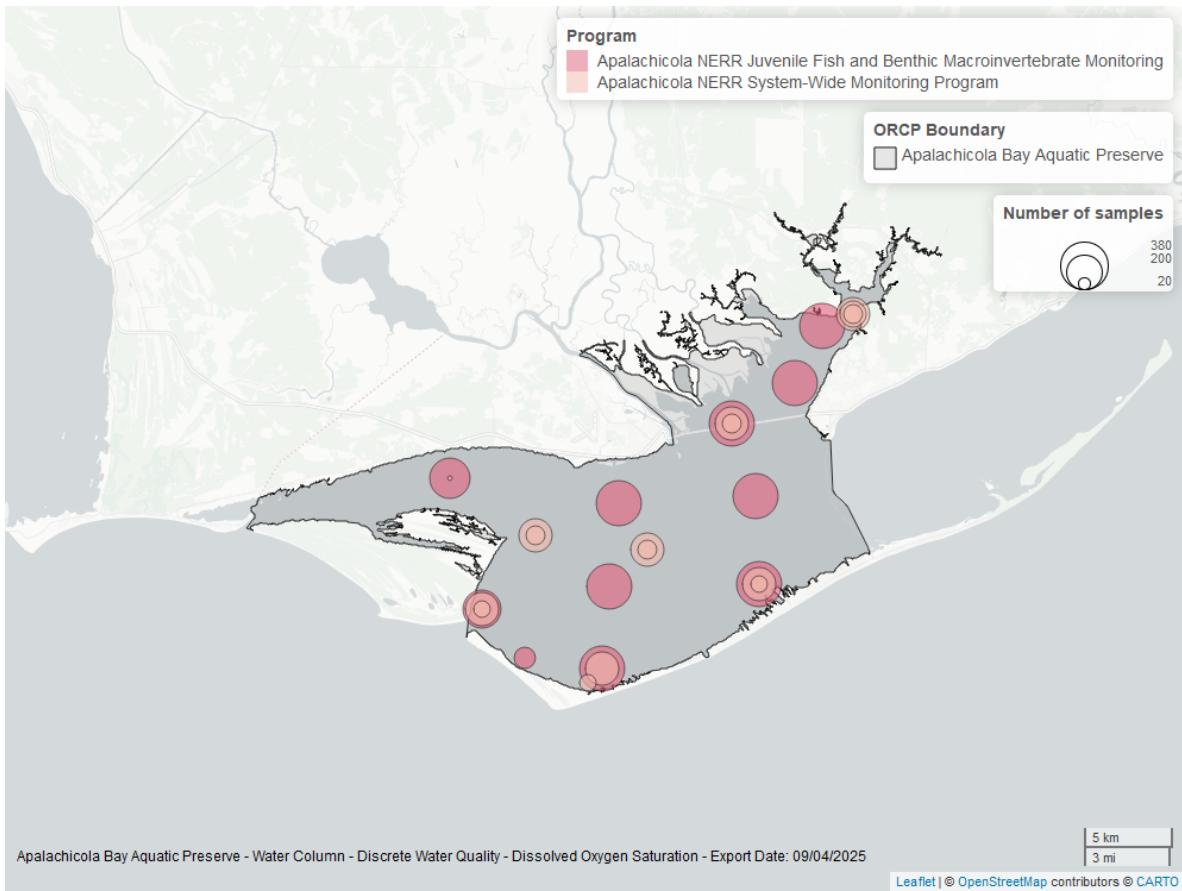


Figure 10: Map showing location of discrete water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Dissolved Oxygen Saturation - Continuous

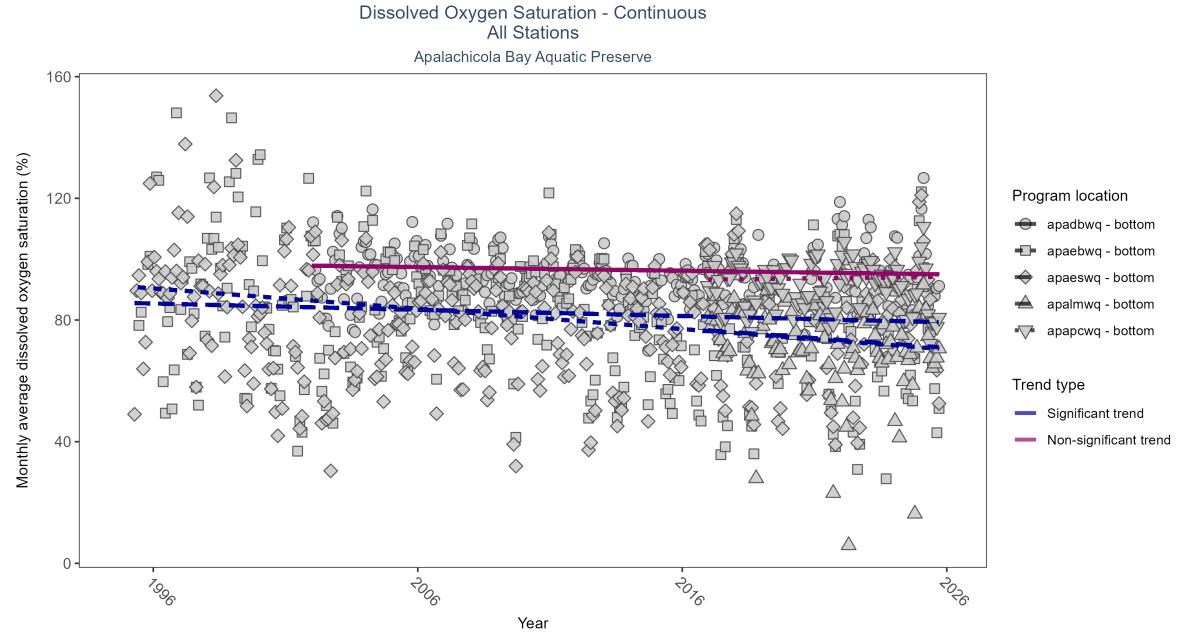


Figure 11: Scatter plot of monthly average dissolved oxygen saturation over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
apalmwq	Significantly decreasing trend	275950	10	2016 - 2025	74.6	-0.21	77.22	-0.64	0.0073
apaebwq	Significantly decreasing trend	681137	31	1995 - 2025	84.5	-0.26	91.05	-0.67	0
apapcwq	No significant trend	293014	10	2016 - 2025	93.9	0.03	93.21	0.10	0.6435
apaeswq	Significantly decreasing trend	734556	31	1995 - 2025	84.2	-0.09	85.63	-0.21	0.0172
apadbwq	No significant trend	645250	24	2002 - 2025	94.7	-0.08	97.86	-0.12	0.0663

At three program locations, monthly average dissolved oxygen saturation decreased between 0.21 and 0.67% per year. No detectable change in monthly average dissolved oxygen saturation was observed at two locations.

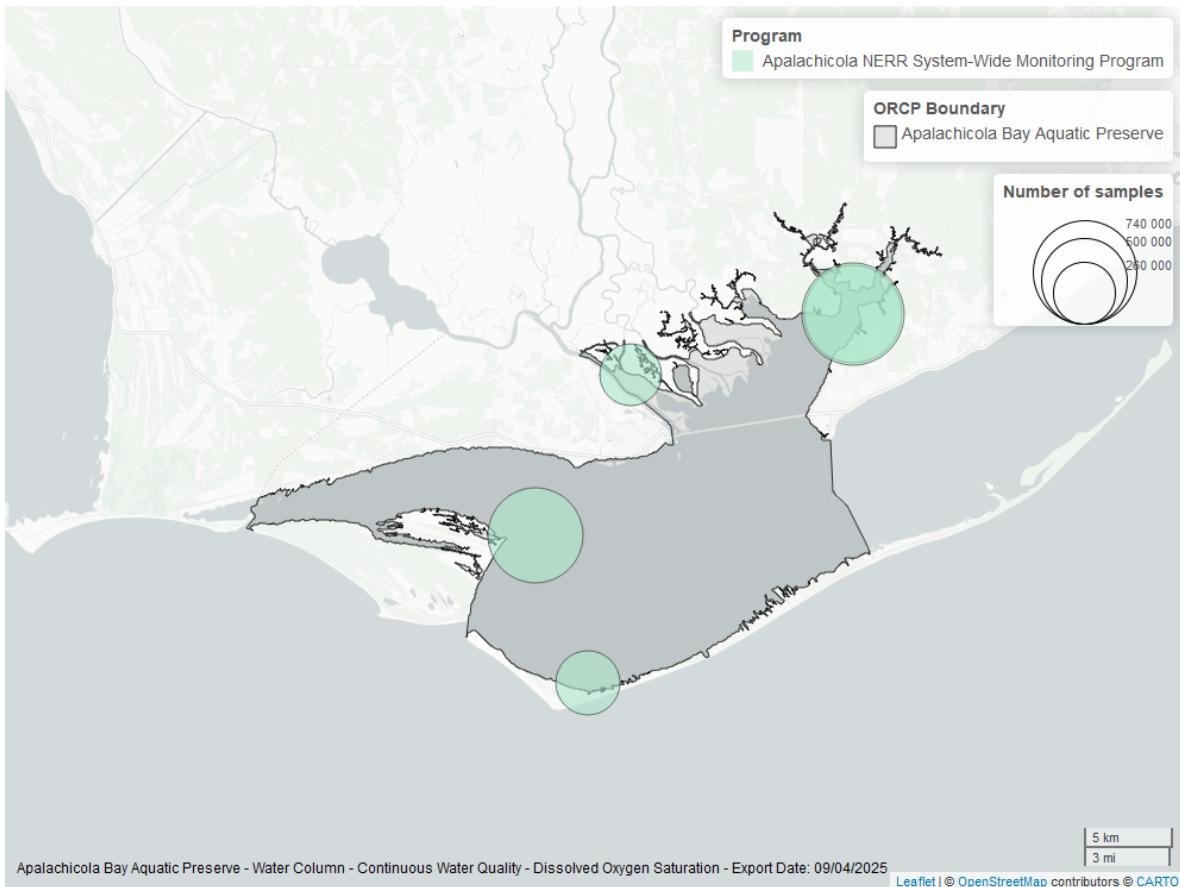


Figure 12: Map showing location of dissolved oxygen saturation continuous water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Salinity - Discrete

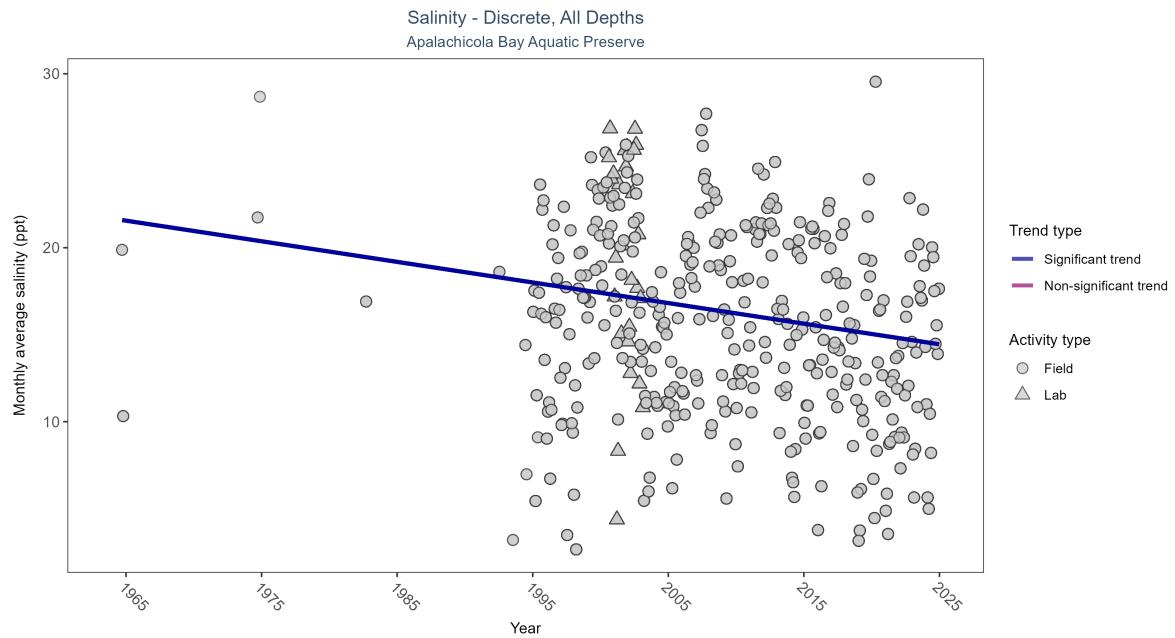


Figure 13: Scatter plot of monthly average salinity over time. If the time series included ten or more years of discrete observations, significant (blue) or non-significant (magenta) trend lines are also shown. Discrete salinity values derived from grab samples analyzed in the field (circles) or the 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	63140	36	1964 - 2024	15.8	-0.16545	21.67417	-0.11844	0

Monthly average salinity decreased by 0.12 ppt per year.

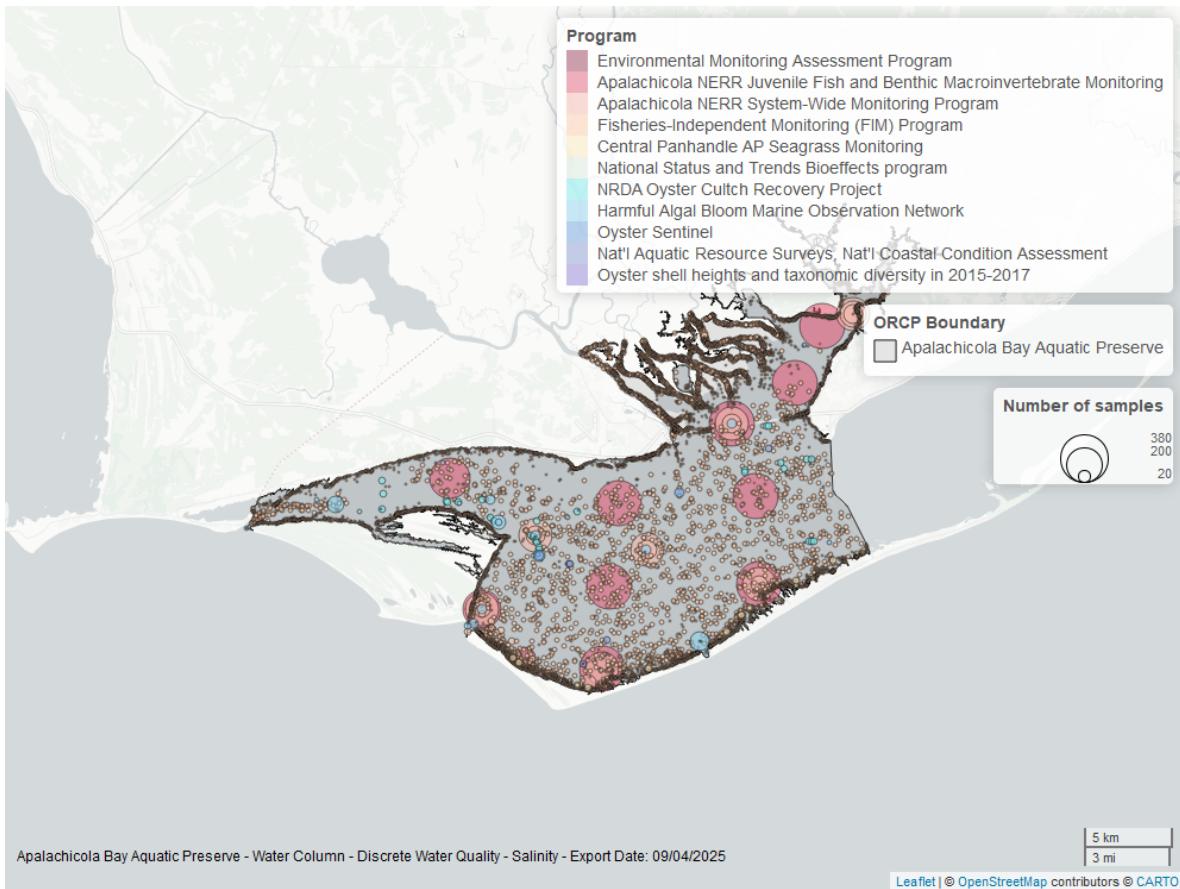


Figure 14: Map showing location of discrete water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Salinity - Continuous

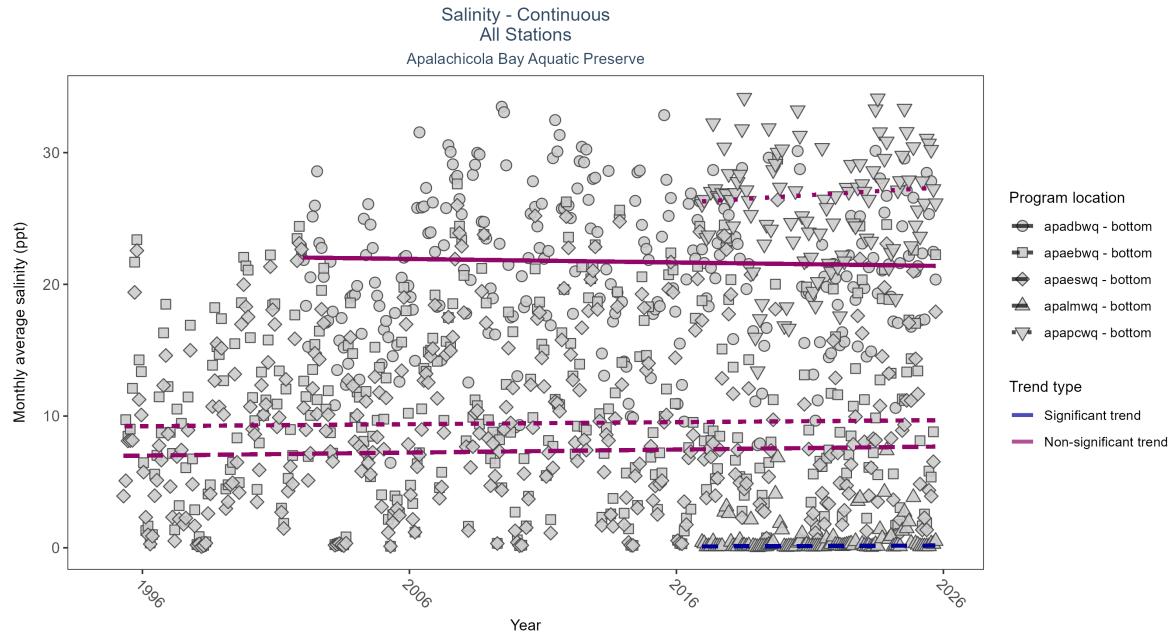


Figure 15: Scatter plot of monthly average salinity over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
apalmwq	Significantly increasing trend	291127	10	2016 - 2025	0.1	0.18	0.09	0.01	0.0204
apaeswq	No significant trend	778085	31	1995 - 2025	7.3	0.04	6.97	0.02	0.2995
apapcwq	No significant trend	291880	10	2016 - 2025	27.0	0.08	26.18	0.12	0.3086
apaebwq	No significant trend	768387	31	1995 - 2025	9.7	0.03	9.21	0.02	0.4613
apadbwq	No significant trend	640362	24	2002 - 2025	22.2	-0.03	22.03	-0.03	0.5212

At one program location, monthly average salinity increased by 0.01 ppt per year. No detectable change in monthly average salinity was observed at four locations.

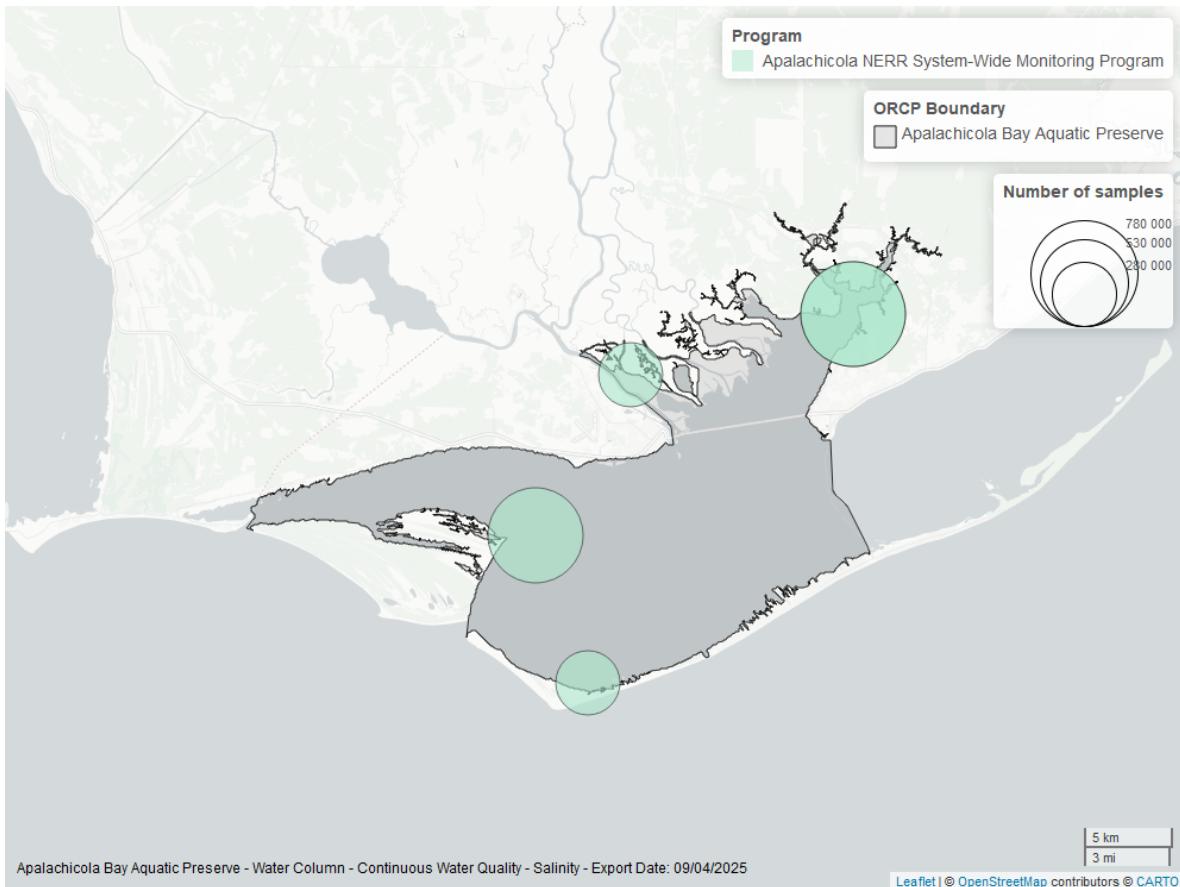


Figure 16: Map showing location of salinity continuous water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Water Temperature - Discrete

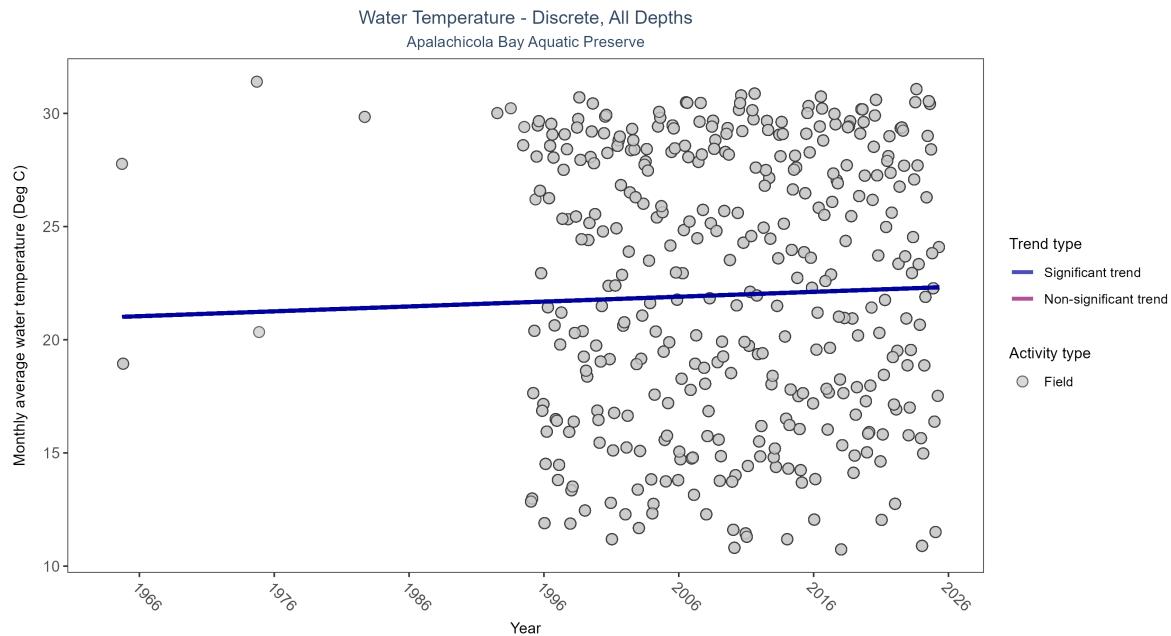


Figure 17: Scatter plot of monthly average water temperature over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only water temperature measurements taken in the field (circles) are included in 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	63038	37	1964 - 2025	24	0.10634	20.99746	0.02151	0.004

Monthly average water temperature increased by  $0.02^{\circ}\text{C}$  per year.

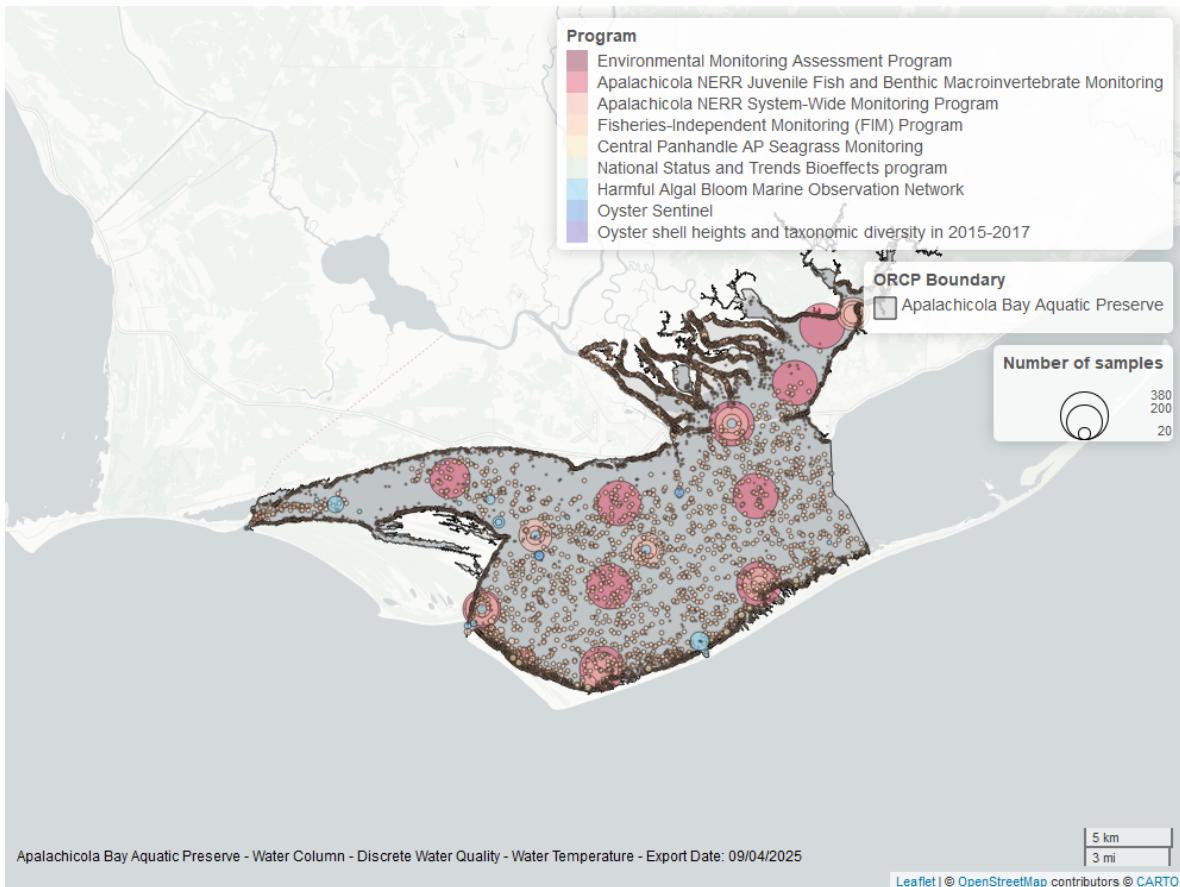


Figure 18: Map showing location of discrete water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Water Temperature - Continuous

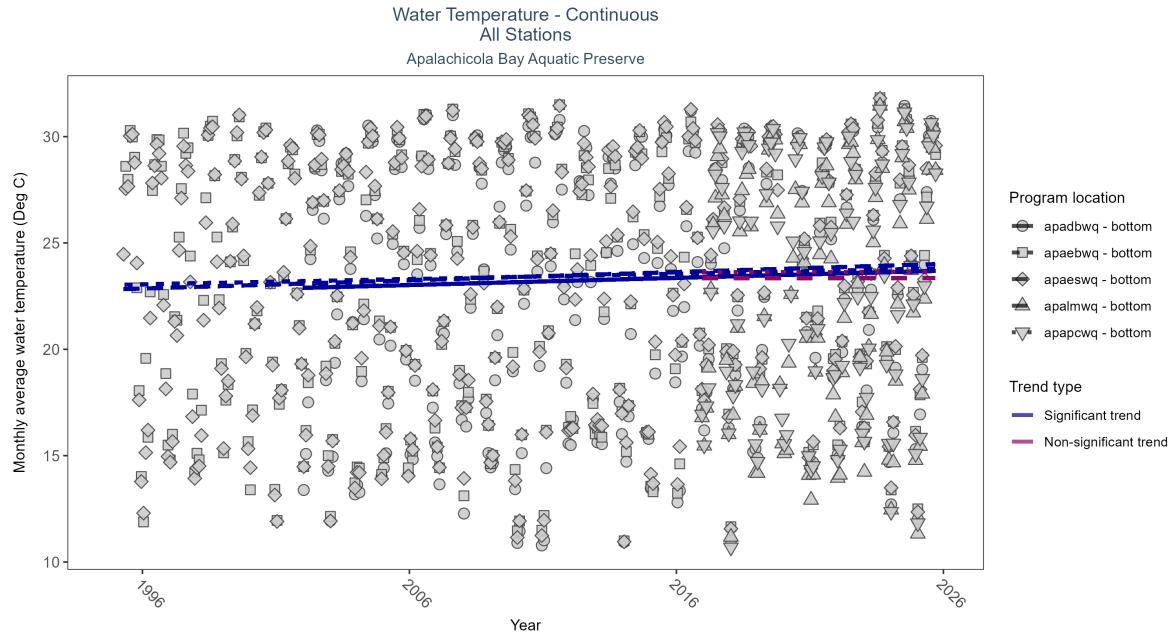


Figure 19: Scatter plot of monthly average water temperature over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
apapcwq	No significant trend	295378	10	2016 - 2025	23.4	0.00	23.62	0.00	0.9754
apalmwq	No significant trend	293385	10	2016 - 2025	22.9	0.00	23.35	0.00	1
apaeswq	Significantly increasing trend	787341	31	1995 - 2025	24.2	0.20	22.82	0.04	0
apadbwq	Significantly increasing trend	666370	24	2002 - 2025	23.5	0.17	22.89	0.03	1e-04
apaebwq	Significantly increasing trend	783431	31	1995 - 2025	24.3	0.16	23.03	0.02	0

At three program locations, monthly average water temperature increased between 0.02 and 0.04°C per year. No detectable change in monthly average water temperature was observed at two locations.

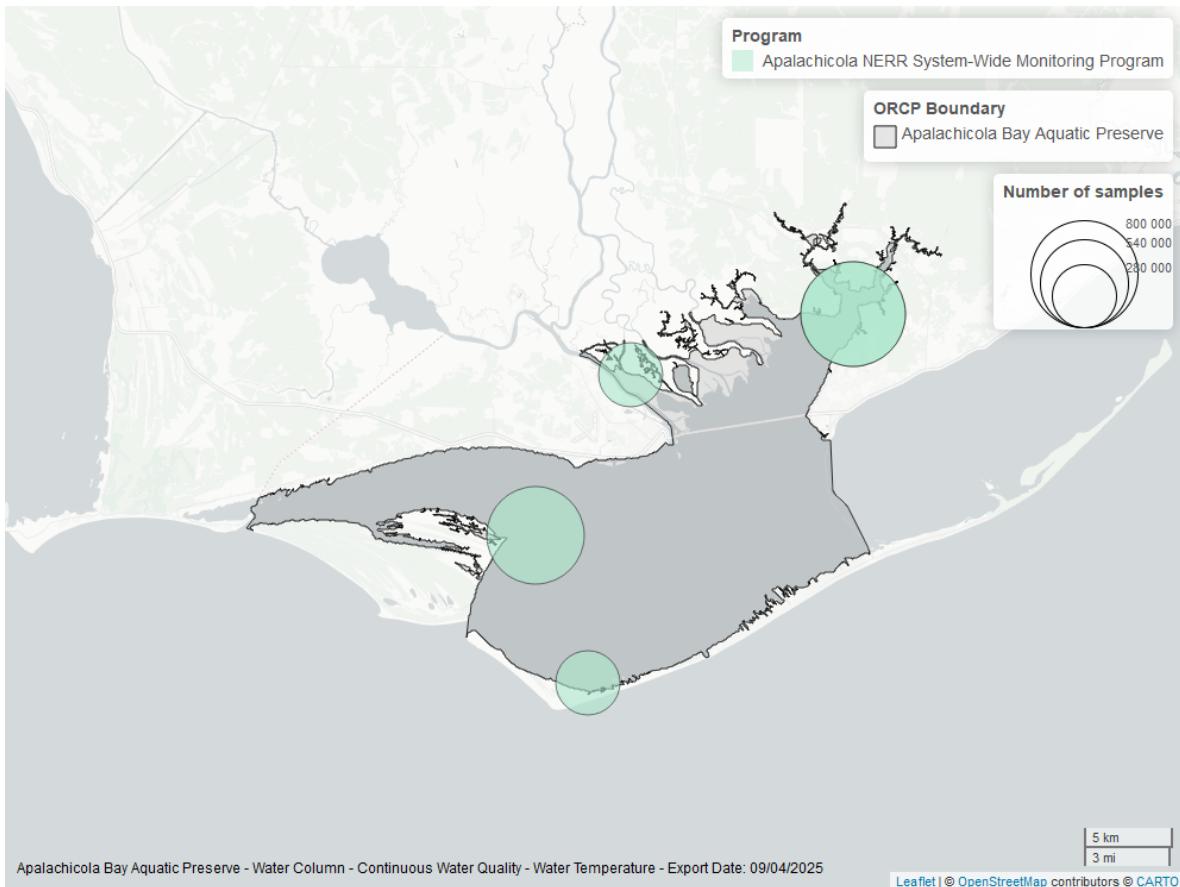


Figure 20: Map showing location of water temperature continuous water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## pH - Discrete

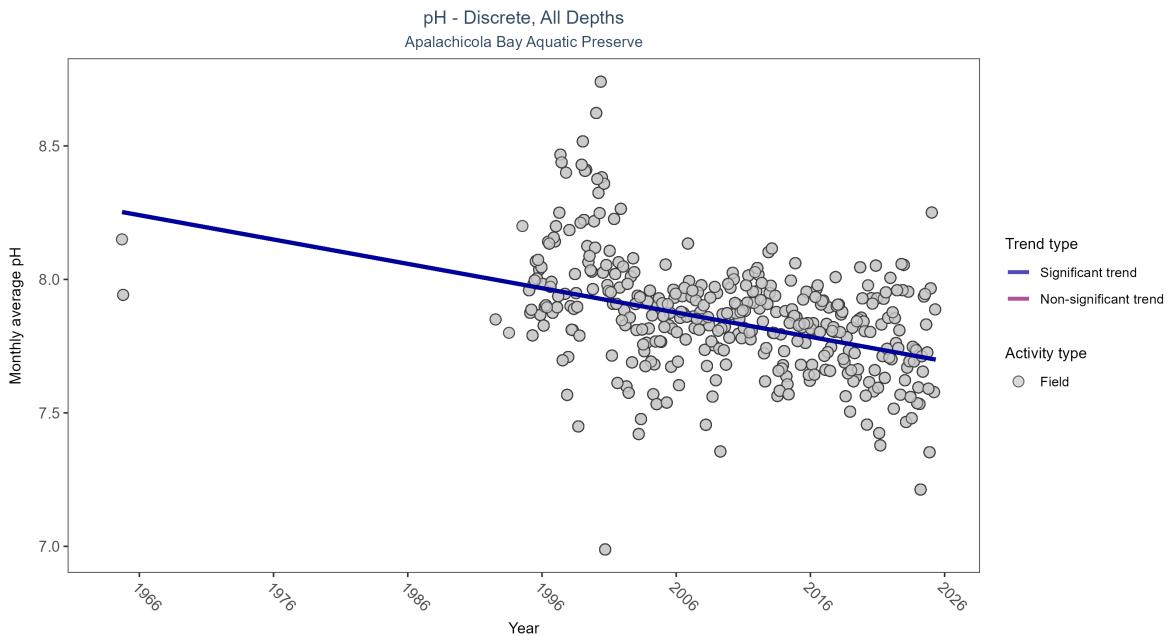


Figure 21: Scatter plot of monthly average pH over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only pH values measured in the field (circles) are included in the plot.

Table 11: Seasonal Kendall-Tau Results for - pH

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
Field	Significantly decreasing trend	42657	35	1964 - 2025	8	-0.30069	8.25895	-0.00912	0

Monthly average pH decreased by 0.01 pH units per year.

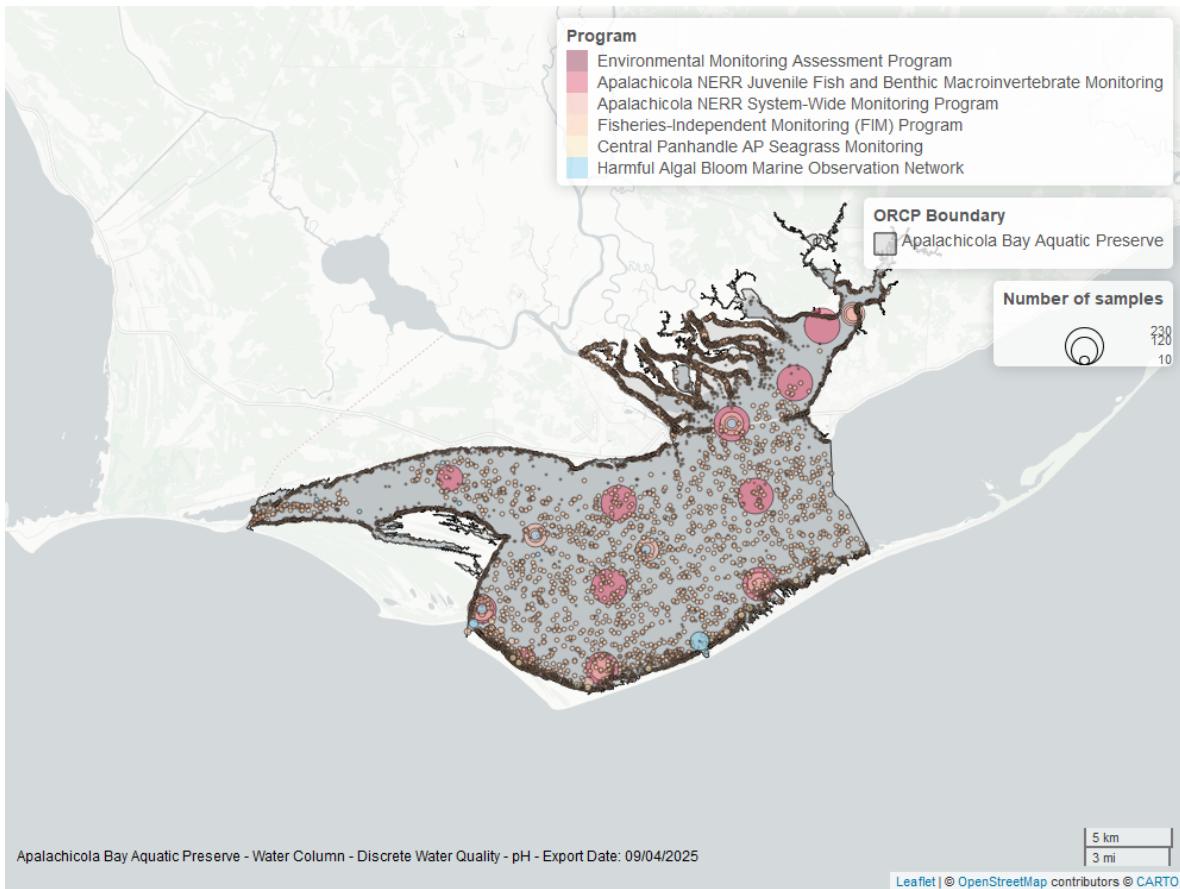


Figure 22: Map showing location of discrete water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## pH - Continuous

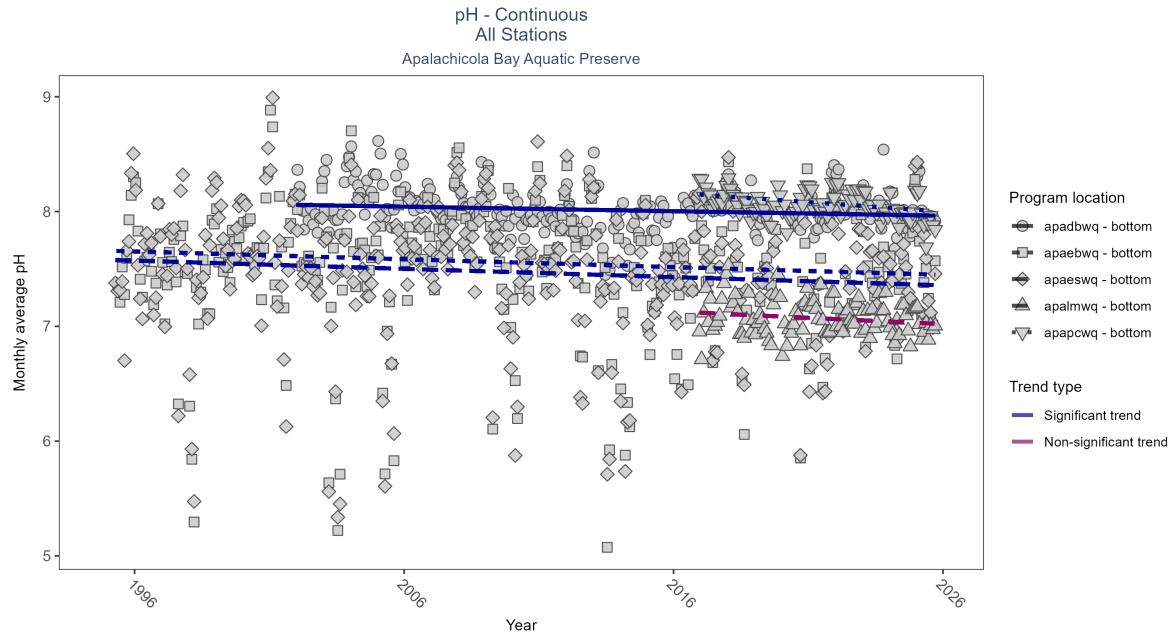


Figure 23: Scatter plot of monthly average pH over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
apaeswq	Significantly decreasing trend	736038	31	1995 - 2025	7.5	-0.12	7.58	-0.01	0.0011
apadbwq	Significantly decreasing trend	623515	24	2002 - 2025	8.0	-0.13	8.06	0.00	0.0031
apalmwq	No significant trend	283547	10	2016 - 2025	7.1	-0.13	7.13	-0.01	0.1156
apapcwq	Significantly decreasing trend	289516	10	2016 - 2025	8.1	-0.34	8.16	-0.02	0
apaebwq	Significantly decreasing trend	738964	31	1995 - 2025	7.6	-0.12	7.66	-0.01	9e-04

At four program locations, monthly average pH decreased between less than 0.01 and 0.02 pH units per year. No detectable change in monthly average pH was observed at one location.

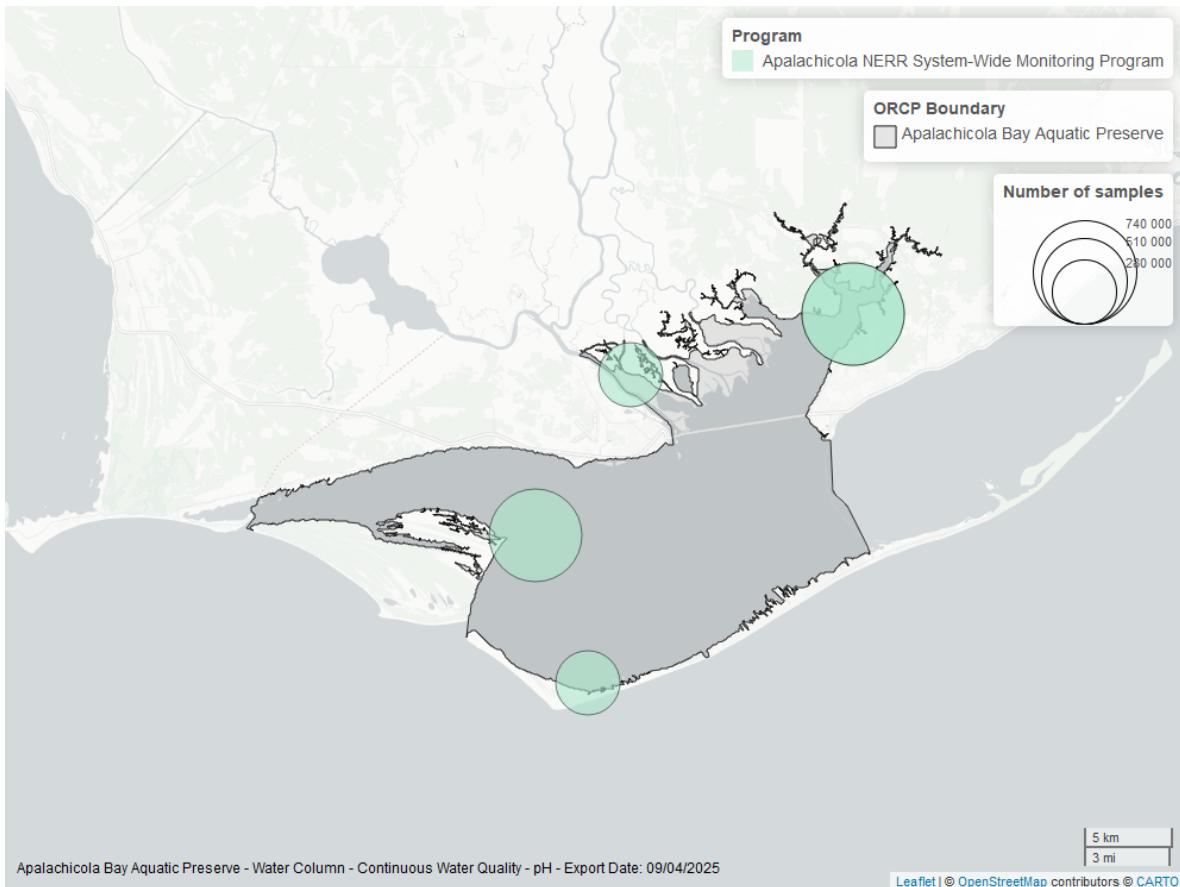


Figure 24: Map showing location of ph continuous water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Water Clarity

### Turbidity - Discrete

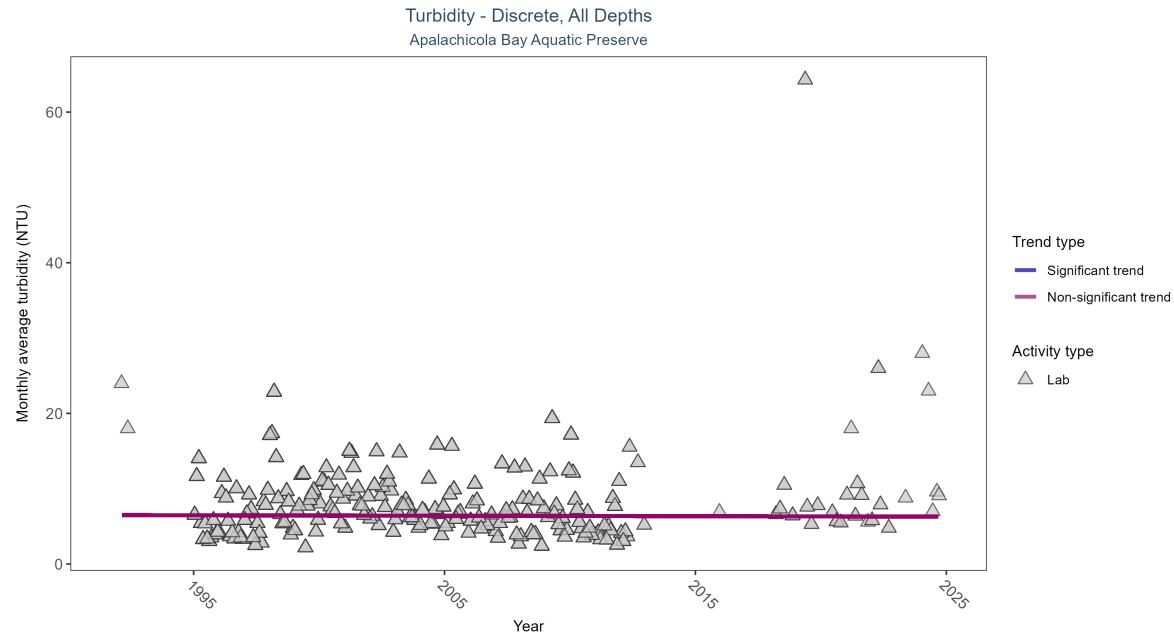


Figure 25: Scatter plot of monthly average turbidity over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only turbidity values measured in the laboratory (triangles) are included in the plot.

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	15523	27	1992 - 2024	5.6	-0.01526	6.48776	-0.00598	0.8103

Turbidity showed no detectable trend between 1992 and 2024.

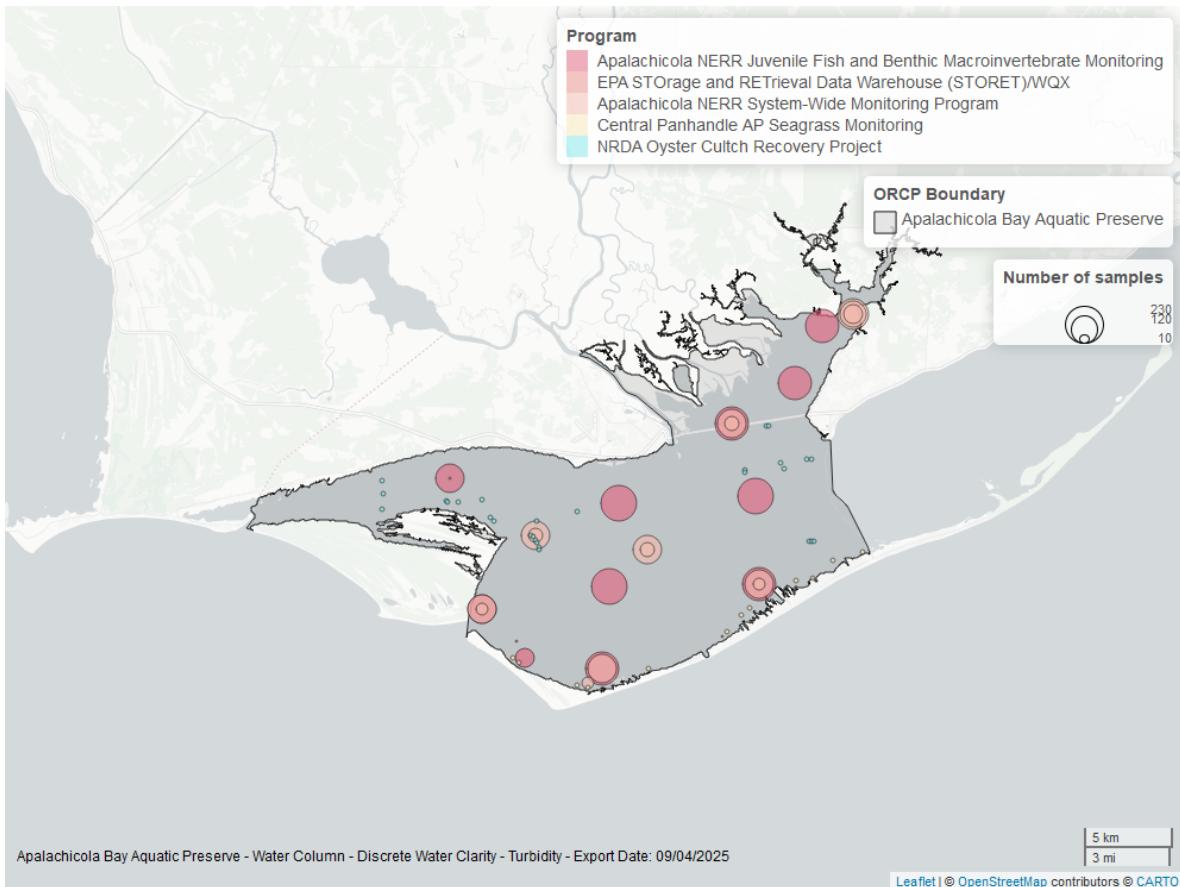


Figure 26: Map showing location of discrete water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Turbidity - Continuous

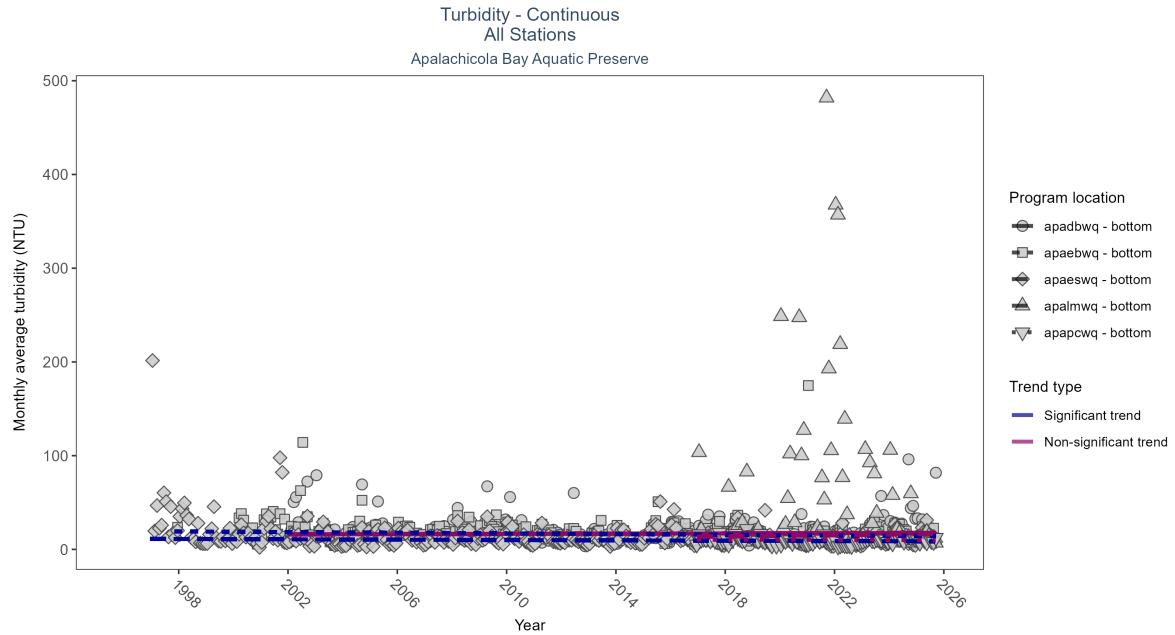


Figure 27: Scatter plot of monthly average turbidity over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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
apaeswq	Significantly decreasing trend	721945	30	1996 - 2025	9	-0.13	11.29	-0.09	0.0012
apapcwq	No significant trend	280348	10	2016 - 2025	7	-0.05	10.67	-0.08	0.5527
apalmwq	No significant trend	261636	10	2016 - 2025	12	0.13	13.14	0.36	0.111
apaebwq	Significantly decreasing trend	656935	27	1997 - 2025	13	-0.17	19.33	-0.18	0
apadbwq	No significant trend	625446	24	2002 - 2025	10	0.06	16.00	0.07	0.2189

At two program locations, monthly average turbidity decreased by 0.09 NTU per year at one site and by 0.18 NTU per year at the other. No detectable change in monthly average turbidity was observed at three locations.

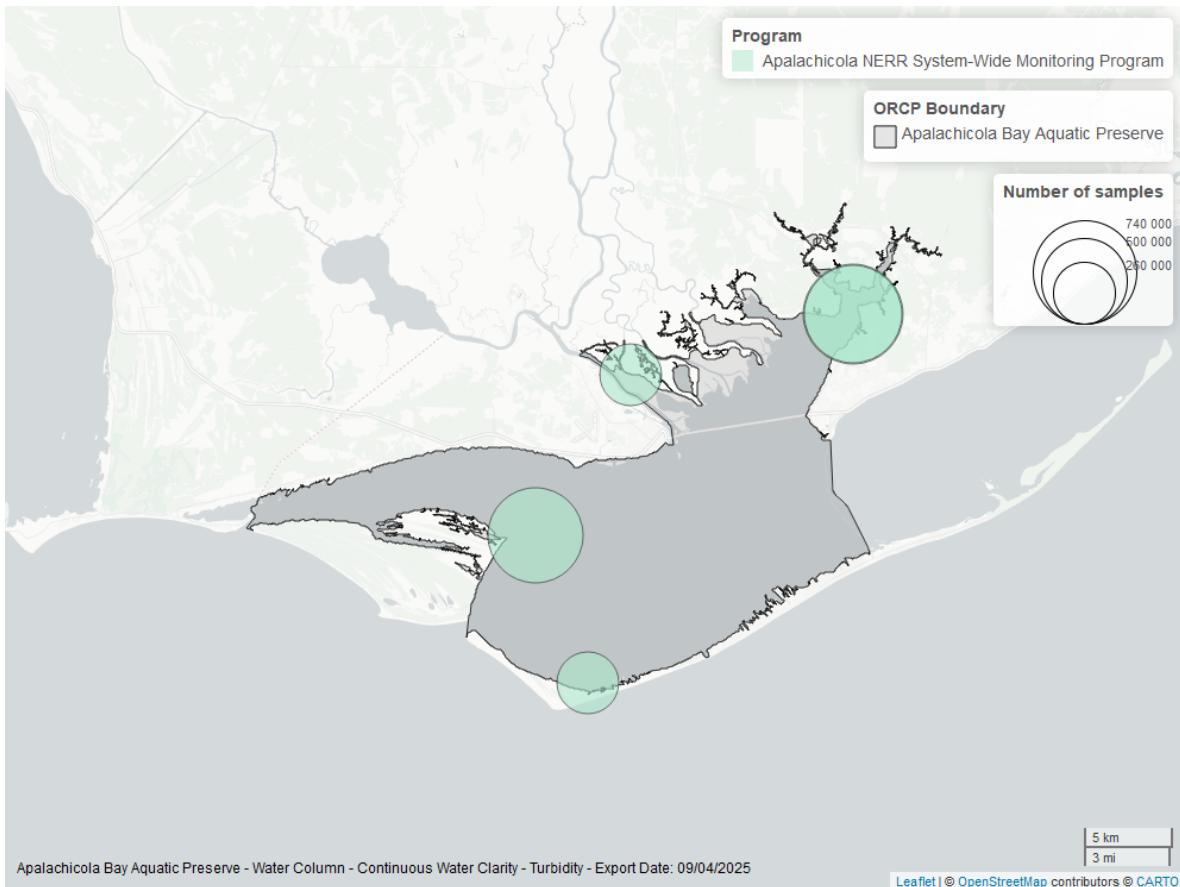


Figure 28: Map showing location of turbidity continuous water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Total Suspended Solids - Discrete

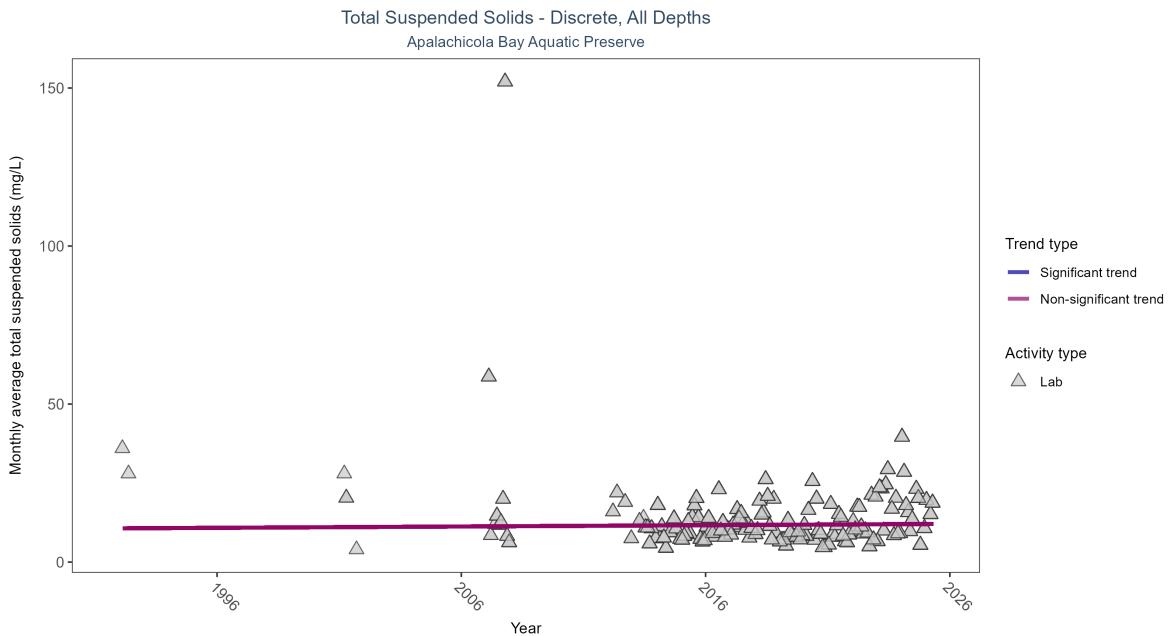


Figure 29: Scatter plot of monthly average total suspended solids (TSS) over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only TSS values obtained from laboratory analyses (triangles) are included 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	3211	17	1992 - 2025	10	0.02365	10.67726	0.04147	0.8033

Total suspended solids showed no detectable trend between 1992 and 2025.

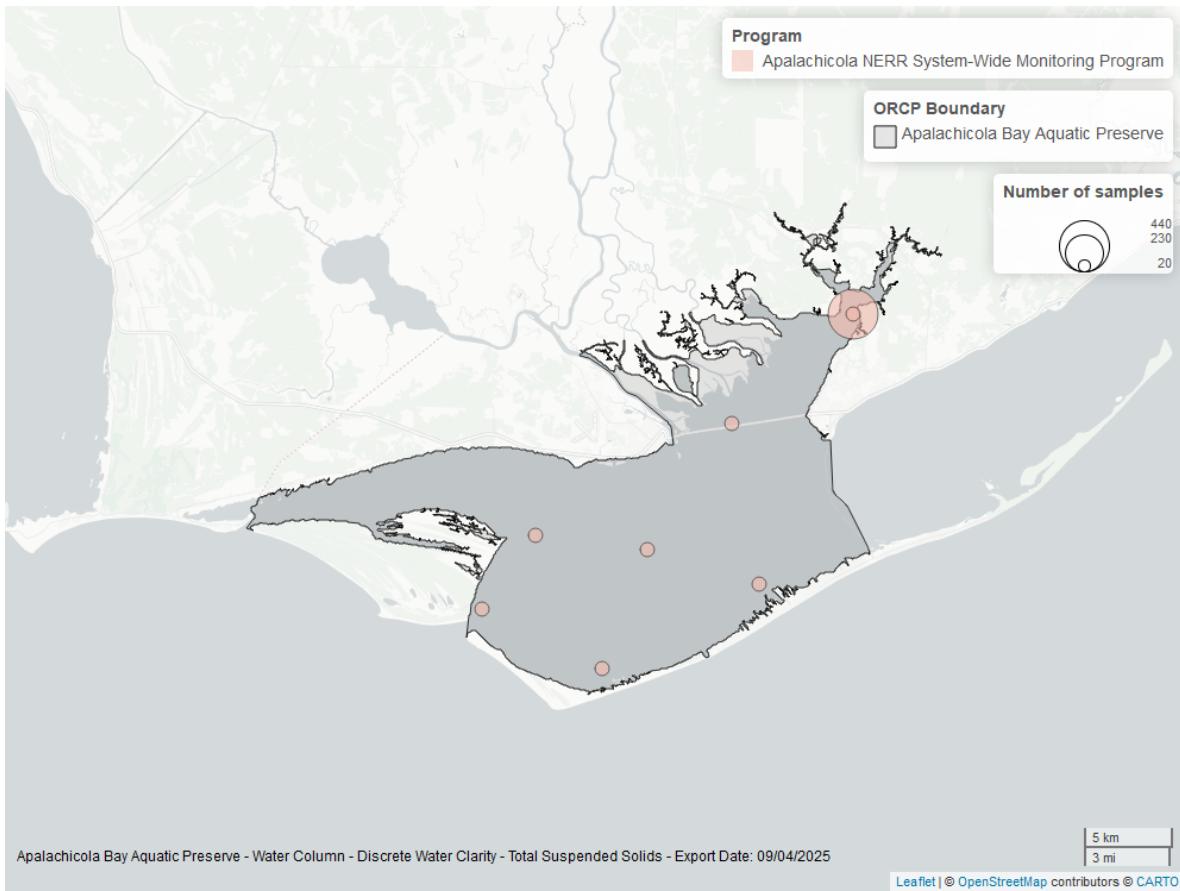


Figure 30: Map showing location of discrete water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Chlorophyll a, Uncorrected for Pheophytin - Discrete

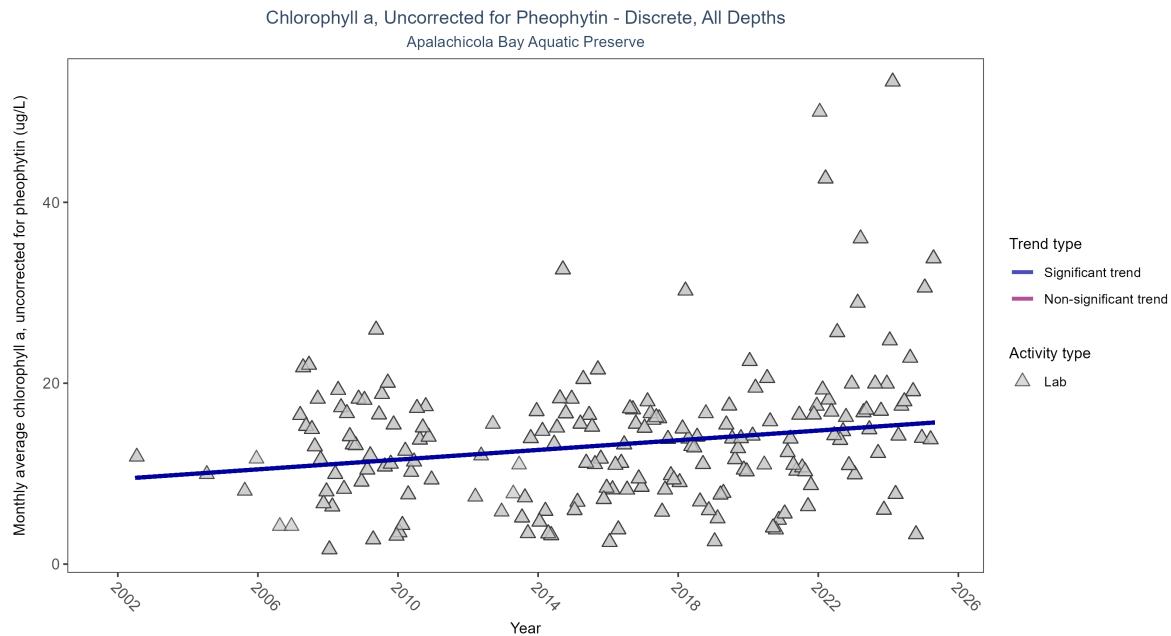


Figure 31: Scatter plot of monthly average levels of chlorophyll a, uncorrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles) 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	4068	22	2002 - 2025	12	0.18388	9.4056	0.26804	7e-04

Monthly average chlorophyll a, uncorrected for pheophytin, increased by 0.27  $\mu\text{g/L}$  per year, indicating a decrease in water clarity.

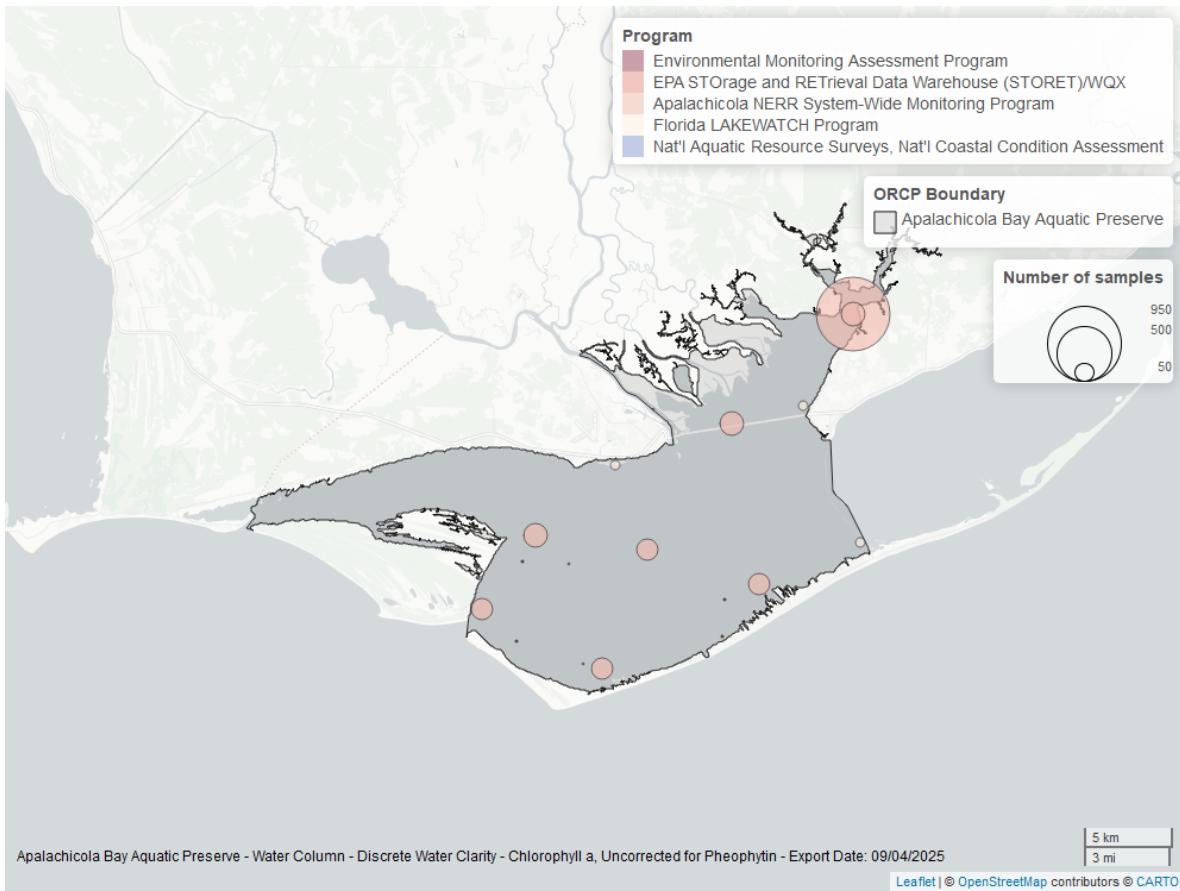


Figure 32: Map showing location of discrete water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Chlorophyll a, Corrected for Pheophytin - Discrete

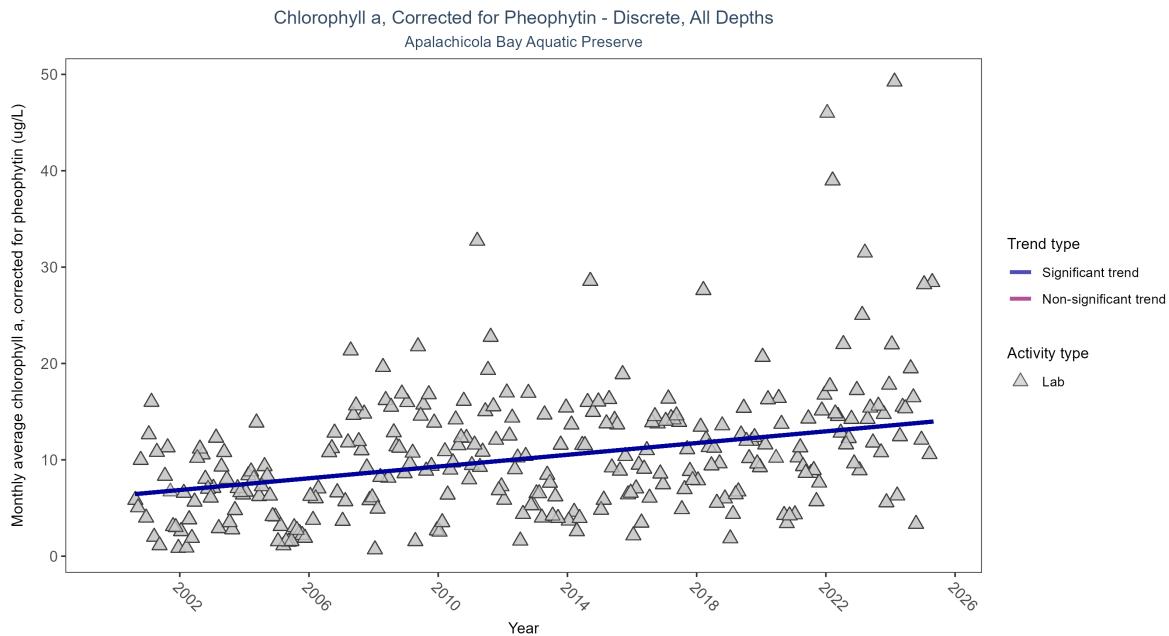


Figure 33: Scatter plot of monthly average levels of chlorophyll a, corrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles)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

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

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median Result Value	Tau	Sen Intercept	Sen Slope	P
Lab	Significantly increasing trend	7610	26	2000 - 2025	8.7	0.29265	6.25819	0.30455	0

Monthly average chlorophyll a, corrected for pheophytin, increased by 0.3  $\mu\text{g}/\text{L}$  per year, indicating a decrease in water clarity.

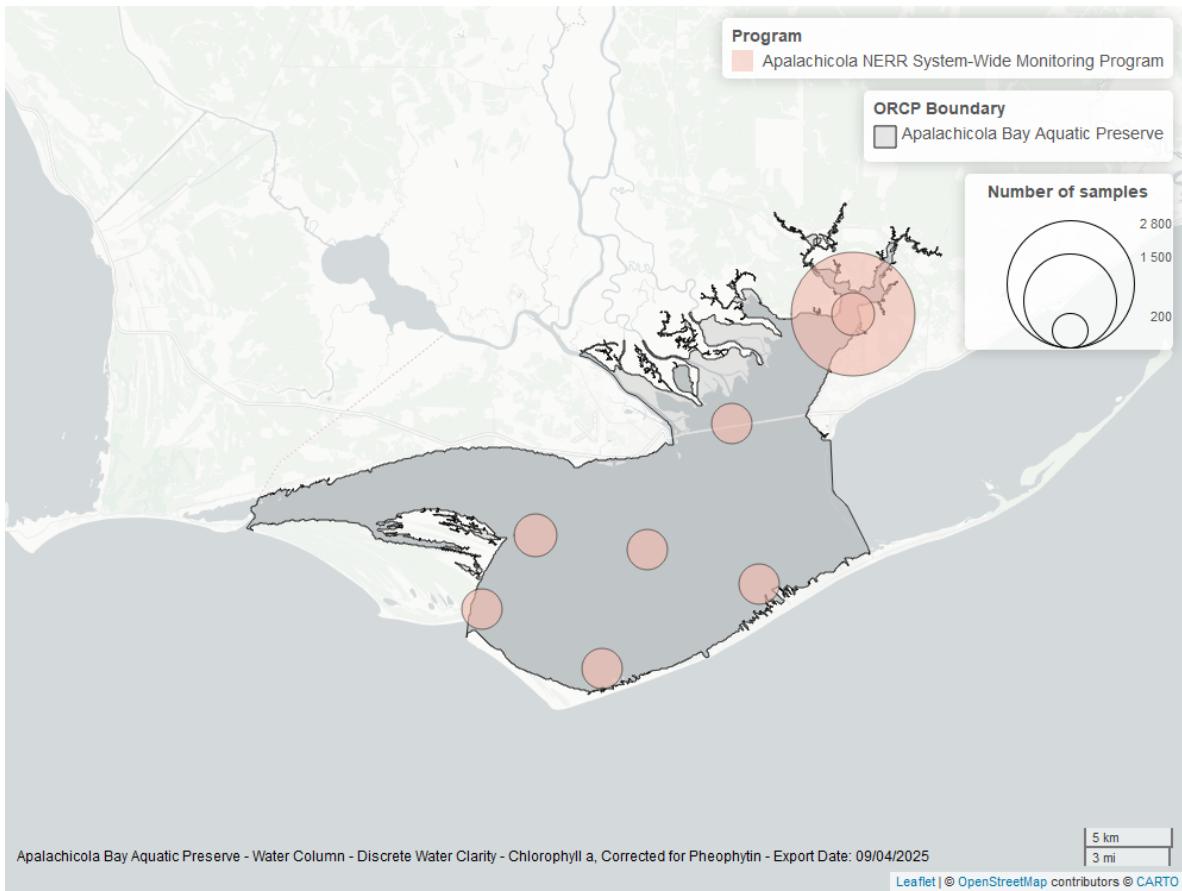


Figure 34: Map showing location of discrete water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Secchi Depth - Discrete

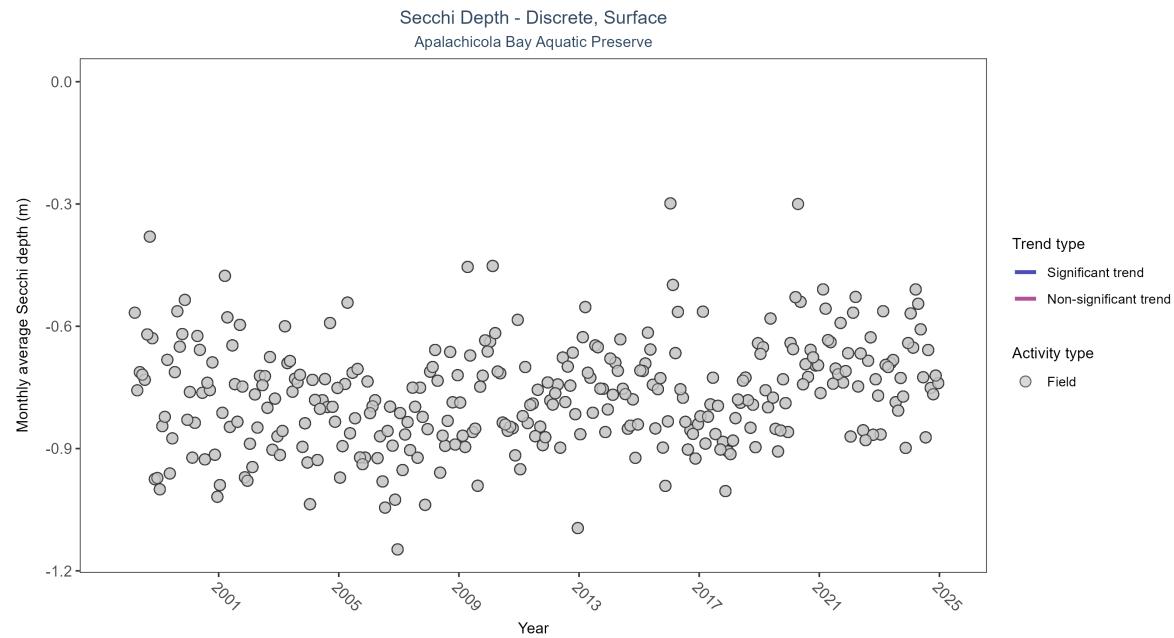


Figure 35: Scatter plot of monthly average Secchi depth over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Secchi depth is only measured in the field (circles).

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 increasing trend	28798	30	1992 - 2024	-0.8	0.1614	-0.86449	0.00389	1e-04

Monthly average Secchi depth became shallower by less than 0.01 m per year, indicating a decrease in water clarity.

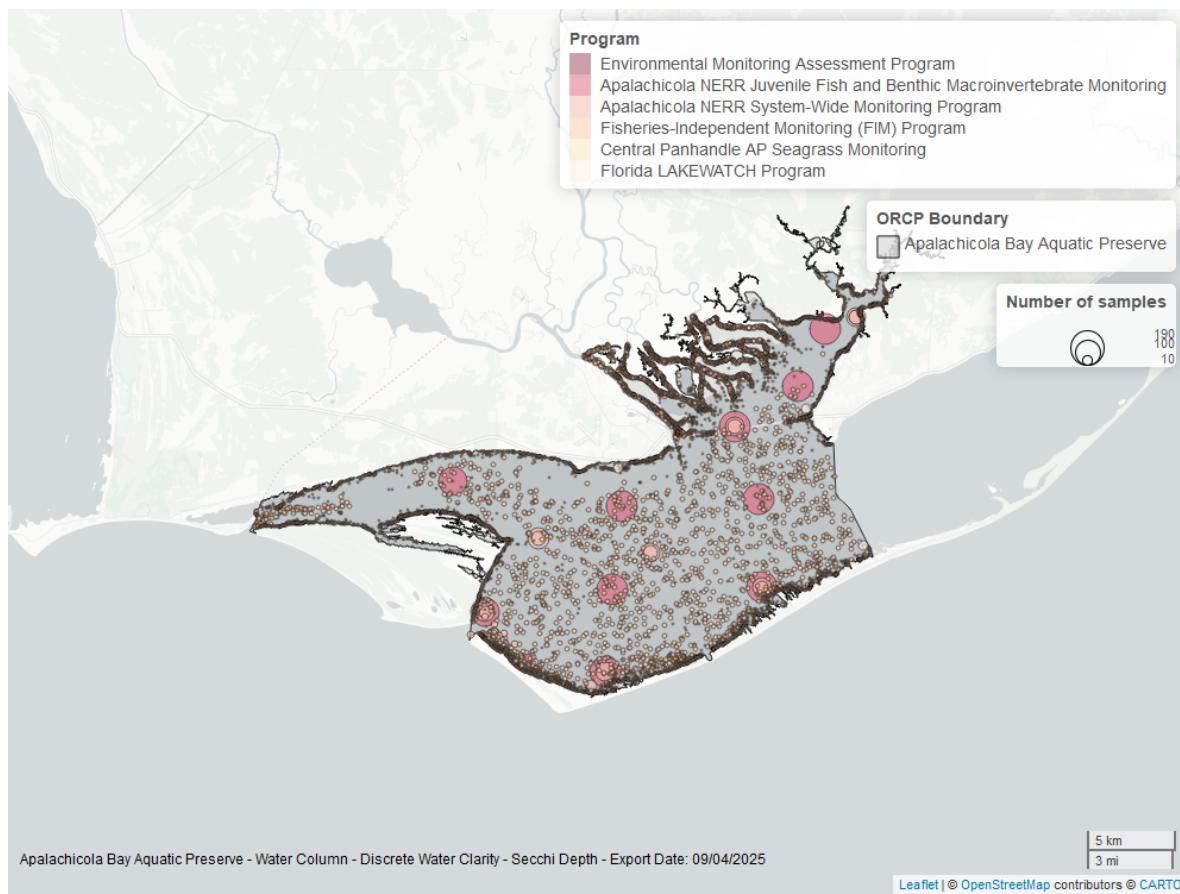


Figure 36: Map showing location of discrete water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Colored Dissolved Organic Matter - Discrete

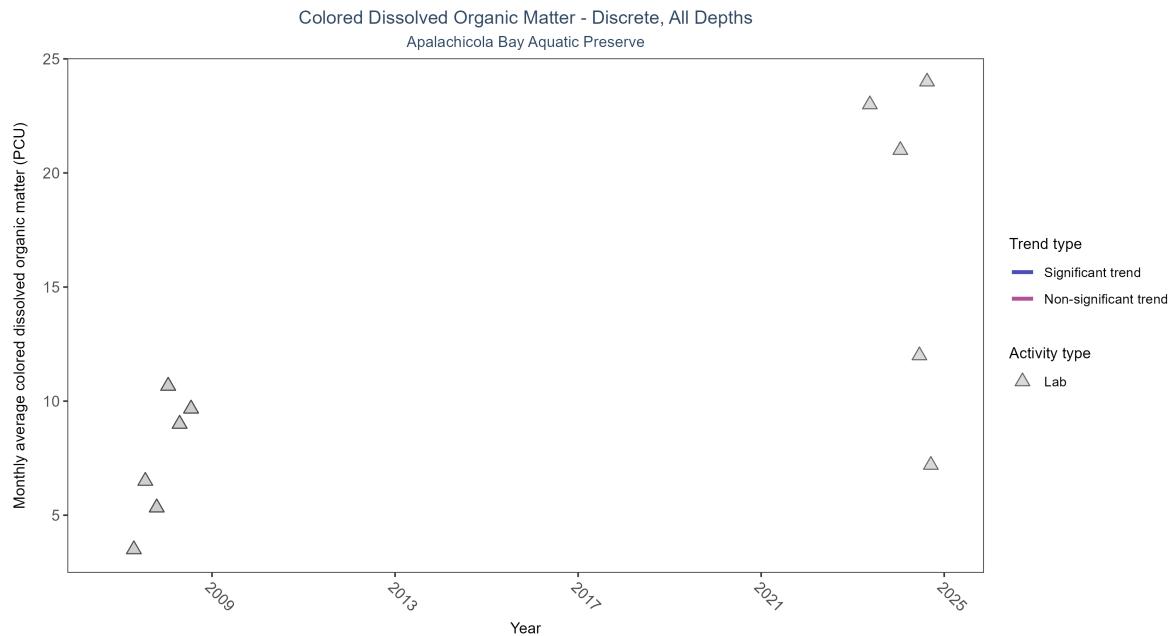


Figure 37: Scatter plot of monthly average colored dissolved organic matter (CDOM) over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed CDOM (triangles) is included in the 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	21	4	2007 - 2024	7.2	-	-	-	-

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

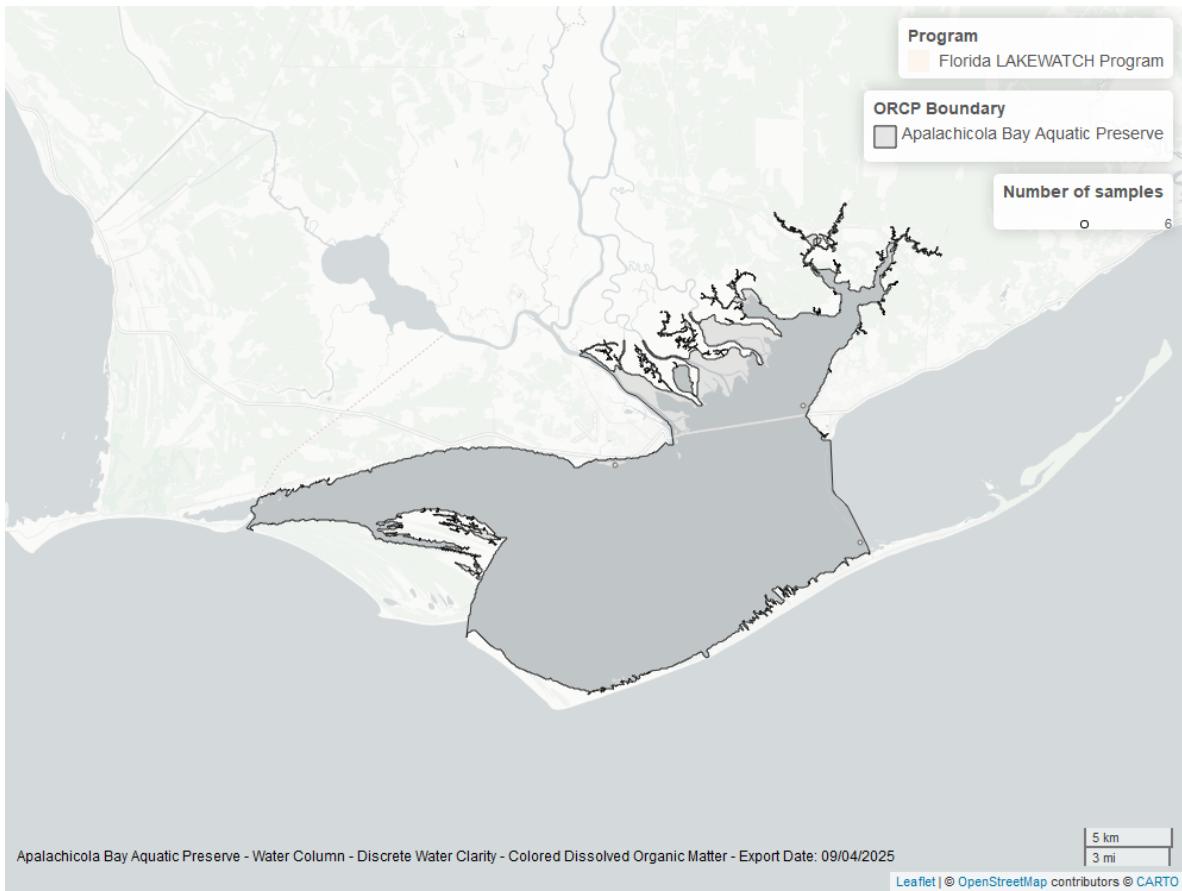


Figure 38: Map showing location of discrete water quality sampling locations within the boundaries of *Apalachicola Bay Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.