# Tomoka Marsh Aquatic Preserve

SEACAR Water Quality Analysis

Last compiled on 30 September, 2025

## Contents

# Indicators

## Nutrients

### Total Nitrogen - Discrete

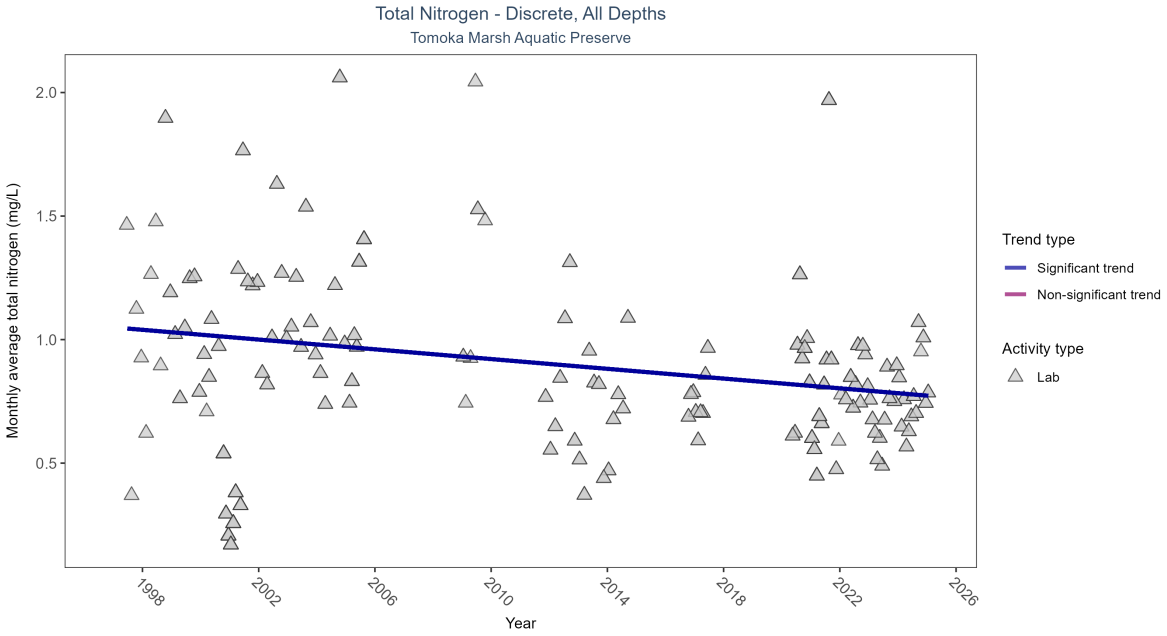


Figure 1: Scatter plot of monthly average total nitrogen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only nitrogen values obtained from laboratory analyses (triangles) are included in the 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 decreasing trend | 411 | 22 | 1997 - 2025 | 0.79046 | -0.20361 | 1.04946 | -0.00987 | 7e-04 |

Monthly average total nitrogen decreased by 0.01 mg/L per year.

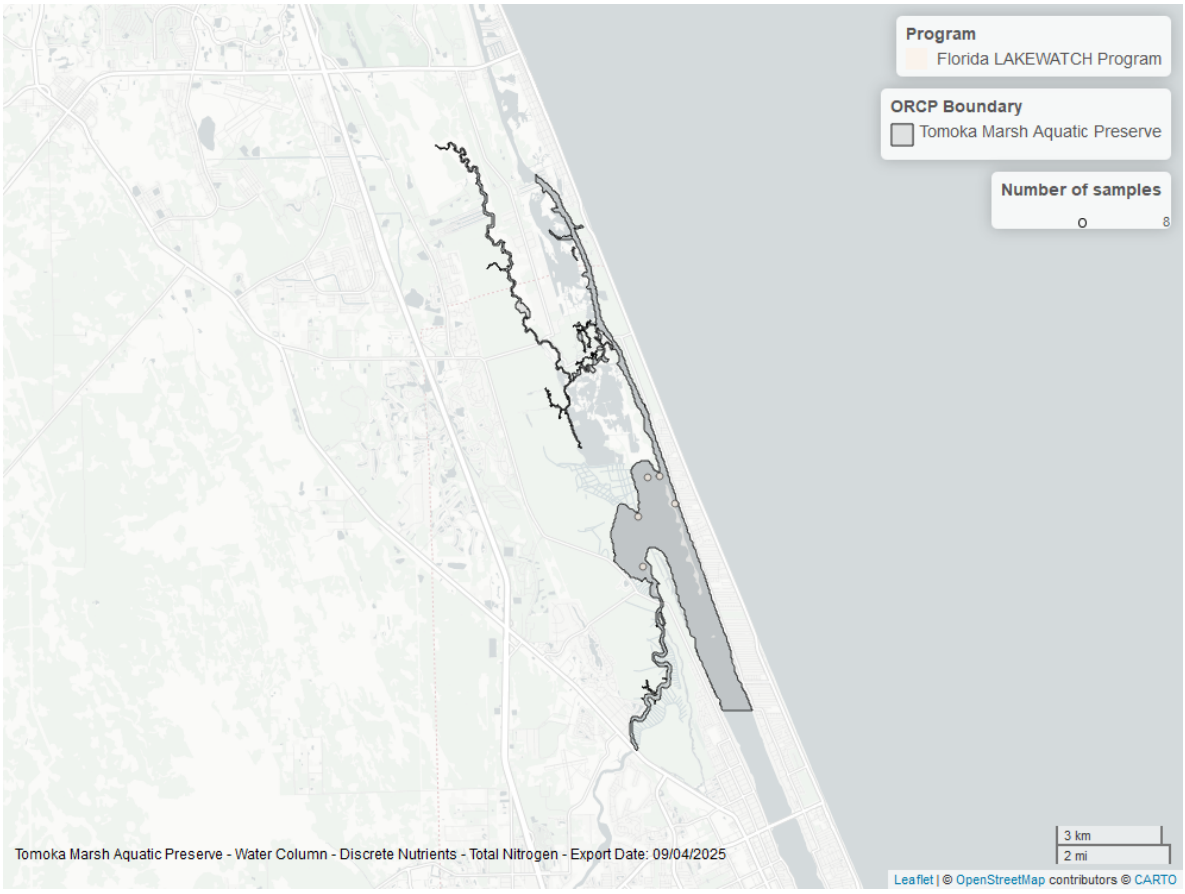


Figure 2: Map showing location of discrete water quality sampling locations within the boundaries of *Tomoka Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

### Total Phosphorus - Discrete

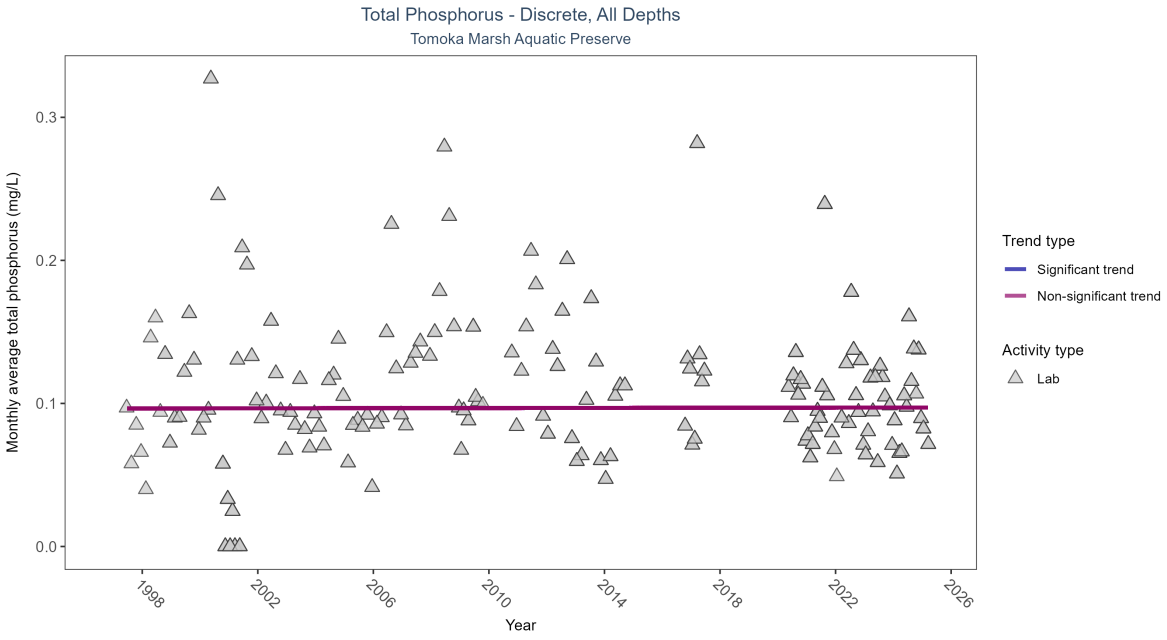


Figure 3: Scatter plot of monthly average total phosphorus over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only phosphorus values obtained from laboratory analyses (triangles) are included in 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 | 726 | 26 | 1997 - 2025 | 0.09685 | 0.0246 | 0.09647 | 0.00002 | 0.966 |

Total phosphorus showed no detectable trend between 1997 and 2025.

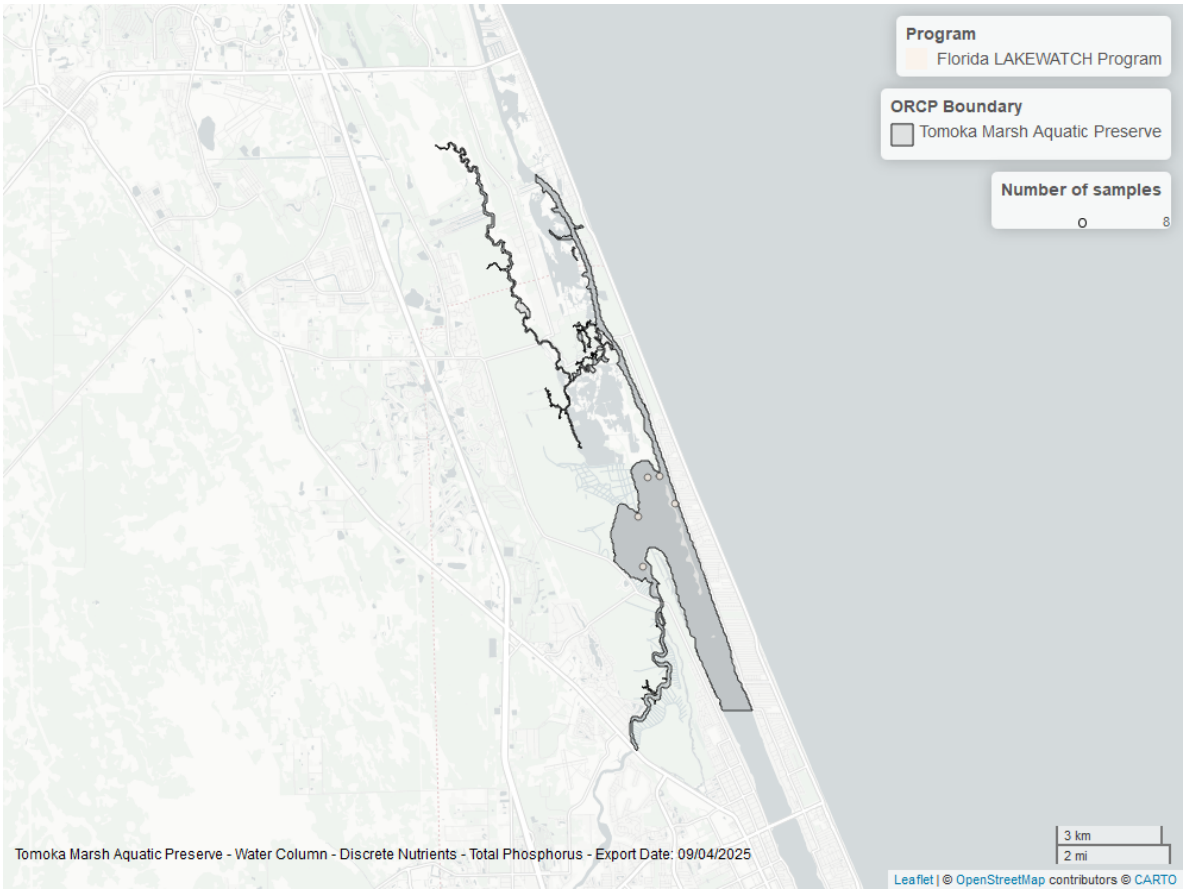


Figure 4: Map showing location of discrete water quality sampling locations within the boundaries of *Tomoka Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Water Quality

### Dissolved Oxygen - Discrete

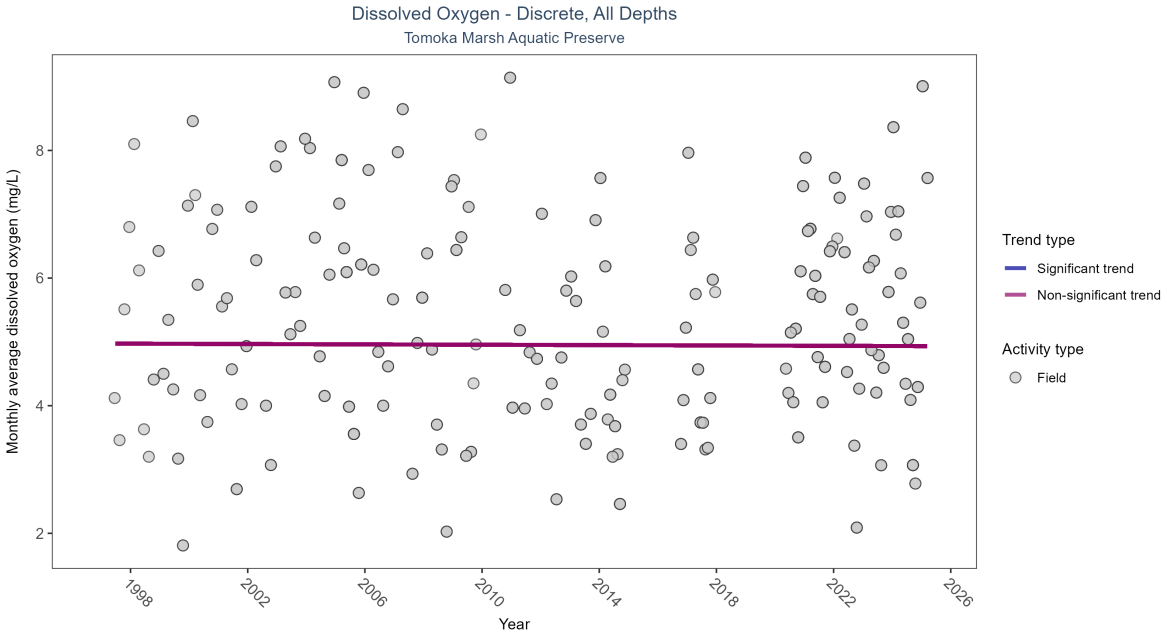


Figure 5: Scatter plot of monthly average dissolved oxygen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen values measured in the field (circles) are included in the plot.

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 | 734 | 26 | 1997 - 2025 | 5.4 | 0.0195 | 4.97338 | -0.00141 | 0.8389 |

Dissolved oxygen showed no detectable trend between 1997 and 2025.


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

### Dissolved Oxygen - Continuous

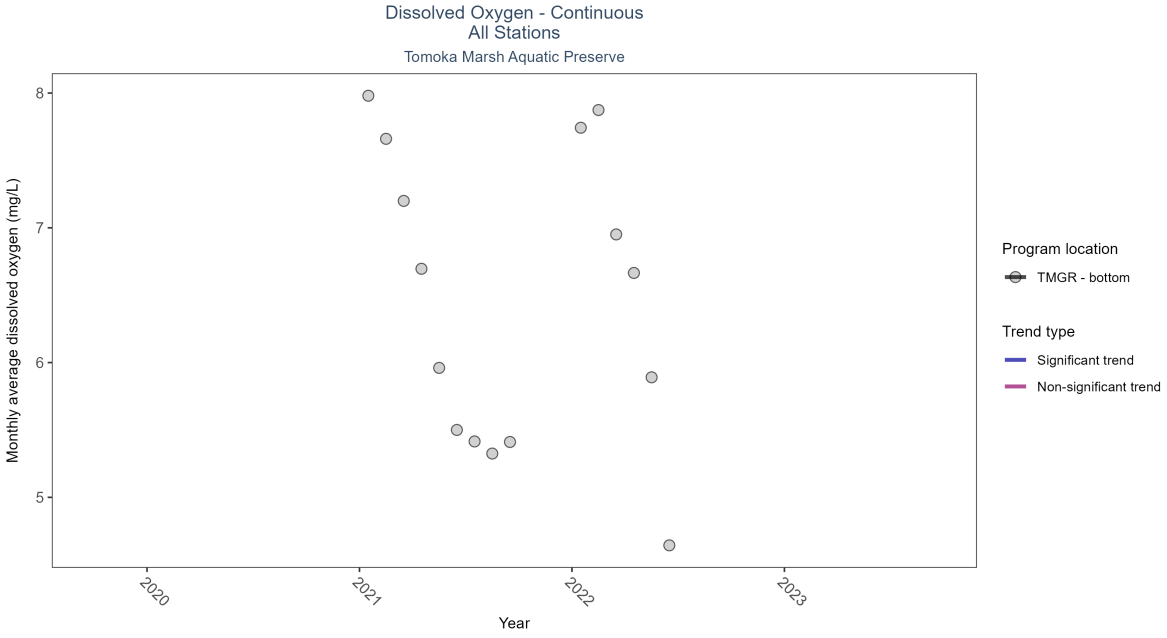


Figure 7: Scatter plot of monthly average dissolved oxygen over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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 |
|---|---|---|---|---|---|---|---|---|---|
| TMGR | Insufficient data to calculate trend | 40492 | 2 | 2021 - 2022 | 6.5 | - | - | - | - |

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 *Tomoka Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

### Dissolved Oxygen Saturation - Discrete

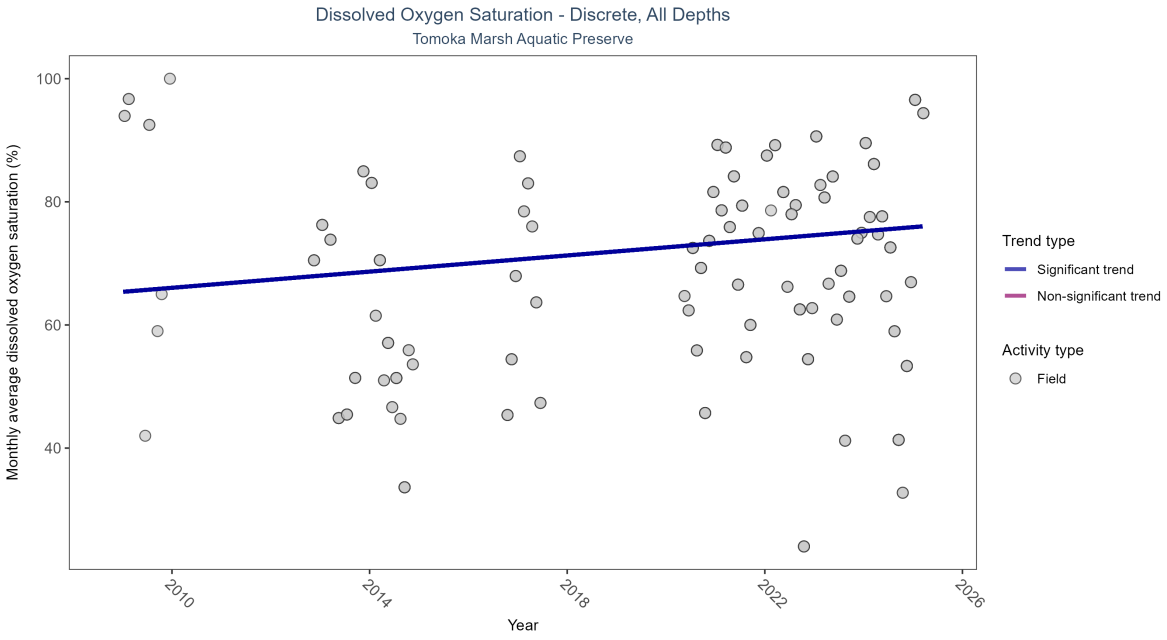


Figure 9: Scatter plot of monthly average dissolved oxygen saturation over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen saturation values measured in the field (circles) 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 | 439 | 12 | 2009 - 2025 | 70.9 | 0.14962 | 65.37792 | 0.65673 | 0.0386 |

Monthly average dissolved oxygen saturation increased by 0.66% per year.

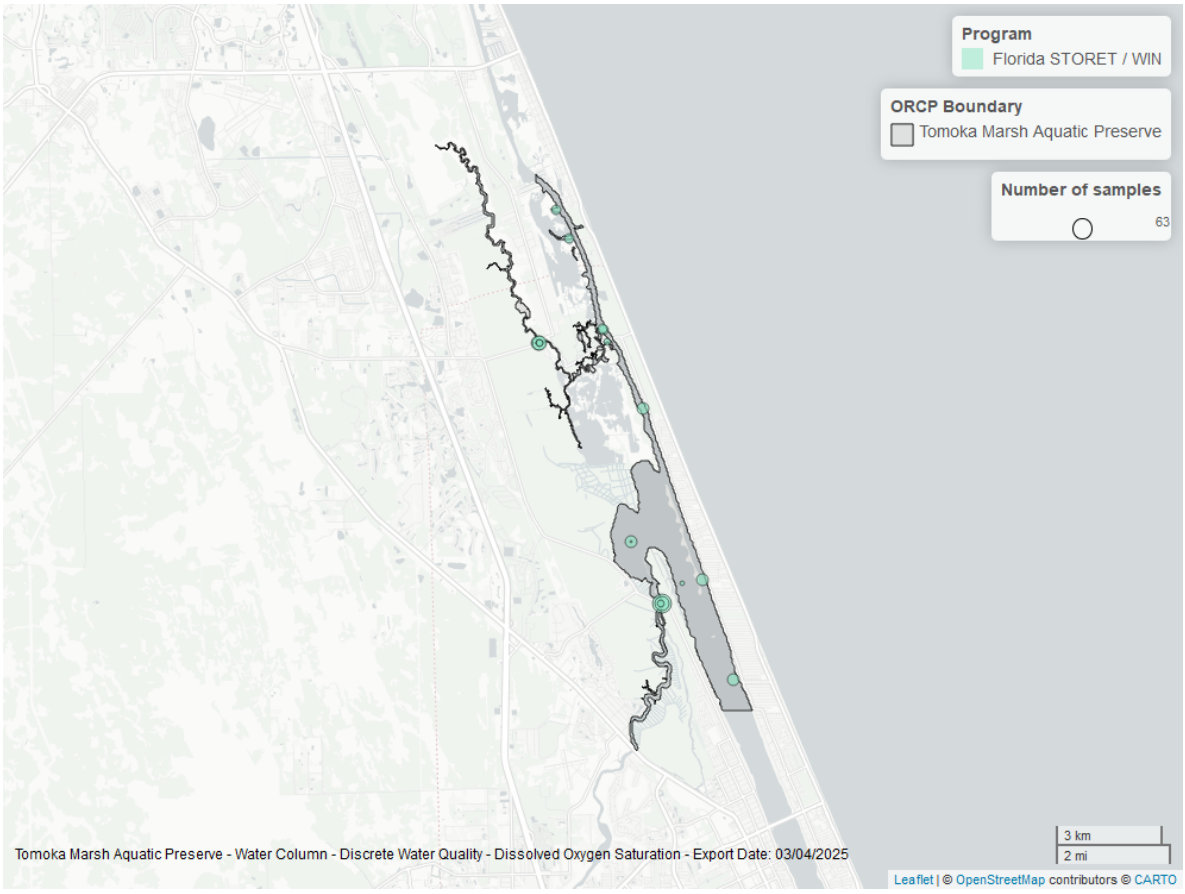


Figure 10: Map showing location of discrete water quality sampling locations within the boundaries of *Tomoka Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

### Dissolved Oxygen Saturation - Continuous

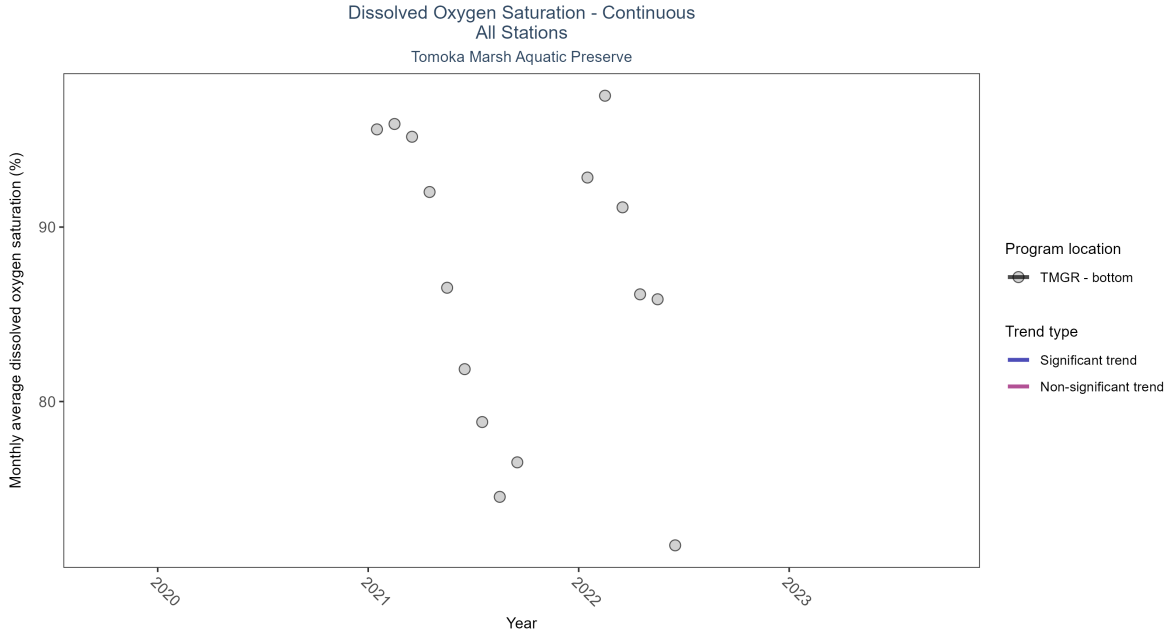


Figure 11: Scatter plot of monthly average dissolved oxygen saturation over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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 |
|---|---|---|---|---|---|---|---|---|---|
| TMGR | Insufficient data to calculate trend | 40492 | 2 | 2021 - 2022 | 88.4 | - | - | - | - |

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 *Tomoka Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

### Salinity - Discrete

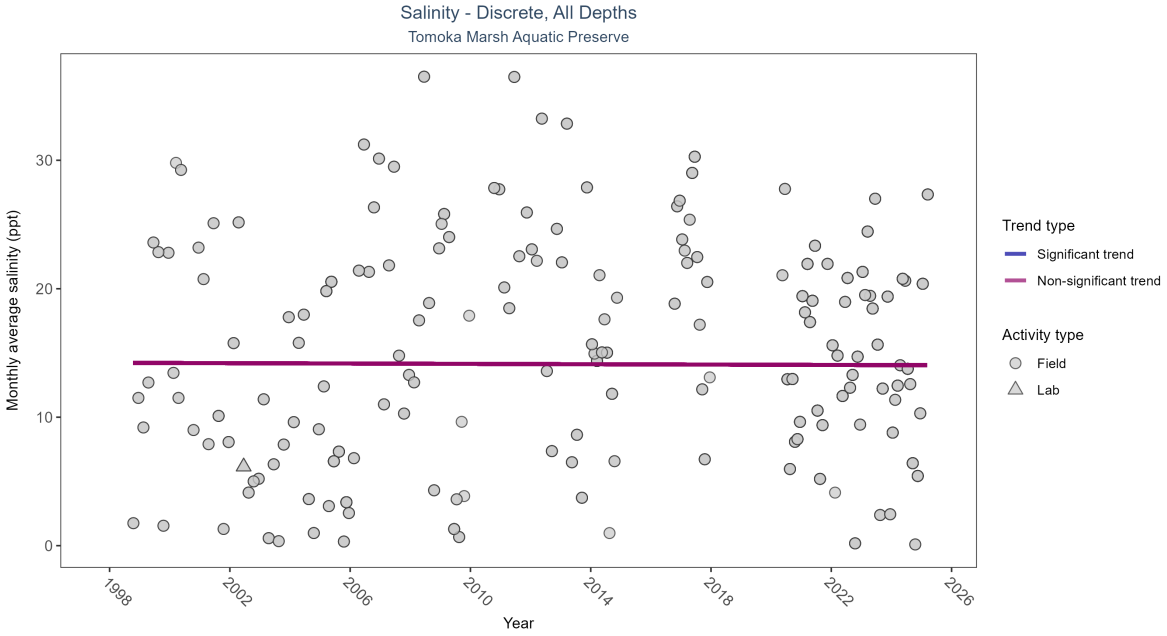


Figure 13: Scatter plot of monthly average salinity over time. If the time series included ten or more years of discrete observations, significant (blue) or non-significant (magenta) trend lines are also shown. Discrete salinity values derived from grab samples analyzed in the field (circles) or the 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 | No significant trend | 727 | 25 | 1998 - 2025 | 15.85 | -0.01664 | 14.23267 | -0.00688 | 0.9455 |

Salinity showed no detectable trend between 1998 and 2025.


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

### Salinity - Continuous

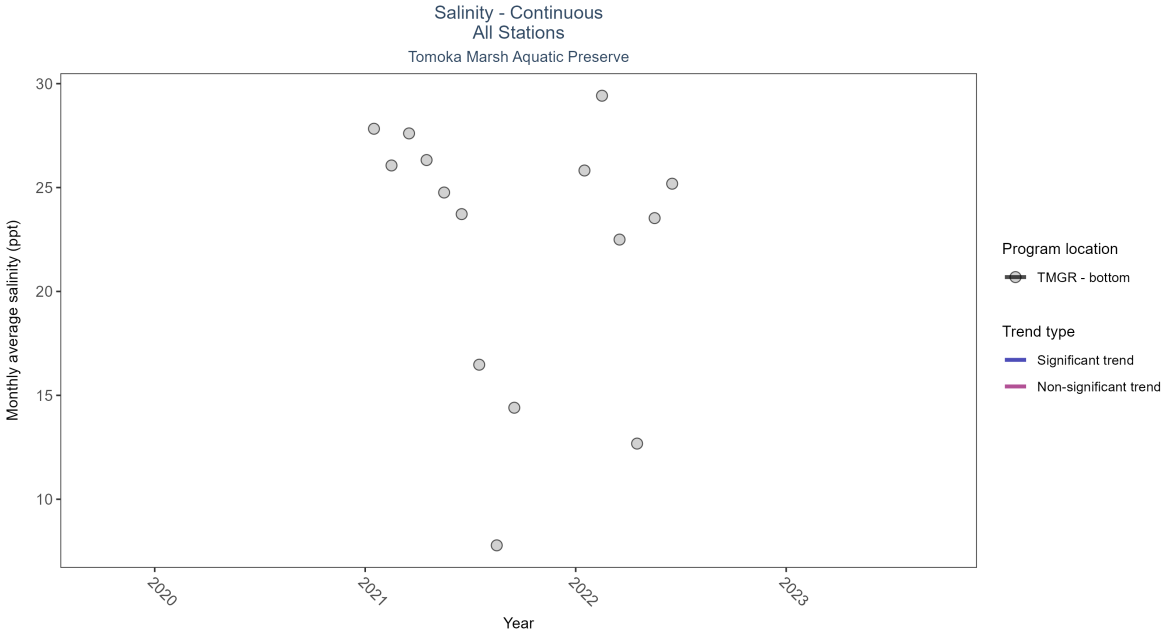


Figure 15: Scatter plot of monthly average salinity over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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 |
|---|---|---|---|---|---|---|---|---|---|
| TMGR | Insufficient data to calculate trend | 41374 | 2 | 2021 - 2022 | 23.3 | - | - | - | - |

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


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

### Water Temperature - Discrete

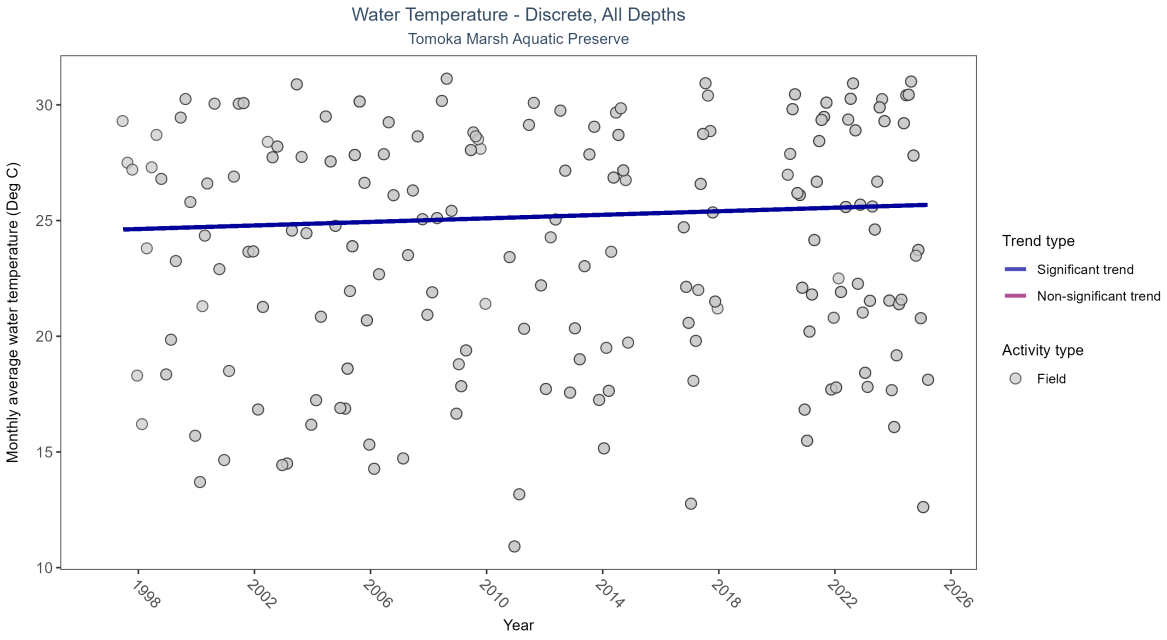


Figure 17: Scatter plot of monthly average water temperature over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only water temperature measurements taken in the field (circles) are included in 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 | 750 | 26 | 1997 - 2025 | 24.89 | 0.12735 | 24.59551 | 0.0384 | 0.0275 |

Monthly average water temperature increased by 0.04°C per year.


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

### Water Temperature - Continuous

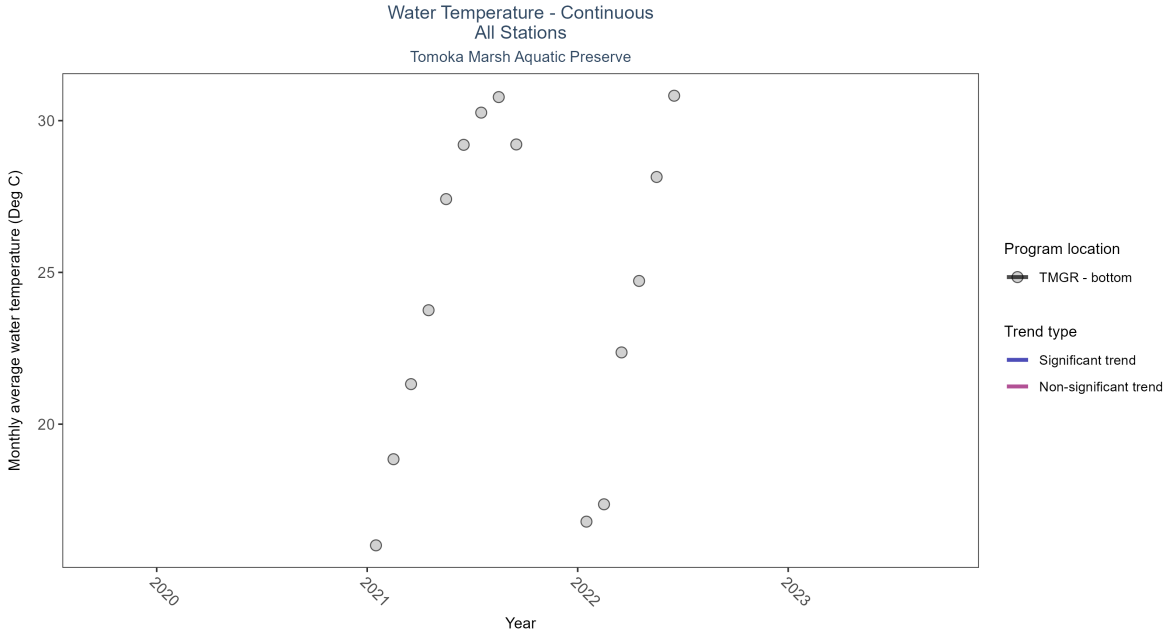


Figure 19: Scatter plot of monthly average water temperature over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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 |
|---|---|---|---|---|---|---|---|---|---|
| TMGR | Insufficient data to calculate trend | 41374 | 2 | 2021 - 2022 | 25.5 | - | - | - | - |

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


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

### pH - Discrete

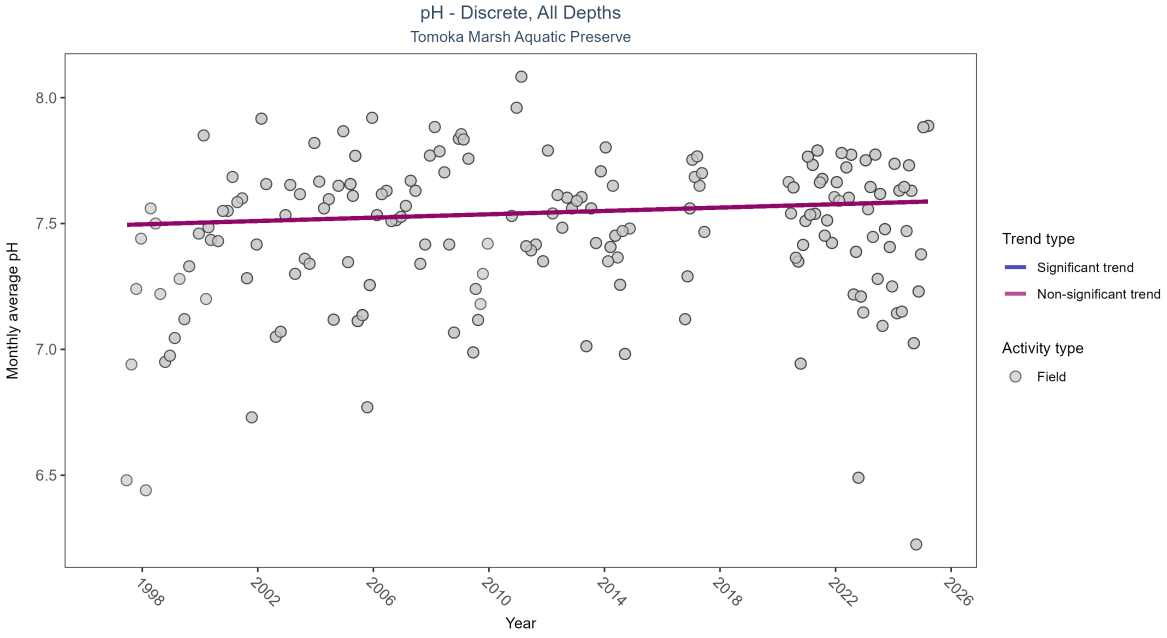


Figure 21: Scatter plot of monthly average pH over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only pH values measured in the field (circles) are included in the plot.

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 | 723 | 26 | 1997 - 2025 | 7.53 | 0.08532 | 7.49335 | 0.00333 | 0.2147 |

pH showed no detectable trend between 1997 and 2025.


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

## pH - Continuous

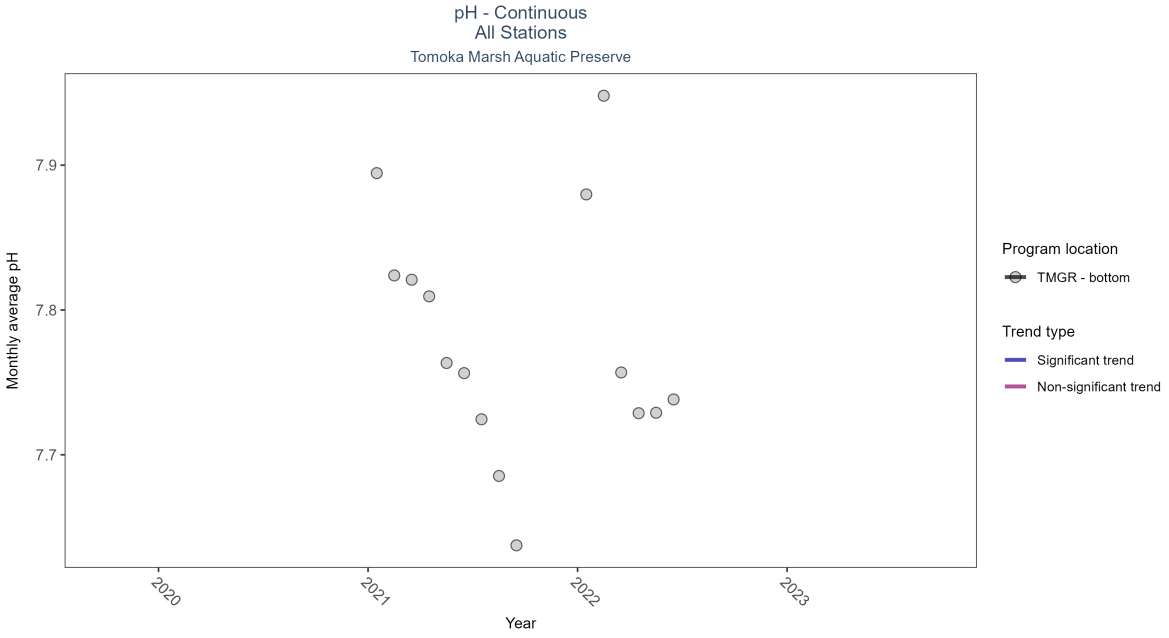


Figure 23: Scatter plot of monthly average pH over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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 |
|---|---|---|---|---|---|---|---|---|---|
| TMGR | Insufficient data to calculate trend | 41374 | 2 | 2021 - 2022 | 7.8 | - | - | - | - |

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 *Tomoka Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

## Water Clarity

### Turbidity - Discrete

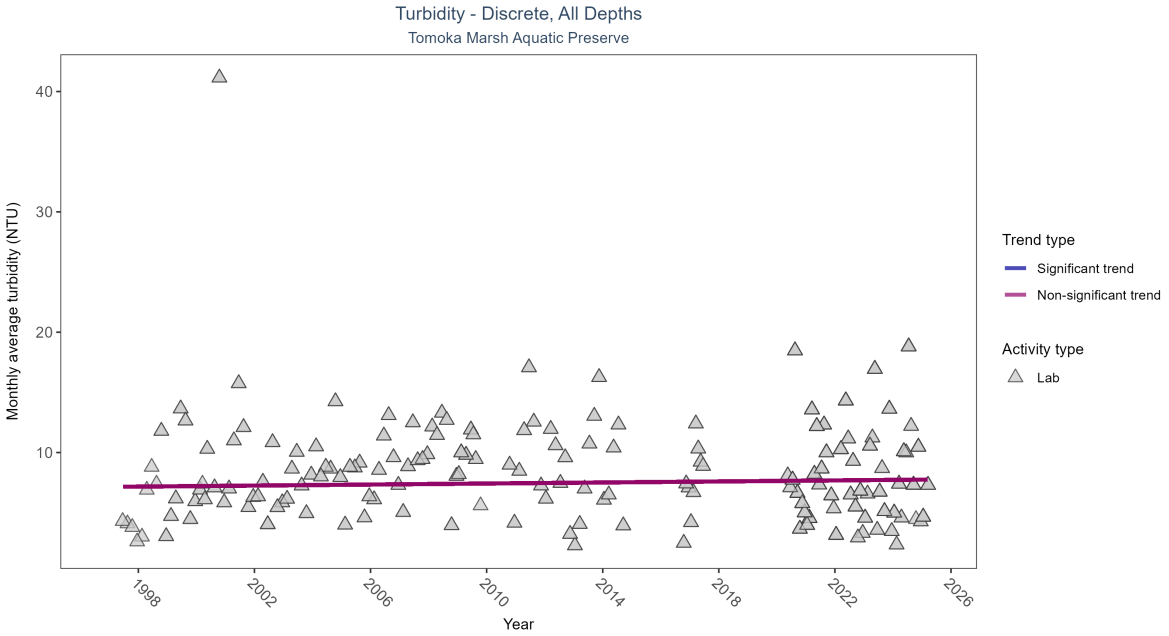


Figure 25: Scatter plot of monthly average turbidity over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only turbidity values measured in the laboratory (triangles) are included in the plot.

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 | 512 | 26 | 1997 - 2025 | 7.11 | 0.02966 | 7.14593 | 0.02143 | 0.5601 |

Turbidity showed no detectable trend between 1997 and 2025.

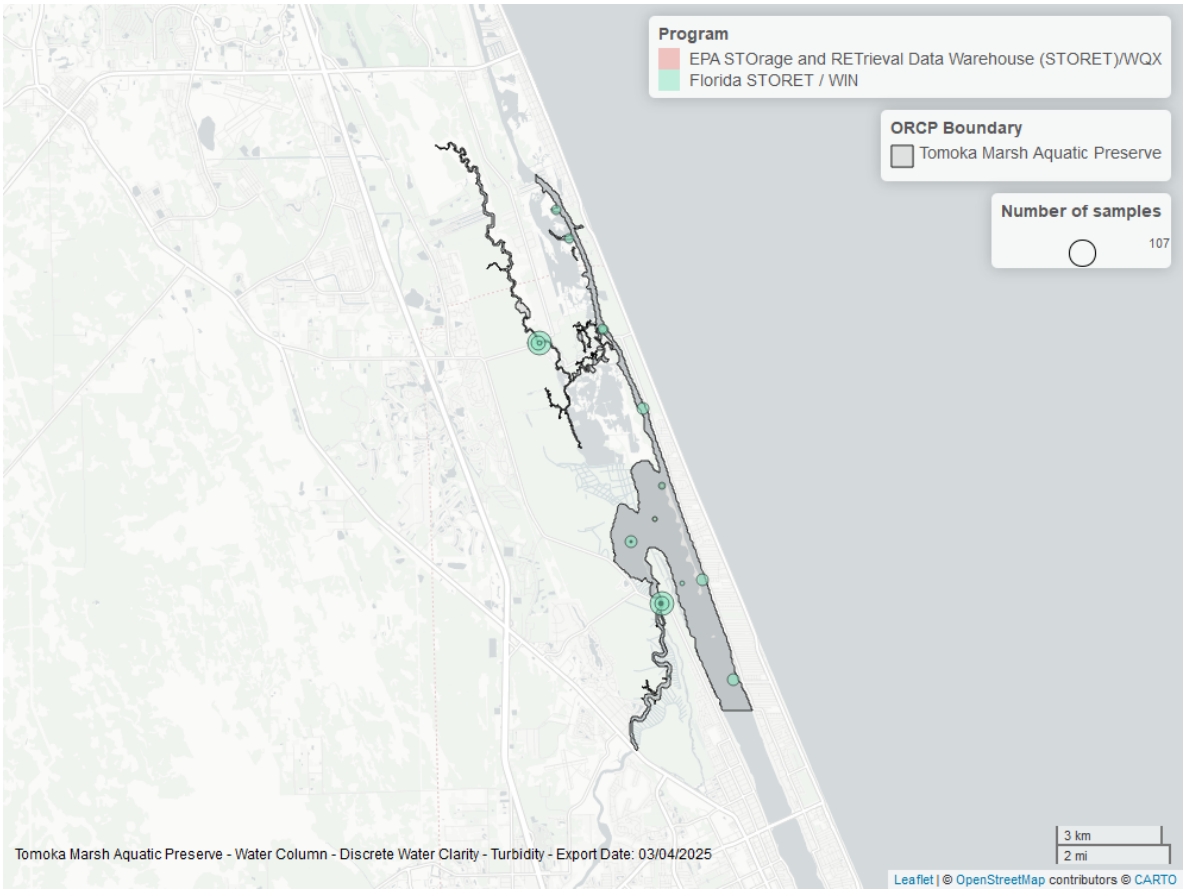


Figure 26: Map showing location of discrete water quality sampling locations within the boundaries of *Tomoka Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

### Turbidity - Continuous

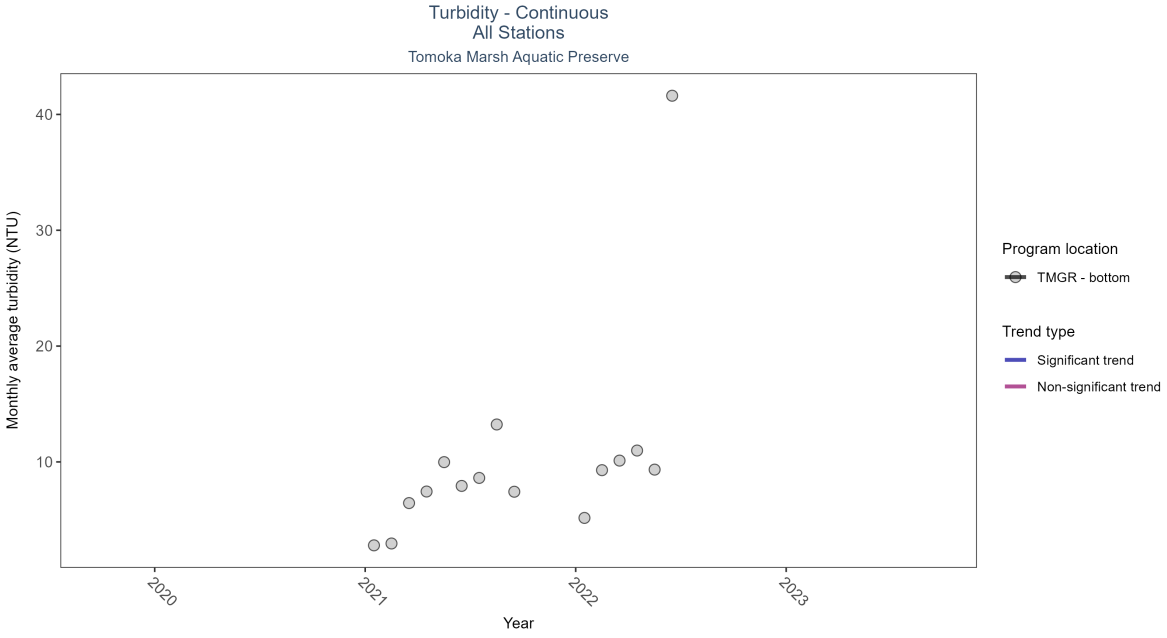


Figure 27: Scatter plot of monthly average turbidity over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

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 |
|---|---|---|---|---|---|---|---|---|---|
| TMGR | Insufficient data to calculate trend | 41169 | 2 | 2021 - 2022 | 7 | - | - | - | - |

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 *Tomoka Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

### Total Suspended Solids - Discrete

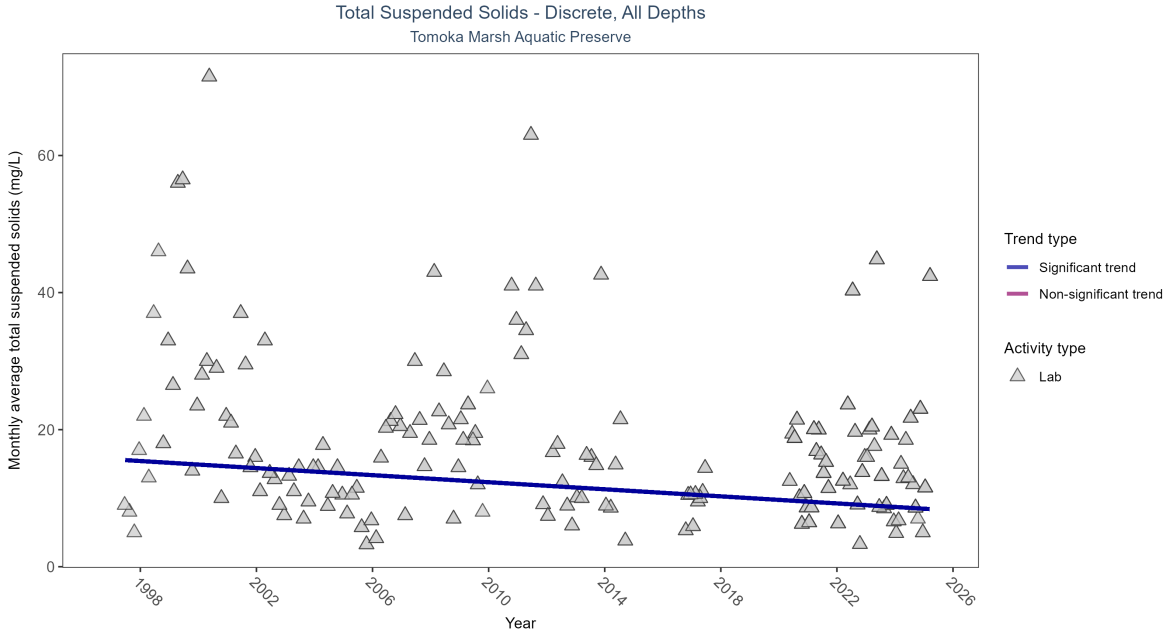


Figure 29: Scatter plot of monthly average total suspended solids (TSS) over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only TSS values obtained from laboratory analyses (triangles) are included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

Table 15: Seasonal Kendall-Tau Results for - Total Suspended Solids

| Activity Type | Statistical Trend | Sample Count | Years with Data | Period of Record | Median Result Value | Tau | Sen Intercept | Sen Slope | P |
|---|---|---|---|---|---|---|---|---|---|
| Lab | Significantly decreasing trend | 465 | 26 | 1997 - 2025 | 14 | -0.10577 | 15.67875 | -0.25772 | 0.0096 |

Monthly average total suspended solids decreased by 0.26 mg/L per year, indicating an increase in water clarity.

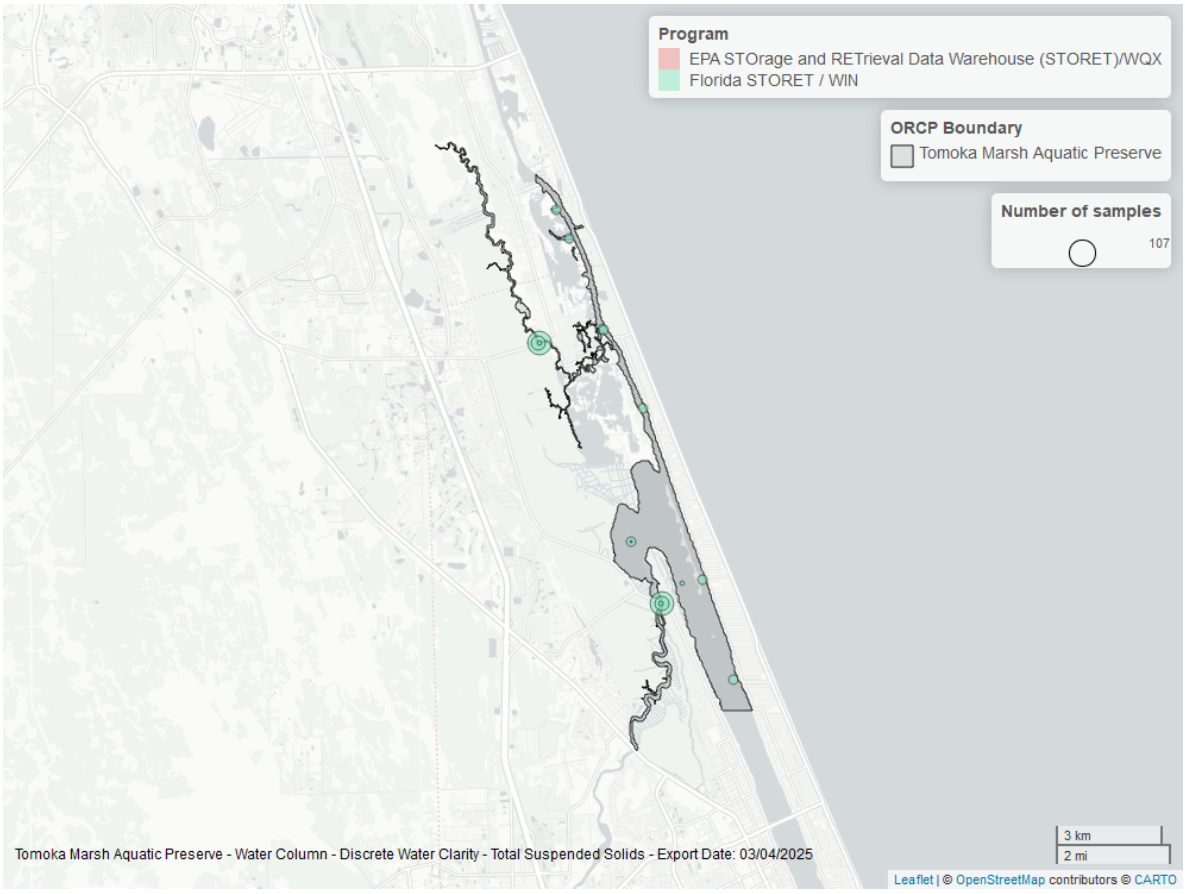


Figure 30: Map showing location of discrete water quality sampling locations within the boundaries of *Tomoka Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

### Chlorophyll a, Uncorrected for Pheophytin - Discrete

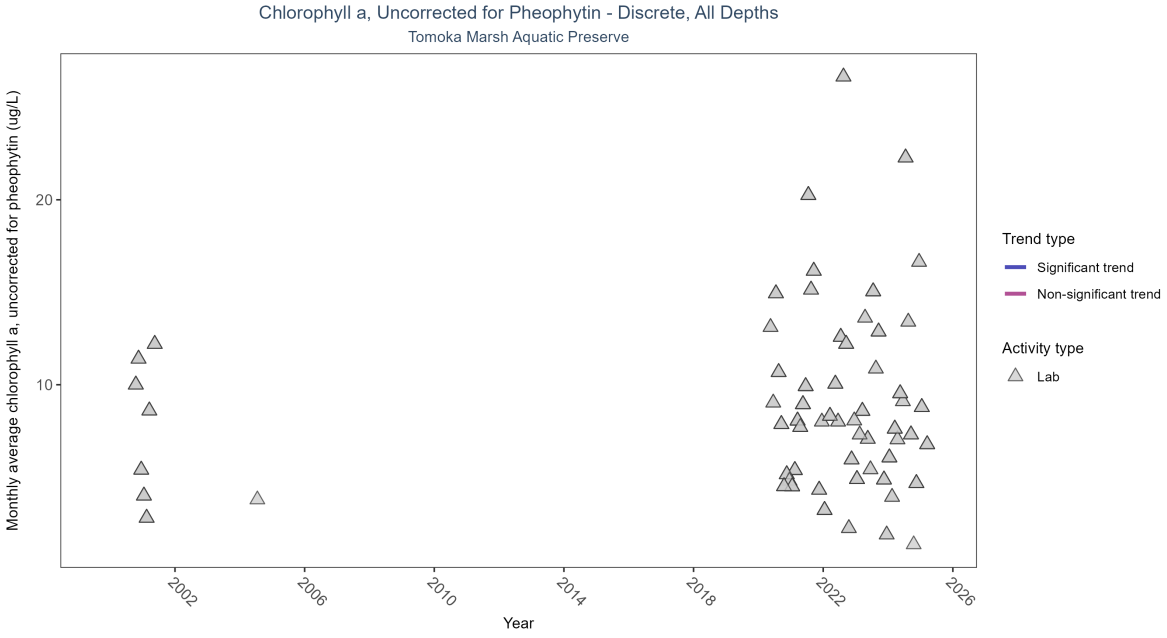


Figure 31: Scatter plot of monthly average levels of chlorophyll a, uncorrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles) 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 | Insufficient data to calculate trend | 330 | 9 | 2000 - 2025 | 7.90715 | - | - | - | - |

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

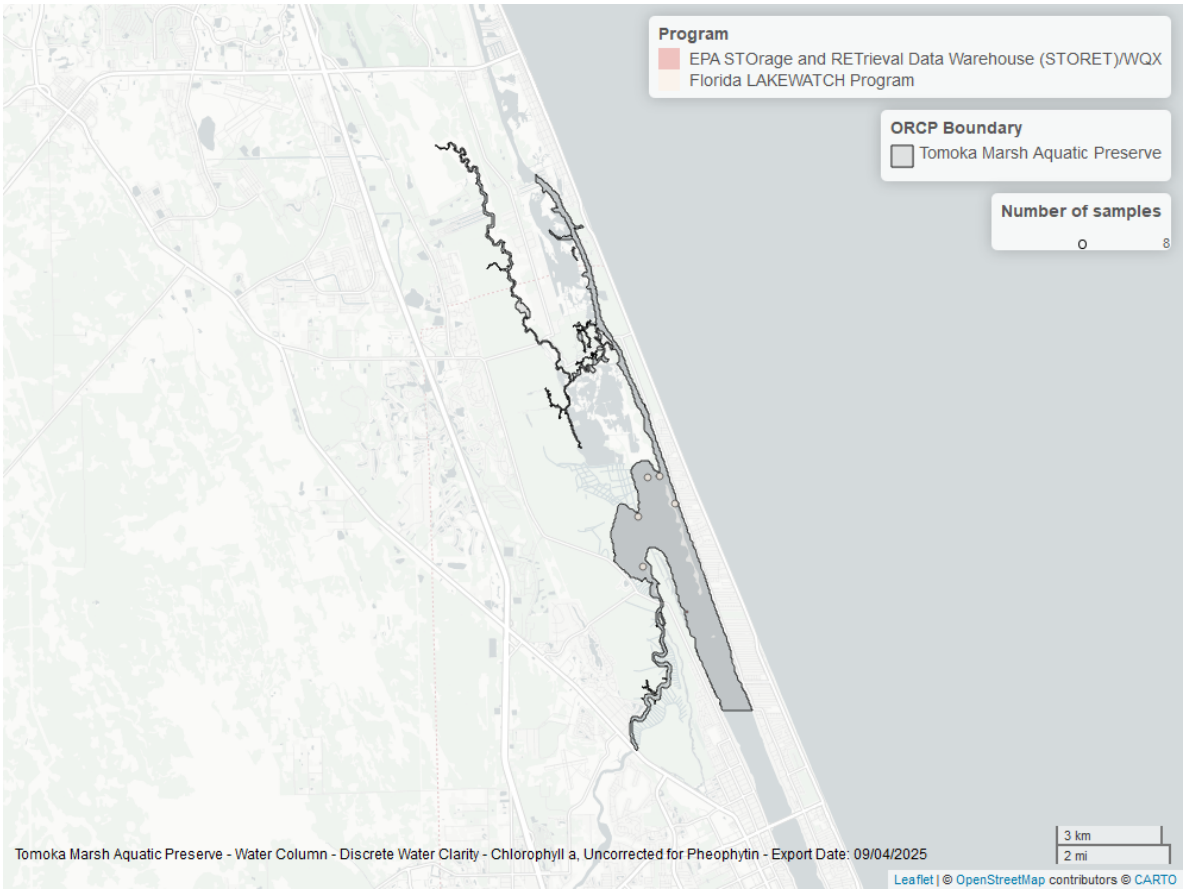


Figure 32: Map showing location of discrete water quality sampling locations within the boundaries of *Tomoka Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

### Chlorophyll a, Corrected for Pheophytin - Discrete

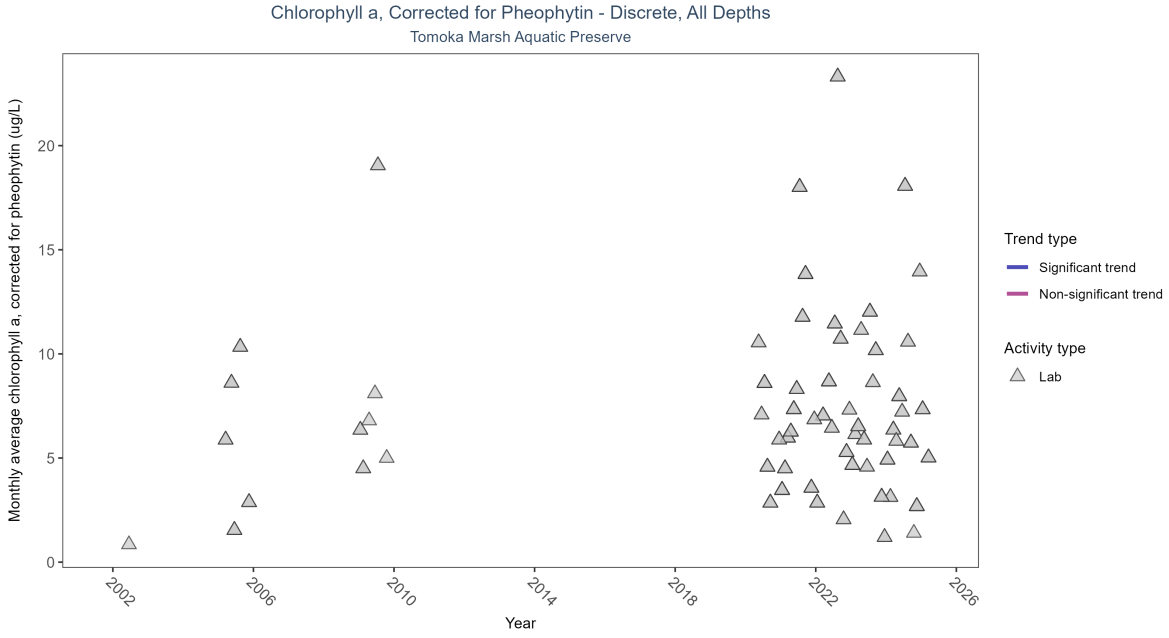


Figure 33: Scatter plot of monthly average levels of chlorophyll a, corrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles) 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 | Insufficient data to calculate trend | 303 | 9 | 2002 - 2025 | 6.3012 | - | - | - | - |

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

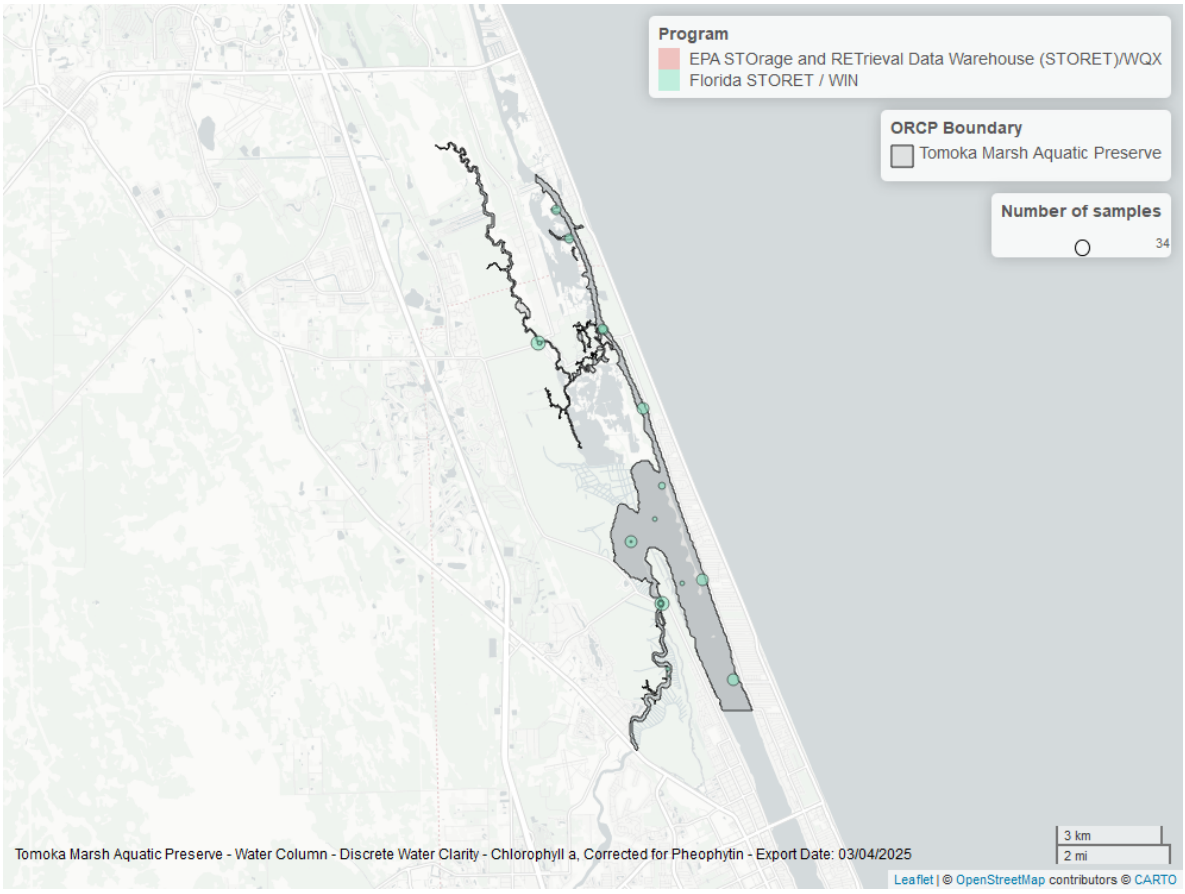


Figure 34: Map showing location of discrete water quality sampling locations within the boundaries of *Tomoka Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

### Secchi Depth - Discrete

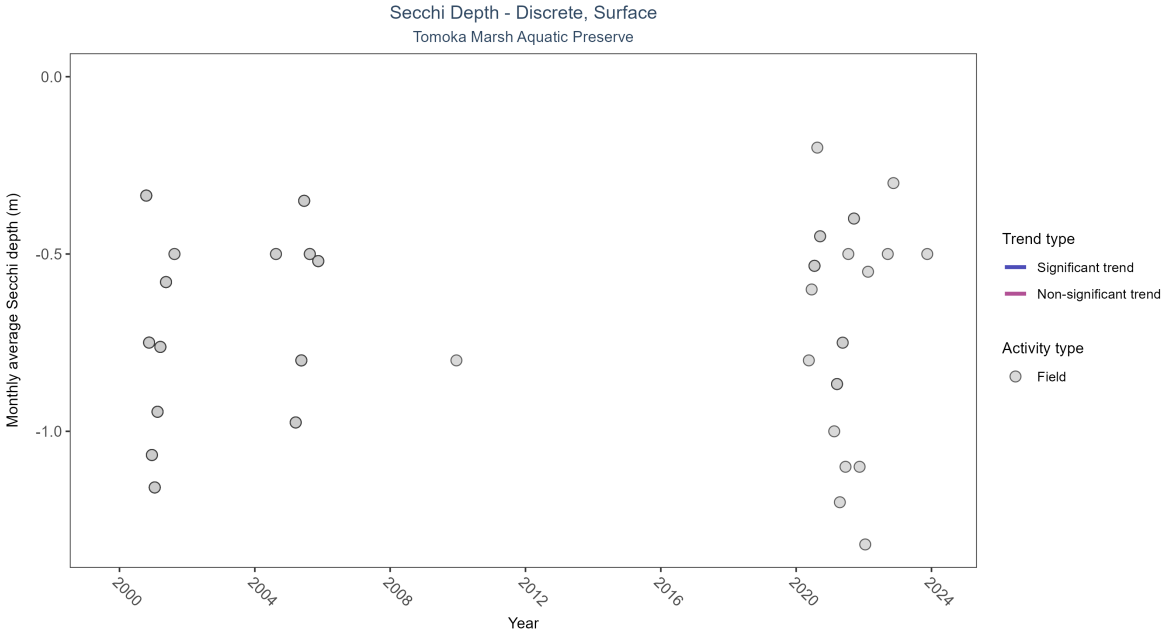


Figure 35: Scatter plot of monthly average Secchi depth over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Secchi depth is only measured in the field (circles).

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 | 365 | 12 | 2000 - 2025 | -0.6 | 0.07851 | -0.64169 | 0.00246 | 0.4769 |

Secchi depth showed no detectable trend between 2000 and 2025.

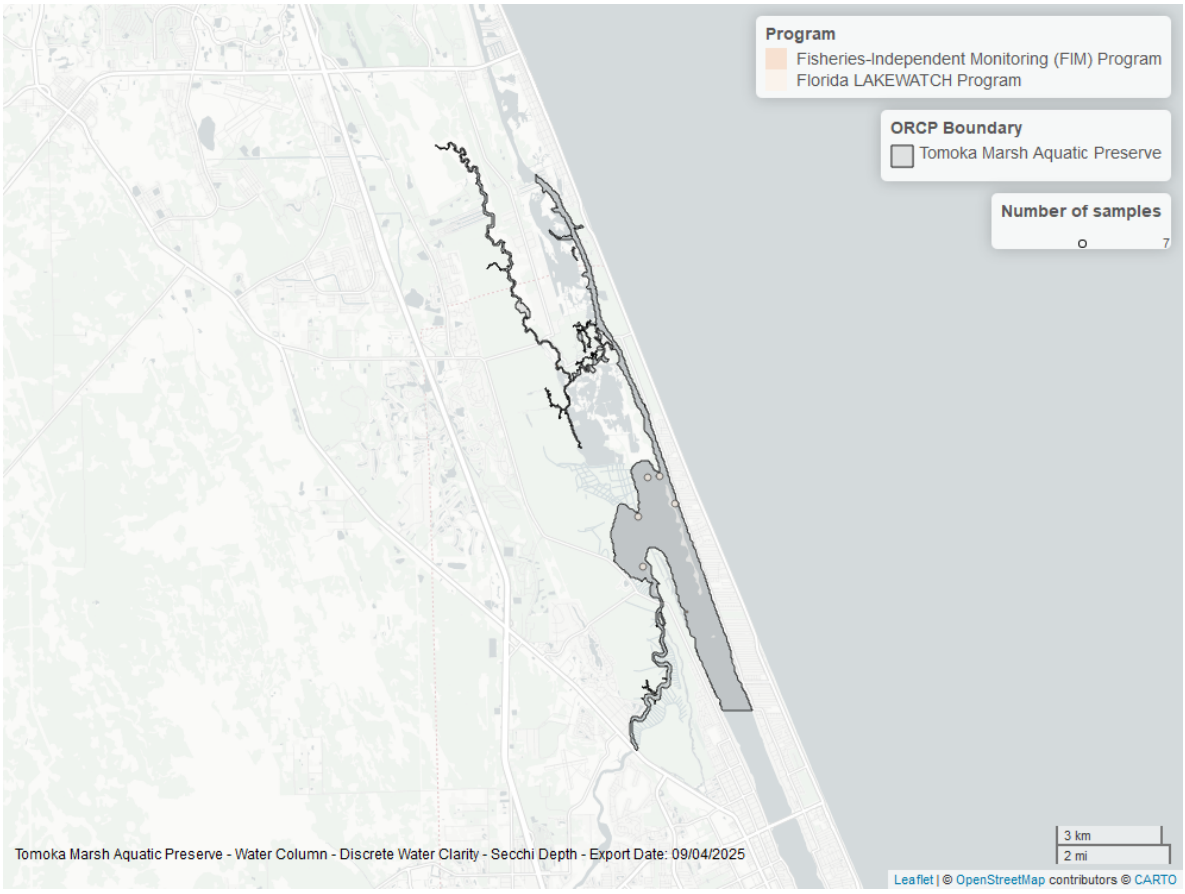


Figure 36: Map showing location of discrete water quality sampling locations within the boundaries of *Tomoka Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

### Colored Dissolved Organic Matter - Discrete

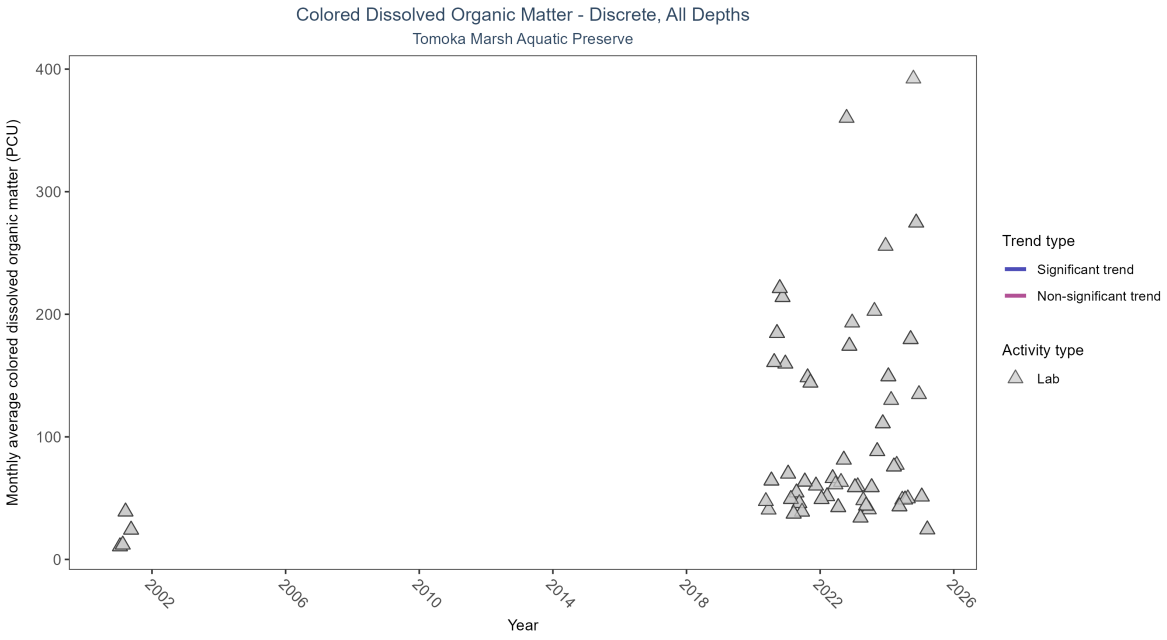


Figure 37: Scatter plot of monthly average colored dissolved organic matter (CDOM) over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed CDOM (triangles) is included in the 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 | 292 | 7 | 2001 - 2025 | 57.31938 | - | - | - | - |

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

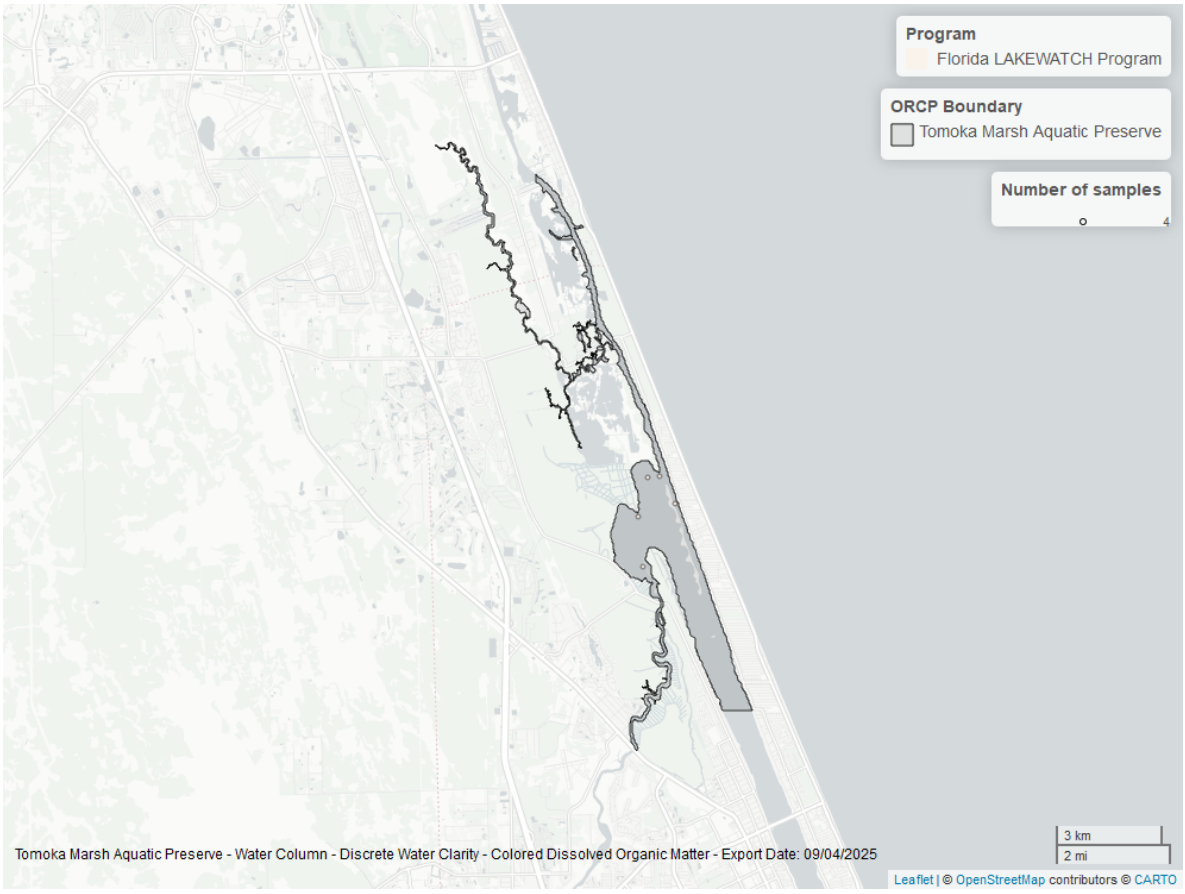


Figure 38: Map showing location of discrete water quality sampling locations within the boundaries of *Tomoka Marsh Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.