Pinellas County Aquatic Preserve

SEACAR Habitat Analyses

Last compiled on 08 October, 2025

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Funding & Acknowledgements

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Threshold Filtering

Threshold filters, following the guidance of Florida Department of Environmental Protection's (*FDEP*) Division of Environmental Assessment and Restoration (*DEAR*) are used to exclude specific results values from the SEACAR Analysis. Based on the threshold filters, Quality Assurance / Quality Control (*QAQC*) Flags are inserted into the *SEACAR_QAQCFlagCode* and *SEACAR_QAQC_Description* columns of the export data. The *Include* column indicates whether the *QAQC* Flag will also indicate that data are excluded from analysis. No data are excluded from the data export, but the analysis scripts can use the *Include* column to exclude data (1 to include, 0 to exclude).

Table 1: Continuous Water Quality threshold values

Parameter Name	*Units*	*Low Threshold*	*High Threshold*
Dissolved Oxygen	mg/L	-0.000001	50
Dissolved Oxygen Saturation	%	-0.000001	500
Salinity	ppt	-0.000001	70
Turbidity	NTU	-0.000001	4000
Water Temperature	Degrees C	-5.000000	45
pH	None	2.000000	14

Table 2: Discrete Water Quality threshold values

Parameter Name	*Units*	*Low Threshold*	*High Threshold*
Ammonia, Un-ionized (NH3)	mg/L	-	-
Ammonium, Filtered (NH4)	mg/L	-	-
Chlorophyll a, Corrected for Pheophytin	ug/L	-	-
Chlorophyll a, Uncorrected for Pheophytin	ug/L	-	-
Colored Dissolved Organic Matter	PCU	-	-

Parameter Name	*Units*	*Low Threshold*	*High Threshold*
Dissolved Oxygen	mg/L	-0.000001	25
Dissolved Oxygen Saturation	%	-0.000001	310
Fluorescent Dissolved Organic Matter	QSE	-	-
Light Extinction Coefficient	mˆ-1	-	-
NO2+3, Filtered	mg/L	-	-
Nitrate (NO3)	mg/L	-	-
Nitrite (NO2)	mg/L	-	-
Nitrogen, organic	mg/L	-	-
Phosphate, Filtered (PO4)	mg/L	-	-
Salinity	ppt	-0.000001	70
Secchi Depth	m	0.000001	50
Specific Conductivity	mS/cm	0.005000	100
Total Kjeldahl Nitrogen	mg/L	-	-
Total Nitrogen	mg/L	-	-
Total Nitrogen	mg/L	-	-
Total Phosphorus	mg/L	-	-
Total Suspended Solids	mg/L	-	-
Turbidity	NTU	-	-
Water Temperature	Degrees C	3.000000	40
pH	None	2.000000	13

Table 3: Quality Assurance Flags inserted based on threshold checks listed in Table 1 and 2

SEACAR QAQC Description	*Include*	*SEACAR QAQCFlagCode*
Exceeds maximum threshold	0	2Q
Below minimum threshold	0	4Q
Within threshold tolerance	1	6Q
No defined thresholds for this parameter	1	7Q

Value Qualifiers

Value qualifier codes included within the data are used to exclude certain results from the analysis. The data are retained in the data export files, but the analysis uses the *Include* column to filter the results.

STORET and WIN value qualifier codes

Value qualifier codes from *STORET* and *WIN* data are examined with the database and used to populate the *Include* column in data exports.

Table 4: Value Qualifier codes excluded from analysis

Qualifier Source	*Value Qualifier*	*Include*	*MDL*	*Description*
STORET-WIN	H	0	0	Value based on field kit determination; results may not be accurate
STORET-WIN	J	0	0	Estimated value
STORET-WIN	V	0	0	Analyte was detected at or above method detection limit
STORET-WIN	Y	0	0	Lab analysis from an improperly preserved sample; data may be inaccurate

Discrete Water Quality Value Qualifiers

The following value qualifiers are highlighted in the Discrete Water Quality section of this report. An exception is made for **Program 476** - *Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network* and data flagged with Value Qualifier **H** are included for this program only.

H - Value based on field kit determiniation; results may not be accurate. This code shall be used if a field screening test (e.g., field gas chromatograph data, immunoassay, or vendor-supplied field kit) was used to generate the value and the field kit or method has not been recognized by the Department as equivalent to laboratory methods.

I - The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

Q - Sample held beyond the accepted holding time. This code shall be used if the value is derived from a sample that was prepared or analyzed after the approved holding time restrictions for sample preparation or analysis.

S - Secchi disk visible to bottom of waterbody. The value reported is the depth of the waterbody at the location of the Secchi disk measurement.

U - Indicates that the compound was analyzed for but not detected. This symbol shall be used to indicate that the specified component was not detected. The value associated with the qualifier shall be the laboratory method detection limit. Unless requested by the client, less than the method detection limit values shall not be reported

Systemwide Monitoring Program (SWMP) value qualifier codes

Value qualifier codes from the *SWMP* continuous program are examined with the database and used to populate the *Include* column in data exports. *SWMP* Qualifier Codes are indicated by *QualifierSource=SWMP*.

Table 5: SWMP Value Qualifier codes

Qualifier Source	*Value Qualifier*	*Include*	*Description*
SWMP	-1	1	Optional parameter not collected
SWMP	-2	0	Missing data
SWMP	-3	0	Data rejected due to QA/QC
SWMP	-4	0	Outside low sensor range
SWMP	-5	0	Outside high sensor range
SWMP	0	1	Passed initial QA/QC checks
SWMP	1	0	Suspect data
SWMP	2	1	Reserved for future use
SWMP	3	1	Calculated data: non-vented depth/level sensor correction for changes in barometric pressure
SWMP	4	1	Historical: Pre-auto QA/QC
SWMP	5	1	Corrected data

Water Column

The water column habitat extends from the water's surface to the bottom sediments, and it's where fish, dolphins, crabs and people swim! So much life makes its home in the water column that the health of marine and coastal ecosystems, as well as human economies, depend on the condition of this vulnerable habitat. Local patterns of rainfall, temperature, winds and currents can rapidly change the condition of the water column, while global influences such as El Niño/La Niña, large-scale fluctuation in sea temperatures and climate change can have long-term effects. Inputs from the prosperity of our day-to-day lives including farming, mining and forestry, and emissions from power generation, automobiles and water treatment can also alter the health of the water column. Acting alone or together, each input can have complex and lasting effects on habitats and ecosystems.

SEACAR evaluates water column health with several essential parameters. These include nutrient surveys of nitrogen and phosphorus, and water quality assessments of salinity, dissolved oxygen, pH, and water temperature. Water clarity is evaluated with Secchi depth, turbidity, levels of chlorophyll a, total suspended solids, and colored dissolved organic matter. Additionally, the richness of nekton is indicated by the abundance of free-swimming fishes and macroinvertebrates like crabs and shrimps.

Seasonal Kendall-Tau Analysis

Indicators must have a minimum of five to ten years, depending on the habitat, of data within the geographic range of the analysis to be included in the analysis. Ten years of data are required for discrete parameters, and five years of data are required for continuous parameters. If there are insufficient years of data, the number of years of data available will be noted and labeled as "insufficient data to conduct analysis". Further, for the preferred Seasonal Kendall-Tau test, there must be data from at least two months in common across at least two consecutive years within the RCP managed area being analyzed. Values that pass both of these tests will be included in the analysis and be labeled as *Use_In_Analysis* = **TRUE**. Any that fail either test will be excluded from the analyses and labeled as *Use_In_Analysis* = **FALSE**. The points for all Water Column plots displayed in this section are monthly averages. Trend significance will be denoted as "Significant Trend" (when $p < 0.05$), or "Non-significant Trend" (when $p >= 0.05$). Any parameters with insufficient data to perform Seasonal Kendall-Tau test will have their monthly averages plotted without a corresponding trend line.

Water Quality - Discrete

The following files were used in the discrete analysis:

- *Combined_WQ_WC_NUT_Chlorophyll_a_corrected_for_pheophytin-2025-Sep-04.txt*
- *Combined_WQ_WC_NUT_Chlorophyll_a_uncorrected_for_pheophytin-2025-Sep-04.txt*
- *Combined_WQ_WC_NUT_Colored_dissolved_organic_matter_CDOM-2025-Sep-04.txt*
- *Combined_WQ_WC_NUT_Dissolved_Oxygen-2025-Sep-04.txt*
- *Combined_WQ_WC_NUT_Dissolved_Oxygen_Saturation-2025-Sep-04.txt*
- *Combined_WQ_WC_NUT_pH-2025-Sep-04.txt*
- *Combined_WQ_WC_NUT_Salinity-2025-Sep-04.txt*
- *Combined_WQ_WC_NUT_Secchi_Depth-2025-Sep-04.txt*
- *Combined_WQ_WC_NUT_Total_Nitrogen-2025-Sep-04.txt*
- *Combined_WQ_WC_NUT_Total_Phosphorus-2025-Sep-04.txt*
- *Combined_WQ_WC_NUT_Total_Suspended_Solids_TSS-2025-Sep-04.txt*
- *Combined_WQ_WC_NUT_Turbidity-2025-Sep-04.txt*
- *Combined_WQ_WC_NUT_Water_Temperature-2025-Sep-04.txt*

Chlorophyll a, Corrected for Pheophytin - Discrete

Seasonal Kendall-Tau Trend Analysis

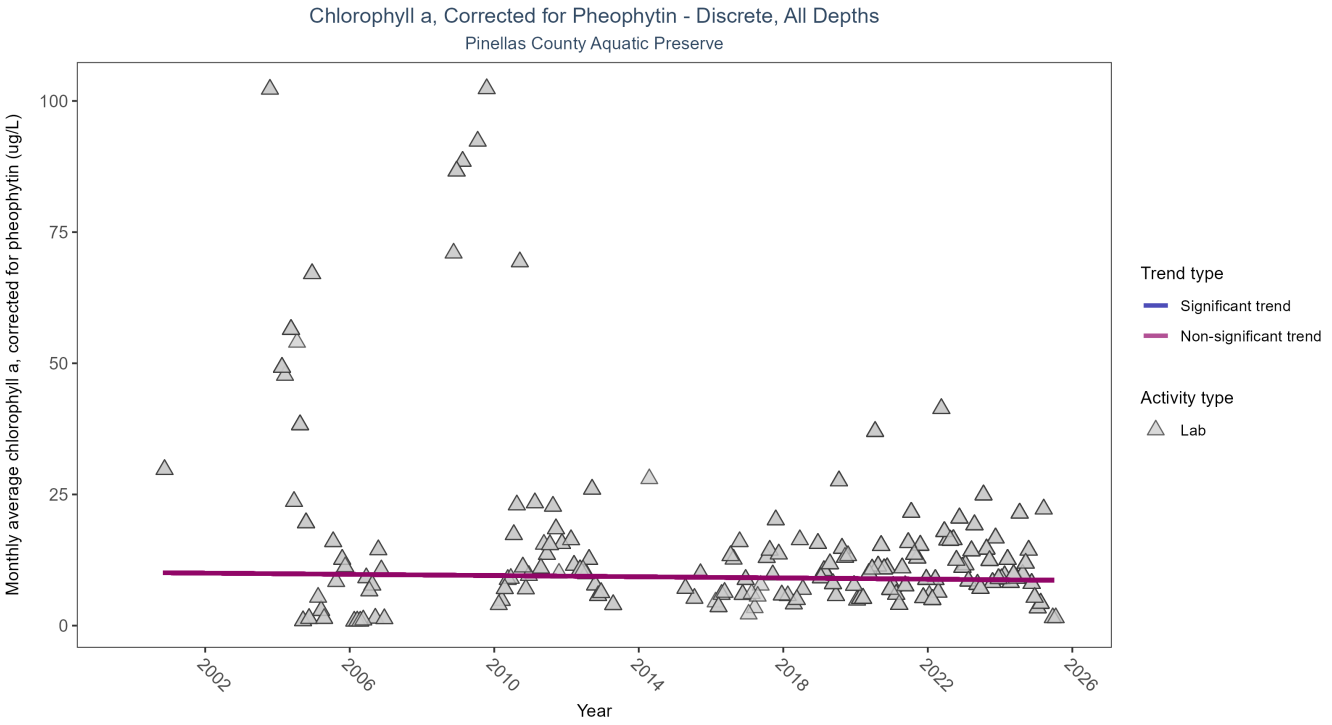

Figure 1: Scatter plot of monthly average levels of chlorophyll a, corrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles) is included in the plot.

Table 6: Seasonal Kendall-Tau Trend Analysis for Chlorophyll a, Corrected for Pheophytin

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
Lab	No significant trend	3654	23	2000 - 2025	5.8	-0.0221	10.1175	-0.0575	0.6058

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

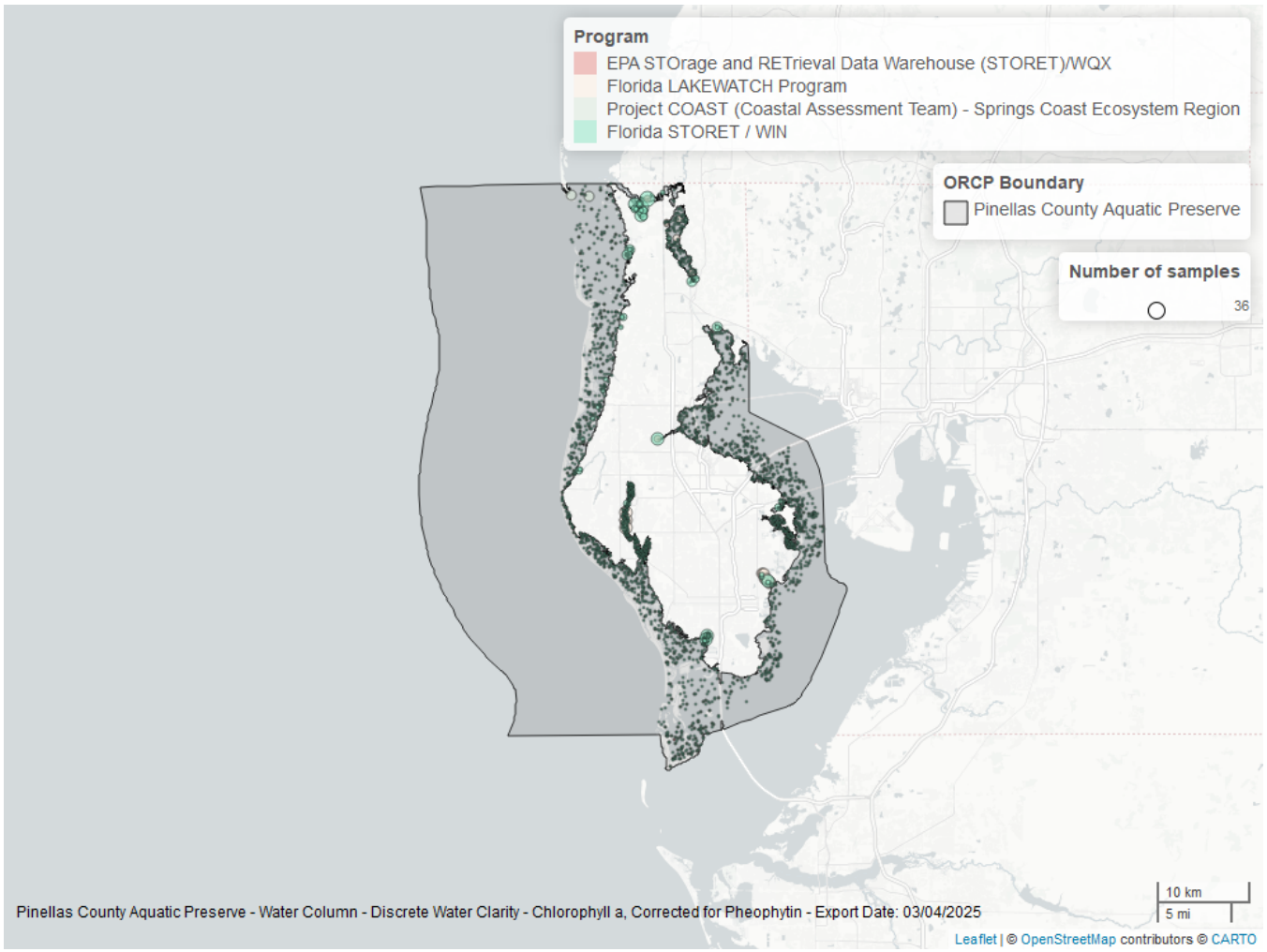

Figure 2: Map showing location of discrete water quality sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 7: Programs contributing data for Chlorophyll a, Corrected for Pheophytin

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	3365	2000	2025
514	292	2018	2024
5008	56	2023	2025

Program names:

514 - Florida LAKEWATCH Program[1]
5002 - Florida STORET / WIN[2]
5008 - Project COAST (Coastal Assessment Team) - Springs Coast Ecosystem Region[3]

Chlorophyll a, Uncorrected for Pheophytin - Discrete

Seasonal Kendall-Tau Trend Analysis

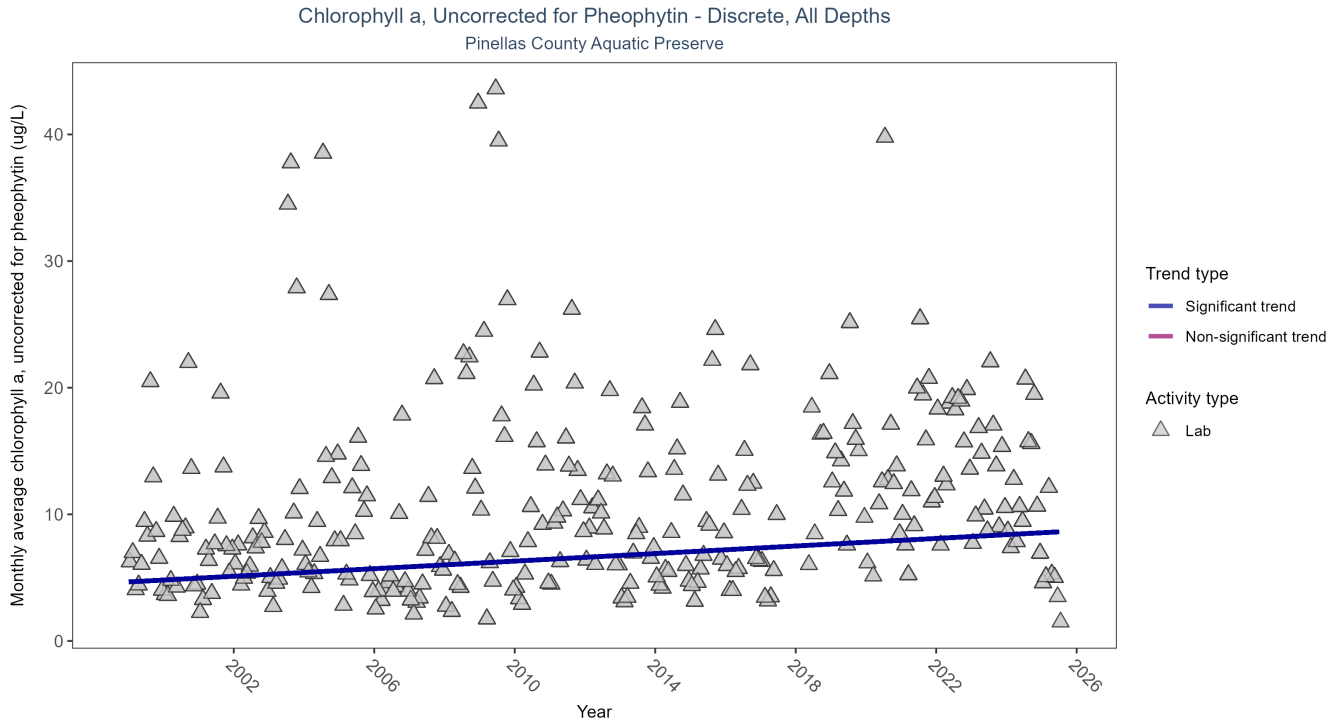

Figure 3: Scatter plot of monthly average levels of chlorophyll a, uncorrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles) is included in the plot.

Table 8: Seasonal Kendall-Tau Trend Analysis for Chlorophyll a, Uncorrected for Pheophytin

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
Lab	Significantly increasing trend	7065	27	1999 - 2025	6.4	0.2328	4.6625	0.1493	0

Monthly average chlorophyll a, uncorrected for pheophytin, increased by 0.15 µg/L per year, indicating a decrease in water clarity.

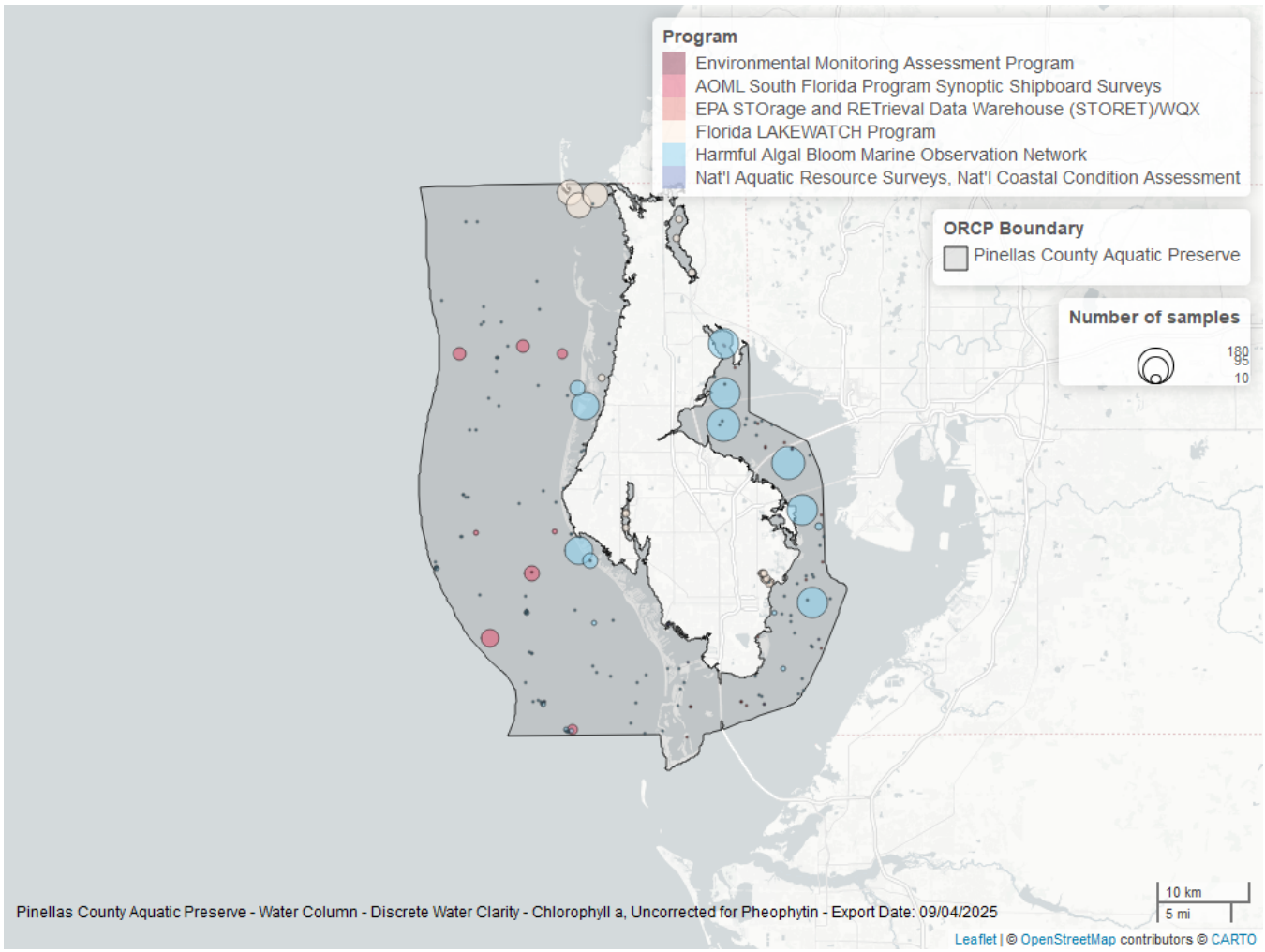

Figure 4: Map showing location of discrete water quality sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 9: Programs contributing data for Chlorophyll a, Uncorrected for Pheophytin

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	6254	1999	2025
95	1495	2000	2018
514	784	2001	2024
3	189	2018	2024
5008	56	2023	2025
103	26	2000	2015
115	9	2000	2004
60	9	2008	2013
118	8	2000	2010

Program names:

3 - Atlantic Oceanographic and Meteorological Laboratory (AOML) South Florida Program Synoptic Shipboard Surveys[4]
60 - Southeast Area Monitoring and Assessment Program (SEAMAP) - Gulf of Mexico Fall & Summer Shrimp/Groundfish Survey[5]

95 - Harmful Algal Bloom Marine Observation Network[6]
103 - EPA STOrage and RETrieval Data Warehouse (STORET)/WQX[7]
115 - Environmental Monitoring Assessment Program[8]
118 - National Aquatic Resource Surveys, National Coastal Condition Assessment[9]
514 - Florida LAKEWATCH Program[1]
5002 - Florida STORET / WIN[2]
5008 - Project COAST (Coastal Assessment Team) - Springs Coast Ecosystem Region[3]

Colored Dissolved Organic Matter - Discrete

Seasonal Kendall-Tau Trend Analysis

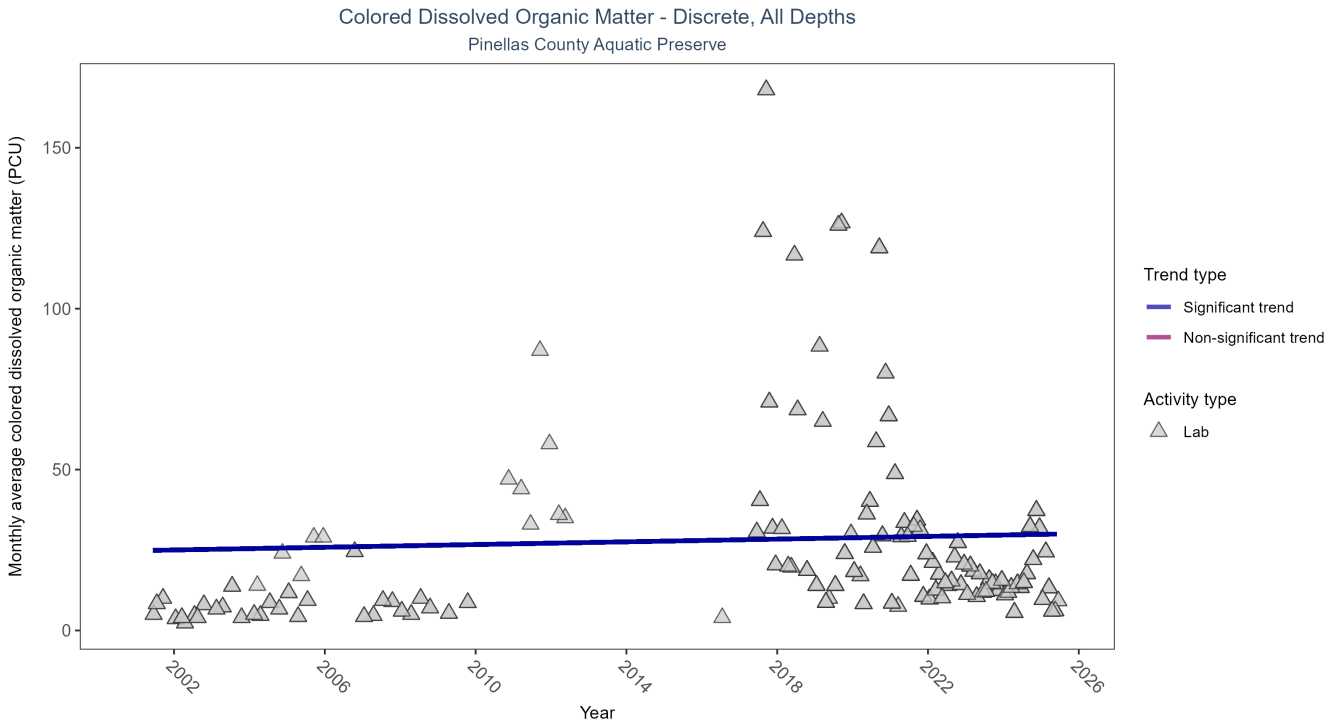

Figure 5: Scatter plot of monthly average colored dissolved organic matter (CDOM) over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed CDOM (triangles) is included in the plot.

Table 10: Seasonal Kendall-Tau Trend Analysis for Colored Dissolved Organic Matter

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
Lab	Significantly increasing trend	1317	22	2001 - 2025	10.502	0.0708	24.8044	0.2112	0.0422

Monthly average colored dissolved organic matter increased by 0.21 PCU per year, indicating a decrease in water clarity.

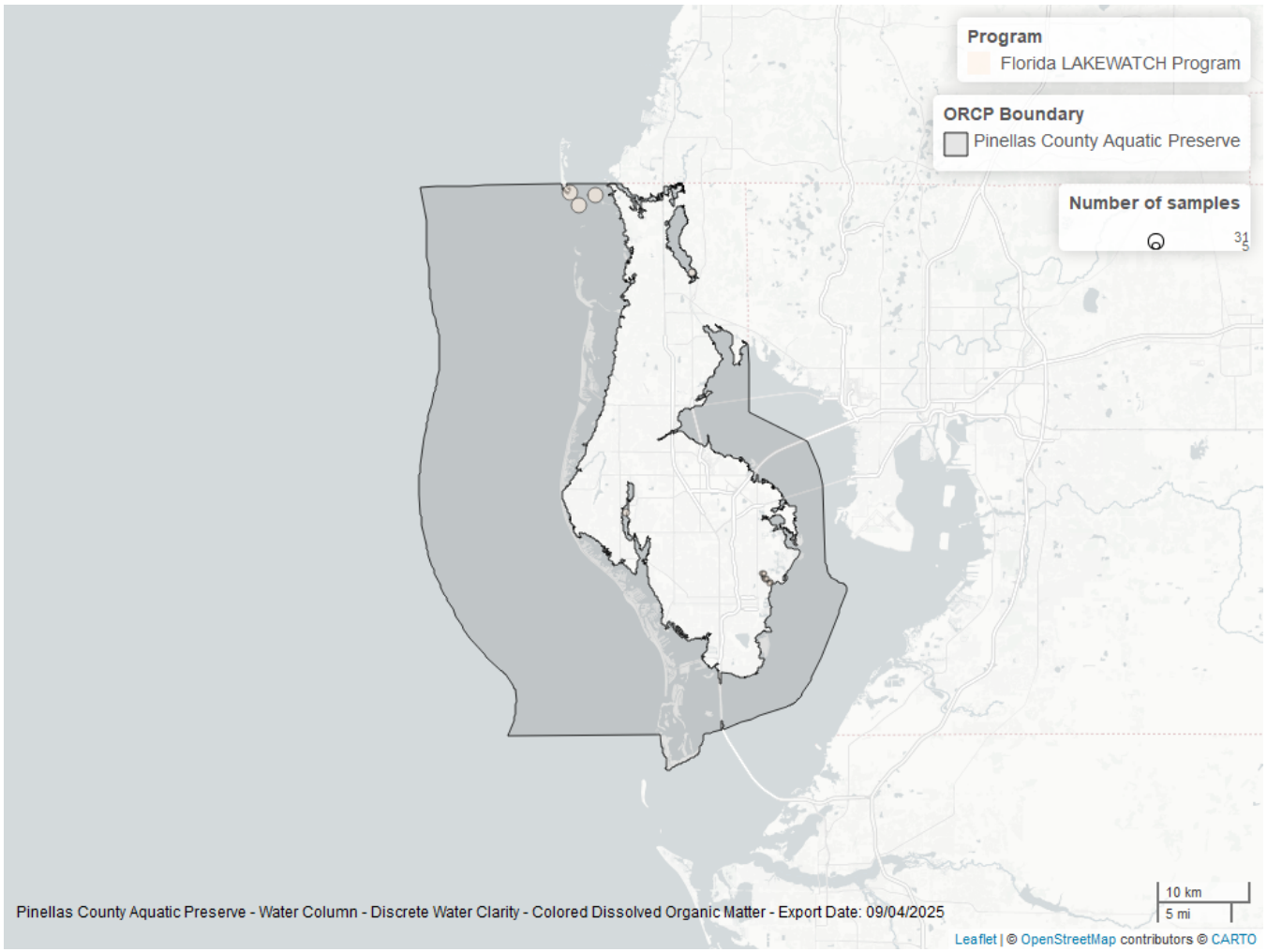

Figure 6: Map showing location of discrete water quality sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 11: Programs contributing data for Colored Dissolved Organic Matter

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	949	2017	2025
514	262	2001	2024
5008	100	2021	2025
479	13	2016	2024

Program names:

479 - Southwest Florida Water Management District - Water Quality Monitoring[10]
514 - Florida LAKEWATCH Program[1]
5002 - Florida STORET / WIN[2]
5008 - Project COAST (Coastal Assessment Team) - Springs Coast Ecosystem Region[3]

Dissolved Oxygen - Discrete

Seasonal Kendall-Tau Trend Analysis

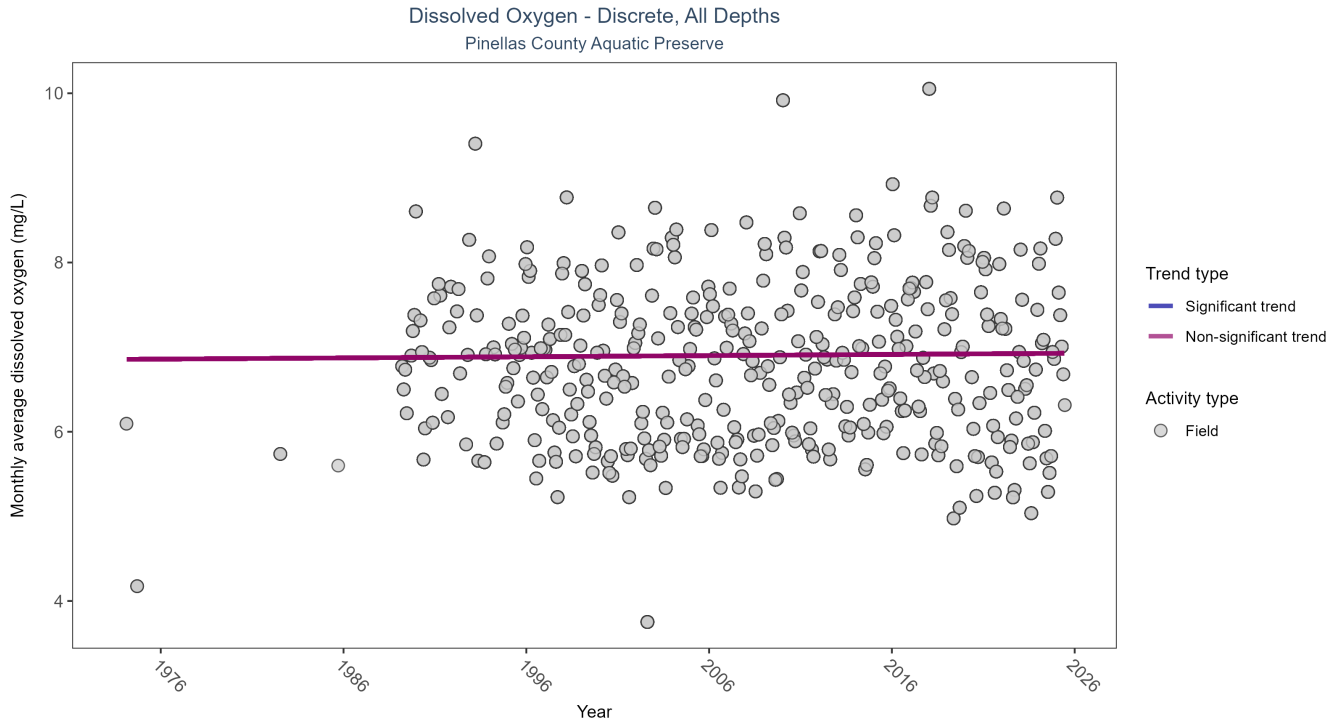

Figure 7: Scatter plot of monthly average dissolved oxygen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen values measured in the field (circles) are included in the plot.

Table 12: Seasonal Kendall-Tau Trend Analysis for Dissolved Oxygen

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
Field	No significant trend	97011	40	1974 - 2025	6.6	0.0237	6.8557	0.0014	0.5698

Dissolved oxygen showed no detectable trend between 1974 and 2025.

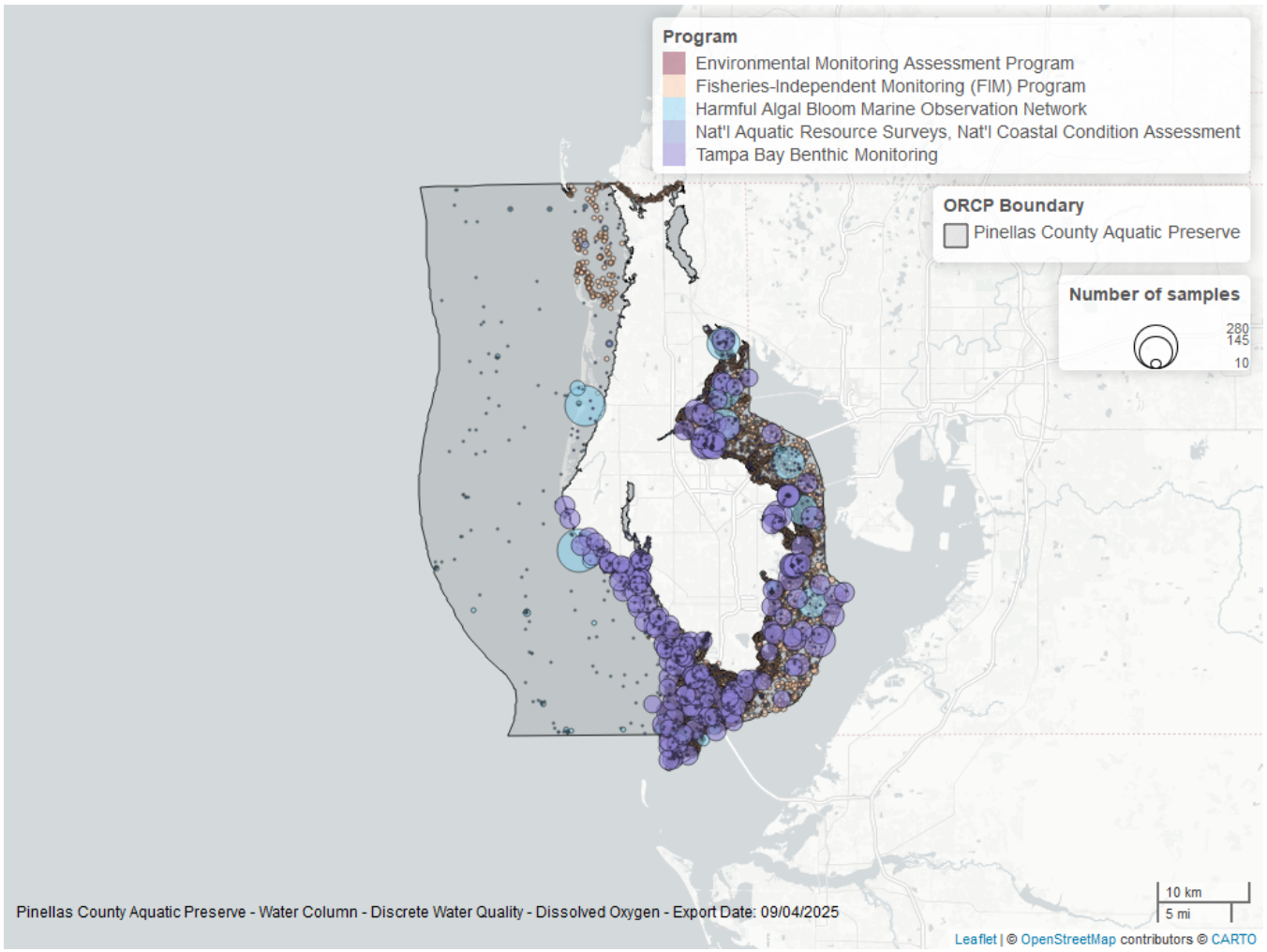

Figure 8: Map showing location of discrete water quality sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 13: Programs contributing data for Dissolved Oxygen

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	52306	1995	2025
69	31262	1989	2024
4067	11610	1993	2023
95	2371	1974	2018
5008	100	2021	2025
118	32	2000	2020
115	29	2000	2004
60	23	2008	2013
103	10	2015	2015
479	10	2016	2024

Program names:

60 - Southeast Area Monitoring and Assessment Program (SEAMAP) - Gulf of Mexico Fall & Summer Shrimp/Groundfish Survey[5]
69 - Fisheries-Independent Monitoring (FIM) Program[11]

95 - Harmful Algal Bloom Marine Observation Network[6]
103 - EPA STOrage and RETrieval Data Warehouse (STORET)/WQX[7]
115 - Environmental Monitoring Assessment Program[8]
118 - National Aquatic Resource Surveys, National Coastal Condition Assessment[9]
479 - Southwest Florida Water Management District - Water Quality Monitoring[10]
4067 - Tampa Bay Benthic Monitoring[12]
5002 - Florida STORET / WIN[2]
5008 - Project COAST (Coastal Assessment Team) - Springs Coast Ecosystem Region[3]

Dissolved Oxygen Saturation - Discrete

Seasonal Kendall-Tau Trend Analysis

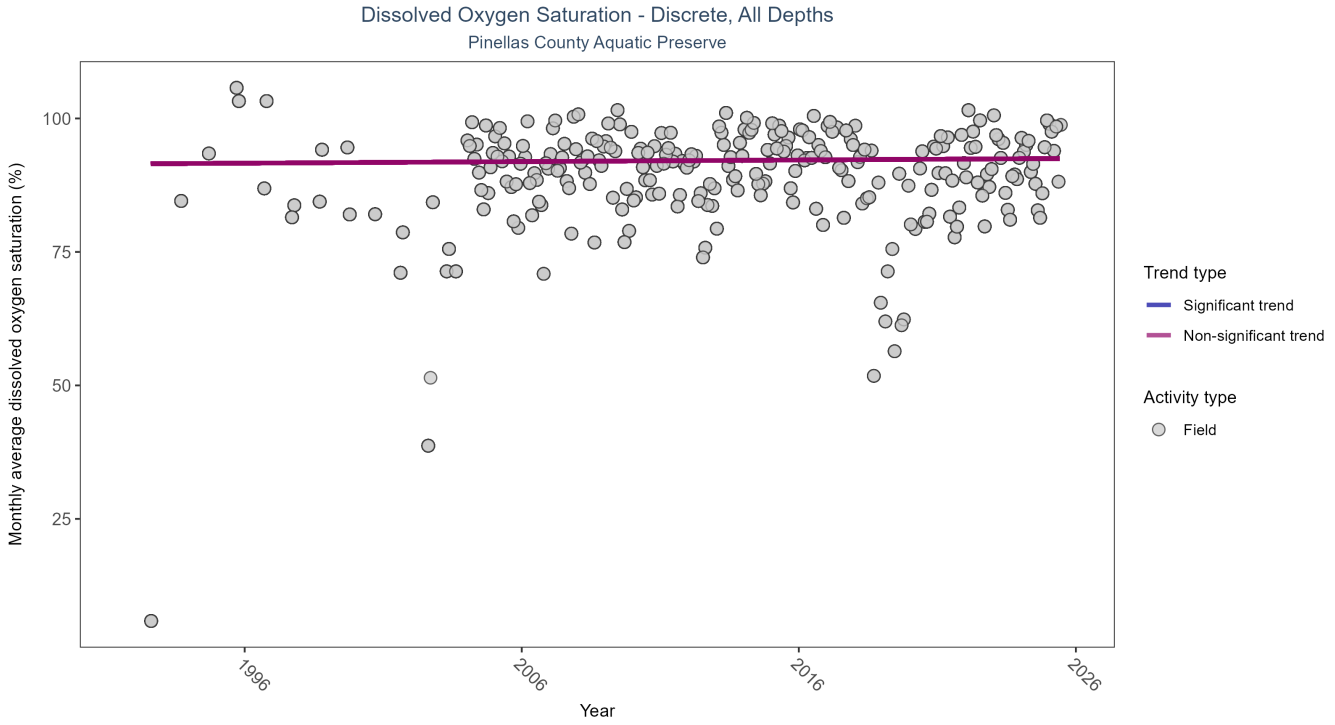

Figure 9: Scatter plot of monthly average dissolved oxygen saturation over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen saturation values measured in the field (circles)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

Table 14: Seasonal Kendall-Tau Trend Analysis for Dissolved Oxygen Saturation

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
Field	No significant trend	31568	34	1992 - 2025	90.9	0.0304	91.5008	0.0298	0.5976

Dissolved oxygen saturation showed no detectable trend between 1992 and 2025.

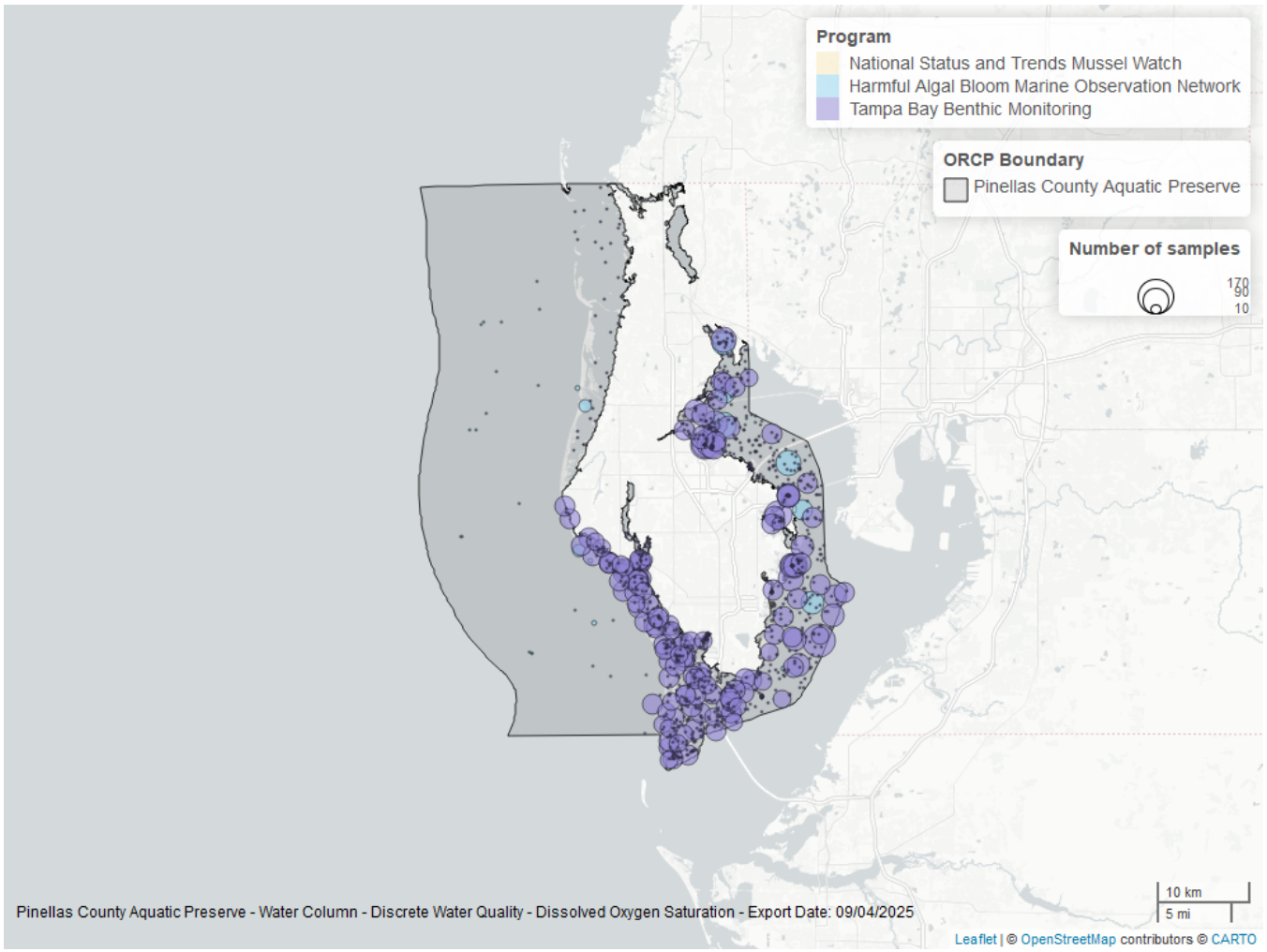

Figure 10: Map showing location of discrete water quality sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 15: Programs contributing data for Dissolved Oxygen Saturation

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	20252	2004	2025
4067	11046	1993	2023
95	638	2002	2018
5008	98	2021	2025
102	66	1992	1992
479	1	2024	2024

Program names:

95 - Harmful Algal Bloom Marine Observation Network[6]
102 - National Status and Trends Mussel Watch[13]
479 - Southwest Florida Water Management District - Water Quality Monitoring[10]
4067 - Tampa Bay Benthic Monitoring[12]
5002 - Florida STORET / WIN[2]
5008 - Project COAST (Coastal Assessment Team) - Springs Coast Ecosystem Region[3]

pH - Discrete

Seasonal Kendall-Tau Trend Analysis

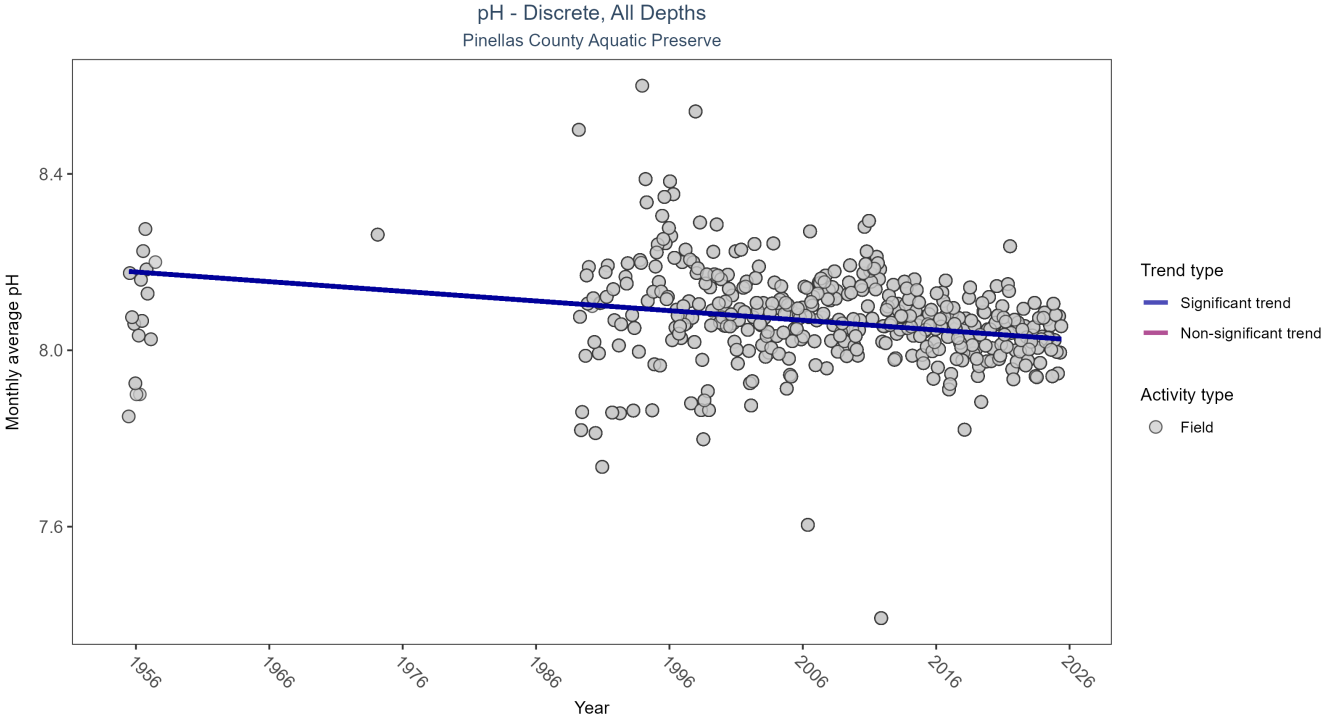

Figure 11: Scatter plot of monthly average pH over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only pH values measured in the field (circles) are included in the plot.

Table 16: Seasonal Kendall-Tau Trend Analysis for pH

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
Field	Significantly decreasing trend	92229	41	1955 - 2025	8.1	-0.2089	8.1797	-0.0022	0

Monthly average pH decreased by less than 0.01 pH units per year.

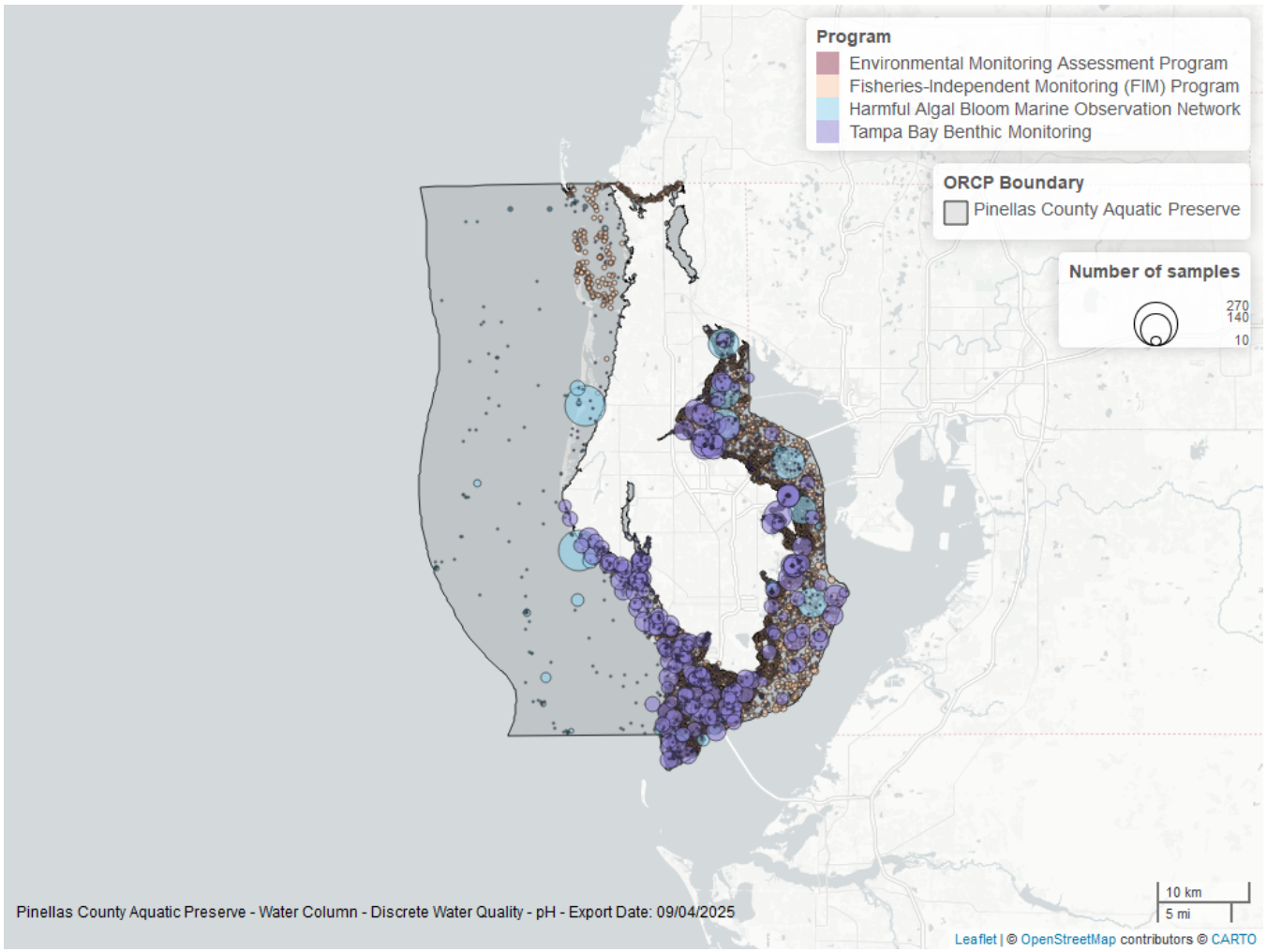

Figure 12: Map showing location of discrete water quality sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 17: Programs contributing data for pH

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	50265	1995	2025
69	30883	1989	2024
4067	9050	1993	2023
95	2304	1955	2018
5008	96	2021	2025
115	29	2000	2004
479	10	2016	2024
103	6	2015	2015

Program names:

69 - Fisheries-Independent Monitoring (FIM) Program[11]
95 - Harmful Algal Bloom Marine Observation Network[6]
103 - EPA STOrage and RETrieval Data Warehouse (STORET)/WQX[7]
115 - Environmental Monitoring Assessment Program[8]
479 - Southwest Florida Water Management District - Water Quality Monitoring[10]

4067 - Tampa Bay Benthic Monitoring[12]
5002 - Florida STORET / WIN[2]
5008 - Project COAST (Coastal Assessment Team) - Springs Coast Ecosystem Region[3]

Salinity - Discrete

Seasonal Kendall-Tau Trend Analysis

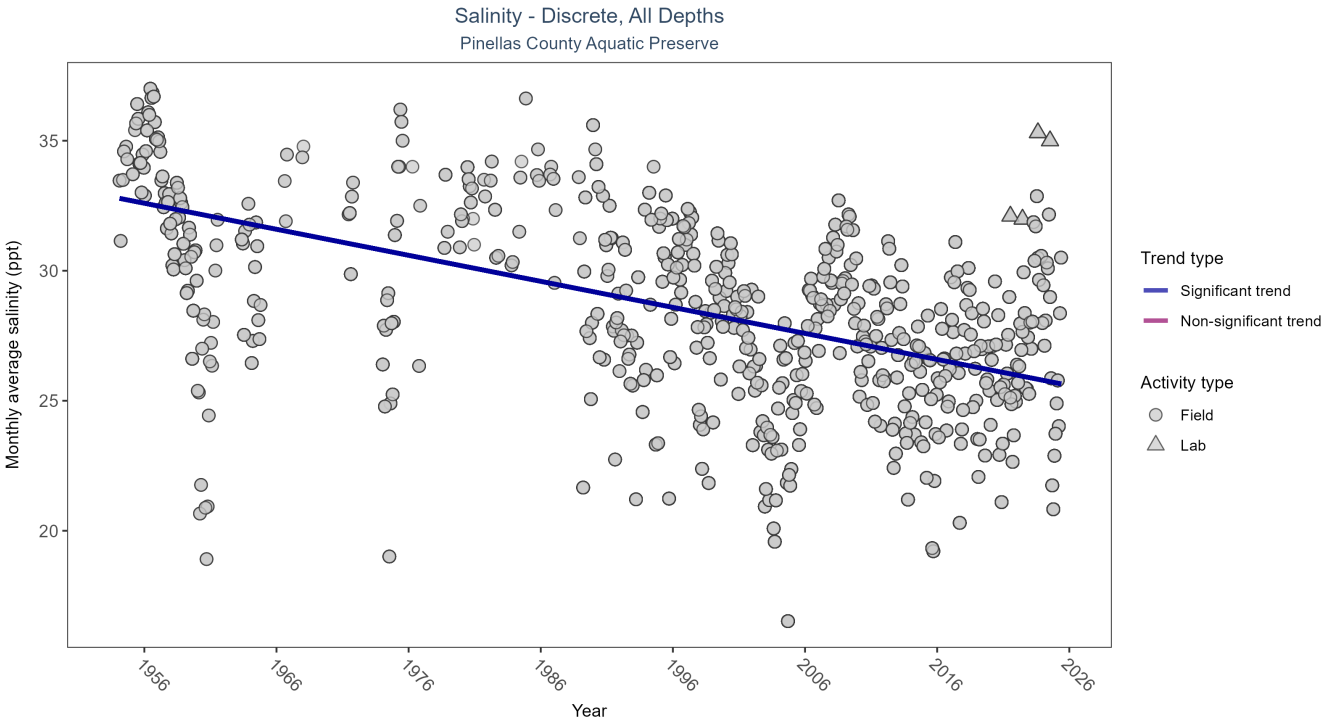

Figure 13: Scatter plot of monthly average salinity over time. If the time series included ten or more years of discrete observations, significant (blue) or non-significant (magenta) trend lines are also shown. Discrete salinity values derived from grab samples analyzed in the field (circles) or the laboratory (triangles) are both included in the plot.

Table 18: Seasonal Kendall-Tau Trend Analysis for Salinity

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
All	Significantly decreasing trend	96492	65	1954 - 2025	28.96	-0.377	32.7958	-0.1001	0

Monthly average salinity decreased by 0.1 ppt per year.

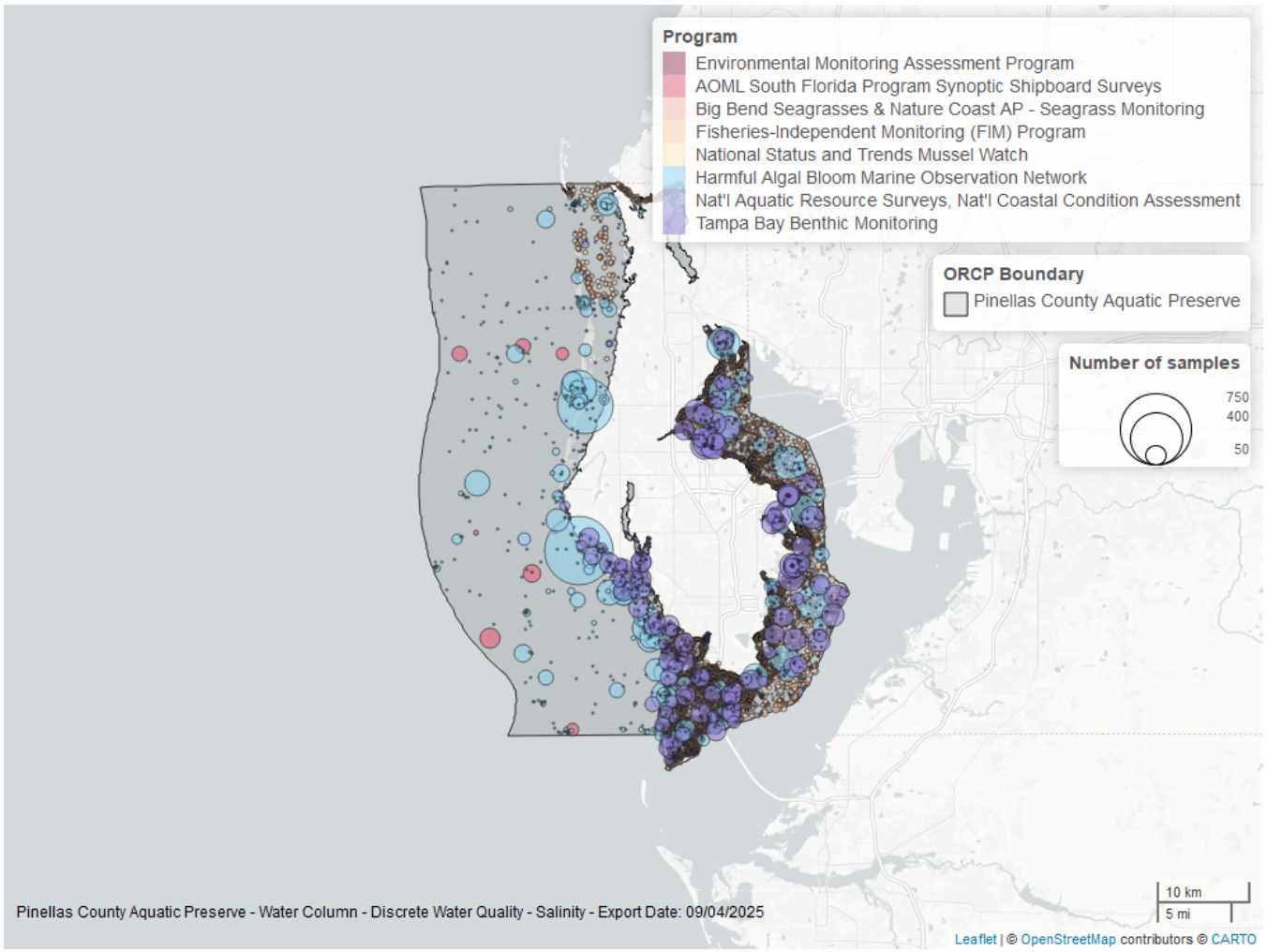

Figure 14: Map showing location of discrete water quality sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 19: Programs contributing data for Salinity

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	50154	1995	2025
69	31552	1989	2024
4067	7290	1993	2023
95	7197	1954	2018
3	241	2018	2024
5008	102	2021	2025
102	66	1992	1992
560	32	2021	2024
115	29	2000	2004
118	24	2015	2020
60	16	2008	2013

Program names:

3 - Atlantic Oceanographic and Meteorological Laboratory (AOML) South Florida Program Synoptic Shipboard Surveys[4]

60 - Southeast Area Monitoring and Assessment Program (SEAMAP) - Gulf of Mexico Fall & Summer Shrimp/Groundfish Survey[5]
69 - Fisheries-Independent Monitoring (FIM) Program[11]
95 - Harmful Algal Bloom Marine Observation Network[6]
102 - National Status and Trends Mussel Watch[13]
115 - Environmental Monitoring Assessment Program[8]
118 - National Aquatic Resource Surveys, National Coastal Condition Assessment[9]
560 - Big Bend Seagrasses & Nature Coast Aquatic Preserves - Seagrass Monitoring[14]
4067 - Tampa Bay Benthic Monitoring[12]
5002 - Florida STORET / WIN[2]
5008 - Project COAST (Coastal Assessment Team) - Springs Coast Ecosystem Region[3]

Secchi Depth - Discrete

Seasonal Kendall-Tau Trend Analysis

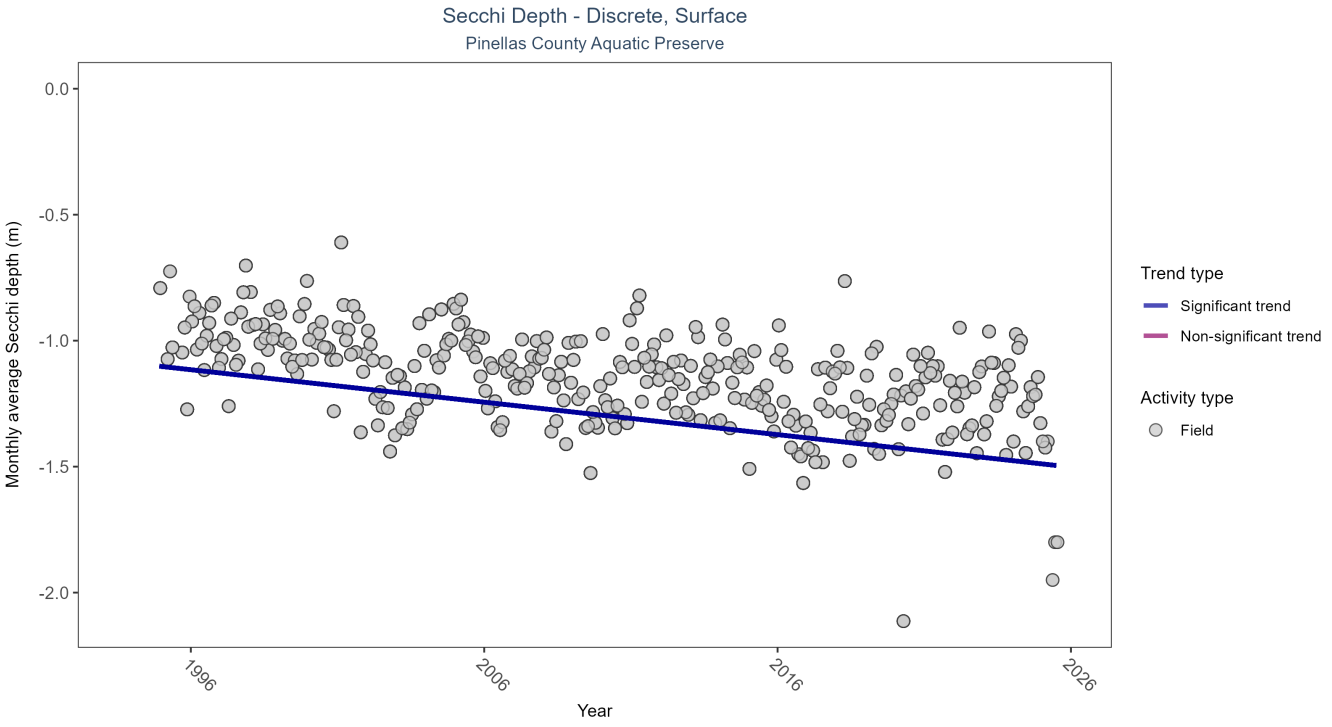

Figure 15: Scatter plot of monthly average Secchi depth over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Secchi depth is only measured in the field (circles).

Table 20: Seasonal Kendall-Tau Trend Analysis for Secchi Depth

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
Field	Significantly decreasing trend	32436	32	1994 - 2025	-1.2	-0.3454	-1.0895	-0.0129	0

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

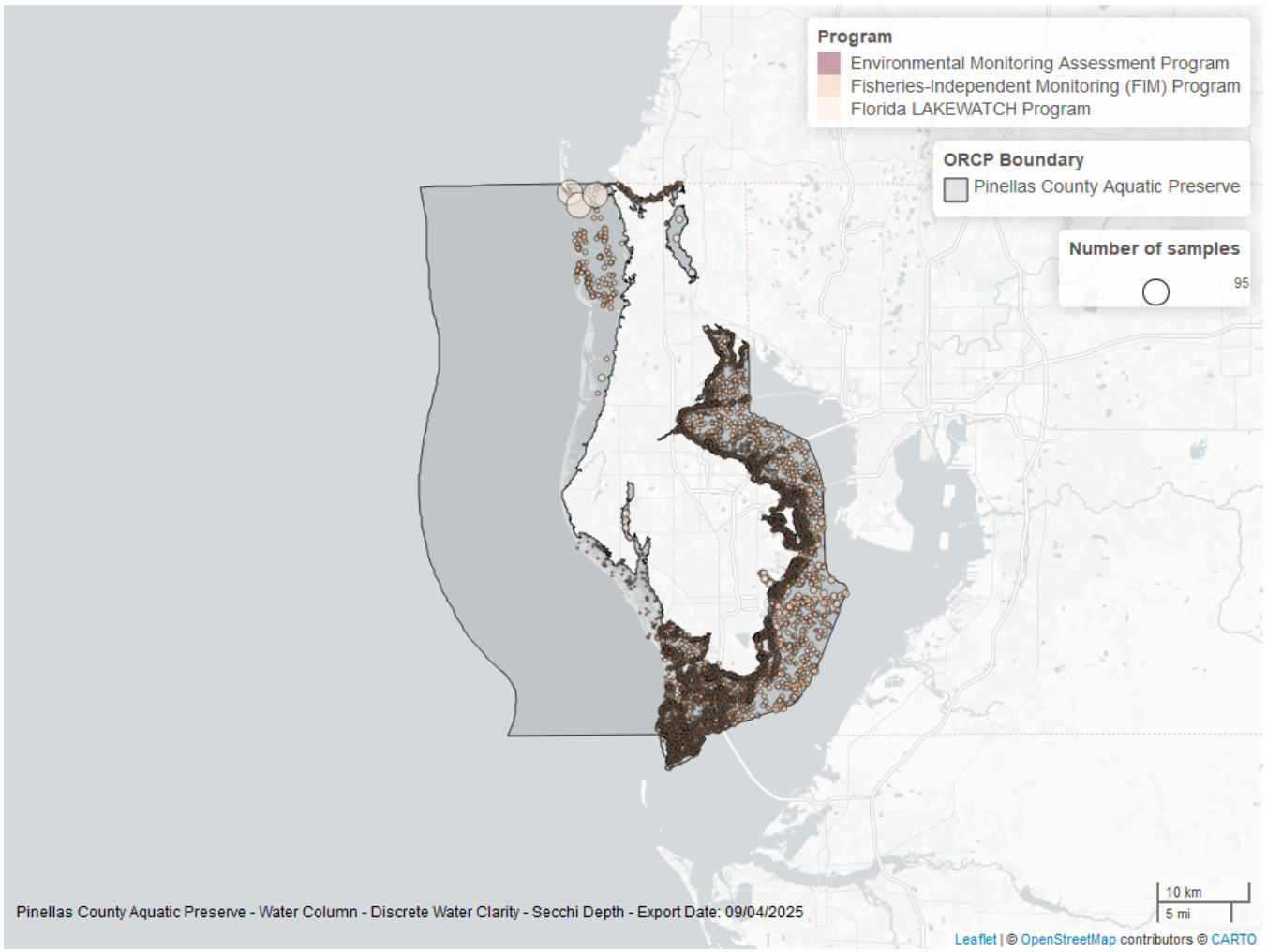

Figure 16: Map showing location of discrete water quality sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 21: Programs contributing data for Secchi Depth

ProgramID	*N_Data*	*YearMin*	*YearMax*
69	28045	1994	2024
5002	3444	1999	2025
514	846	2001	2024
5008	88	2021	2025
115	8	2000	2004
60	5	2008	2013
103	1	2015	2015

Program names:

60 - Southeast Area Monitoring and Assessment Program (SEAMAP) - Gulf of Mexico Fall & Summer Shrimp/Groundfish Survey[5]
69 - Fisheries-Independent Monitoring (FIM) Program[11]
103 - EPA STOrage and RETrieval Data Warehouse (STORET)/WQX[7]
115 - Environmental Monitoring Assessment Program[8]
514 - Florida LAKEWATCH Program[1]

5002 - Florida STORET / WIN[2]
5008 - Project COAST (Coastal Assessment Team) - Springs Coast Ecosystem Region[3]

Total Nitrogen - Discrete

Total Nitrogen Calculation:

The logic for calculated Total Nitrogen was provided by Kevin O'Donnell and colleagues at FDEP (with the help of Jay Silvanima, Watershed Monitoring Section). The following logic is used, in this order, based on the availability of specific nitrogen components.

1) TN = TKN + NO3O2;
2) TN = TKN + NO3 + NO2;
3) TN = ORGN + NH4 + NO3O2;
4) TN = ORGN + NH4 + NO2 + NO3;
5) TN = TKN + NO3;
6) TN = ORGN + NH4 + NO3;

Additional Information:

- Rules for use of sample fraction:
  - Florida Department of Environmental Protection (FDEP) report that if both "Total" and "Dissolved" components are reported, only "Total" is used. If the total is not reported, then the dissolved components are used as a best available replacement.
  - Total nitrogen calculations are done using nitrogen components with the same sample fraction, nitrogen components with mixed total/dissolved sample fractions are not used. In other words, total nitrogen can be calculated when TKN and NO3O2 are both total sample fractions, or when both are dissolved sample fractions. *Future calculations of total nitrogen values may be based on components with mixed sample fractions.*
- Values inserted into data:
  - ParameterName = "Total Nitrogen"
  - SEACAR_QAQCFlagCode = "1Q"
  - SEACAR_QAQC_Description = "SEACAR Calculated"

Seasonal Kendall-Tau Trend Analysis

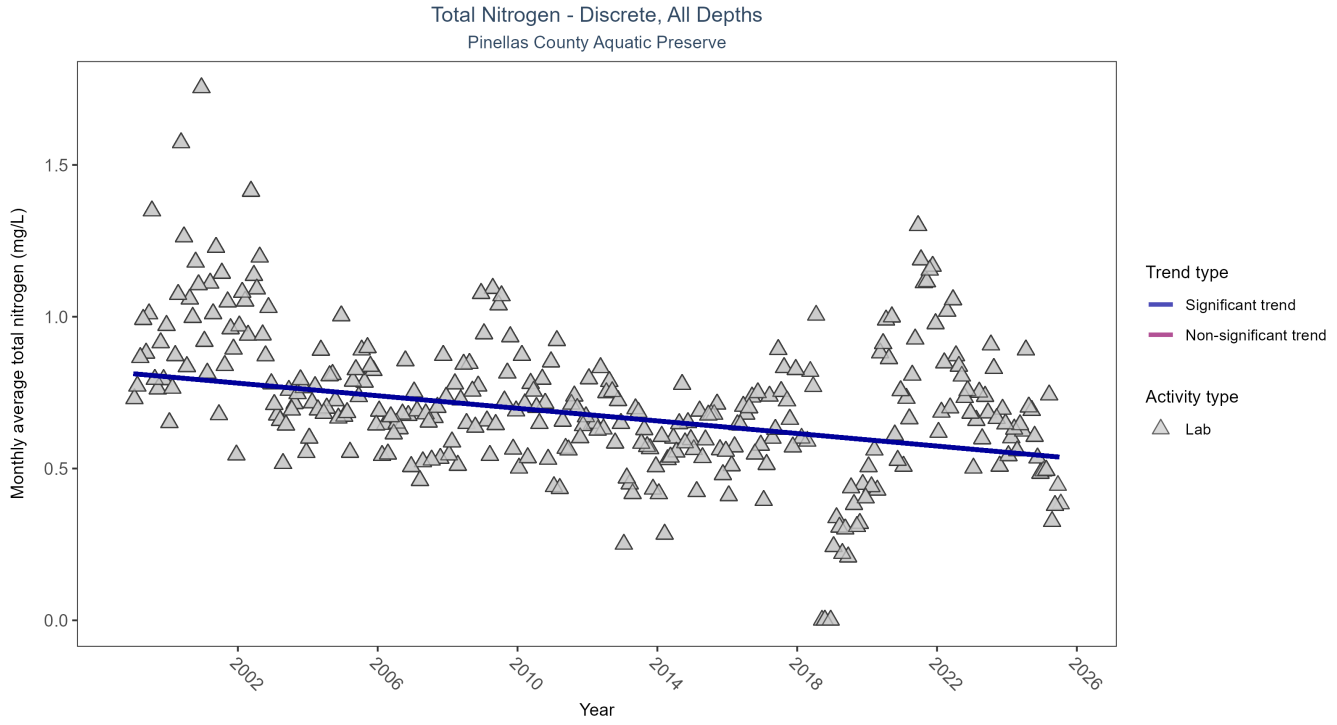

Figure 17: Scatter plot of monthly average total nitrogen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only nitrogen values obtained from laboratory analyses (triangles) are included in the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

Table 22: Seasonal Kendall-Tau Trend Analysis for Total Nitrogen

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
Lab	Significantly decreasing trend	16687	27	1999 - 2025	0.59	-0.2715	0.8123	-0.0104	0

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

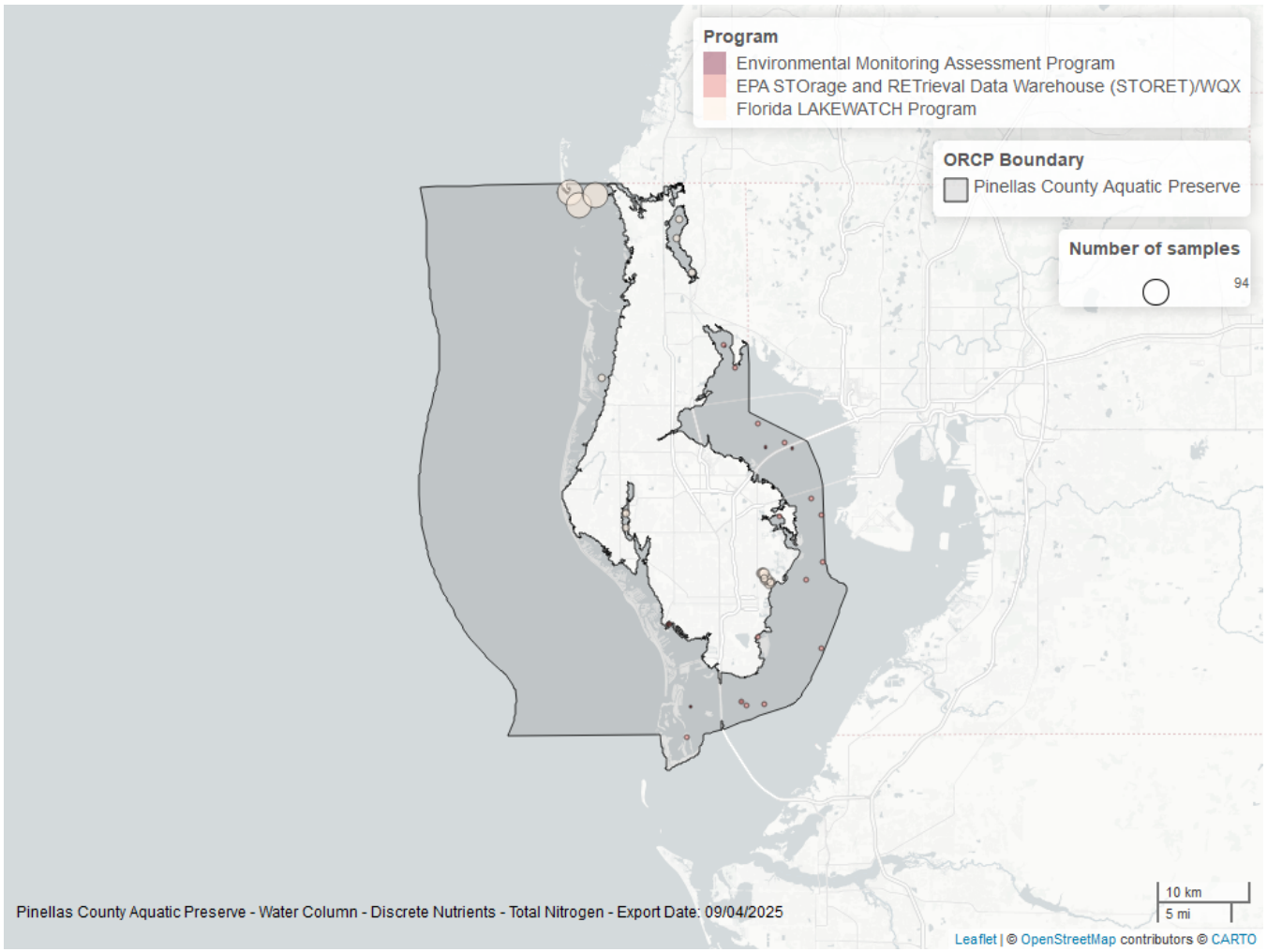

Figure 18: Map showing location of discrete water quality sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 23: Programs contributing data for Total Nitrogen

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	15748	1999	2025
514	871	2001	2024
103	59	2000	2006
5008	58	2023	2025
479	13	2016	2024
115	9	2000	2004

Program names:

103 - EPA STOrage and RETrieval Data Warehouse (STORET)/WQX[7]
115 - Environmental Monitoring Assessment Program[8]
479 - Southwest Florida Water Management District - Water Quality Monitoring[10]
514 - Florida LAKEWATCH Program[1]
5002 - Florida STORET / WIN[2]
5008 - Project COAST (Coastal Assessment Team) - Springs Coast Ecosystem Region[3]

Total Phosphorus - Discrete

Seasonal Kendall-Tau Trend Analysis

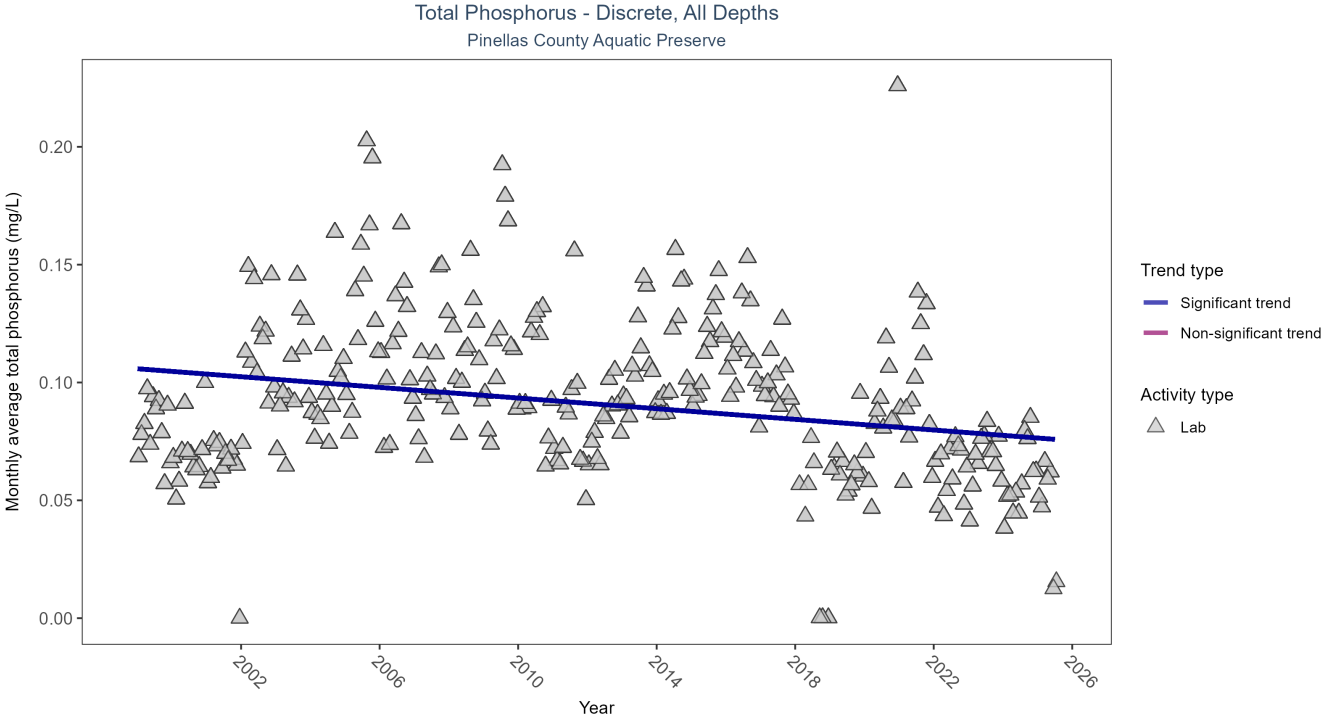

Figure 19: Scatter plot of monthly average total phosphorus over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only phosphorus values obtained from laboratory analyses (triangles) are included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

Table 24: Seasonal Kendall-Tau Trend Analysis for Total Phosphorus

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
Lab	Significantly decreasing trend	15915	27	1999 - 2025	0.082	-0.2138	0.1058	-0.0011	0

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

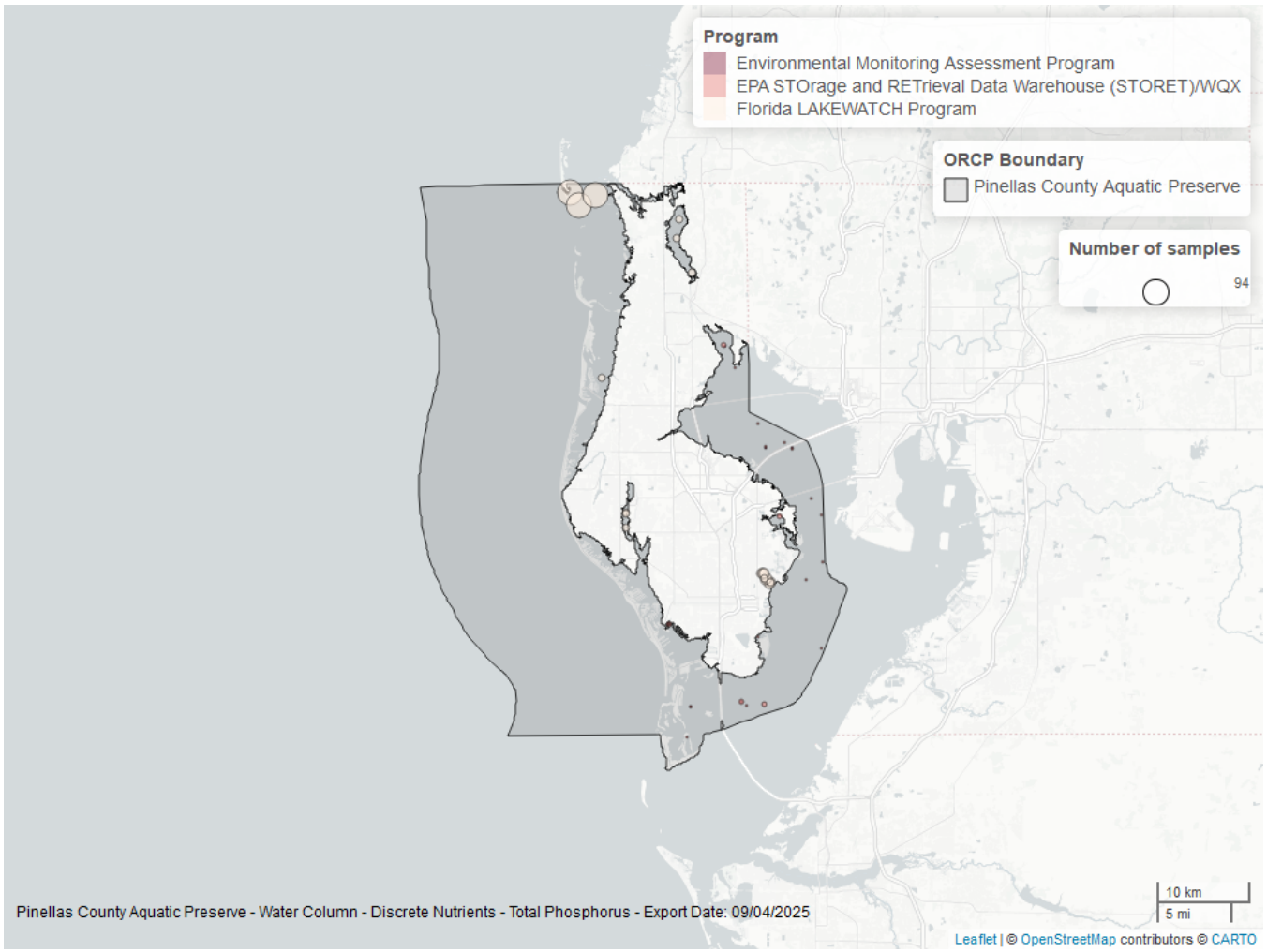

Figure 20: Map showing location of discrete water quality sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 25: Programs contributing data for Total Phosphorus

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	15086	1999	2025
514	876	2001	2024
5008	56	2023	2025
103	47	2000	2015
479	13	2016	2024
115	9	2000	2004

Program names:

103 - EPA STOrage and RETrieval Data Warehouse (STORET)/WQX[7]
115 - Environmental Monitoring Assessment Program[8]
479 - Southwest Florida Water Management District - Water Quality Monitoring[10]
514 - Florida LAKEWATCH Program[1]
5002 - Florida STORET / WIN[2]
5008 - Project COAST (Coastal Assessment Team) - Springs Coast Ecosystem Region[3]

Total Suspended Solids - Discrete

Seasonal Kendall-Tau Trend Analysis

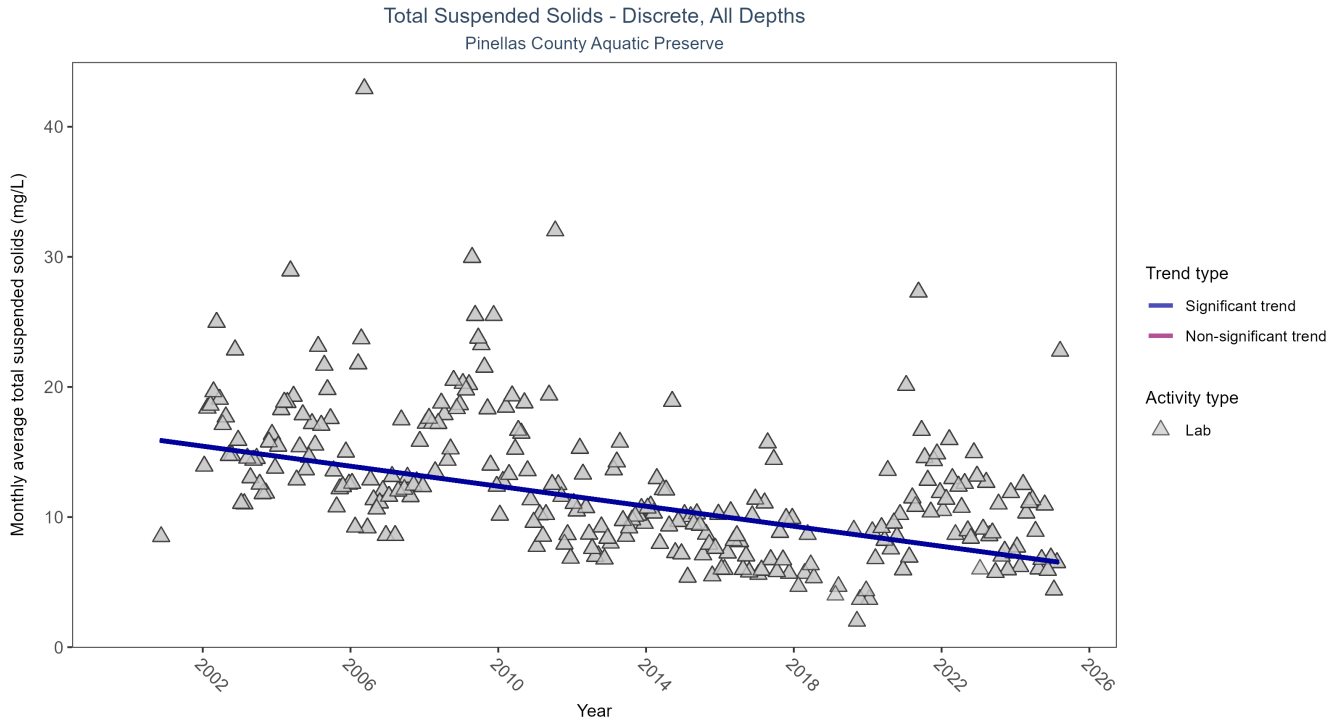

Figure 21: Scatter plot of monthly average total suspended solids (TSS) over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only TSS values obtained from laboratory analyses (triangles) are included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

Table 26: Seasonal Kendall-Tau Trend Analysis for Total Suspended Solids

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
Lab	Significantly decreasing trend	12662	25	2000 - 2025	10	-0.4018	16.2184	-0.3848	0

Monthly average total suspended solids decreased by 0.38 mg/L per year, indicating an increase in water clarity.

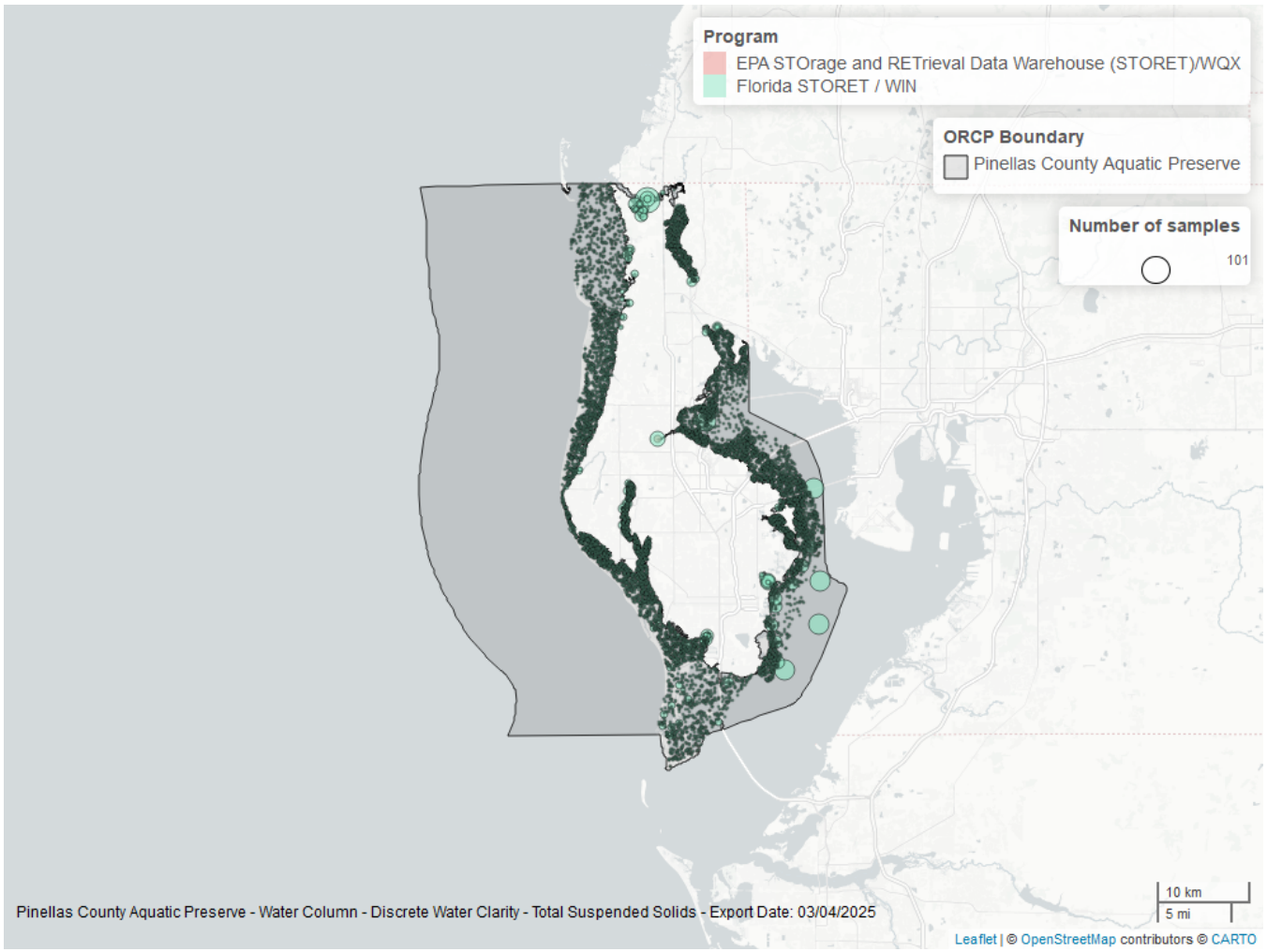

Figure 22: Map showing location of discrete water quality sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 27: Programs contributing data for Total Suspended Solids

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	12792	1999	2025

Program names:

5002 - Florida STORET / WIN[2]

Turbidity - Discrete

Seasonal Kendall-Tau Trend Analysis

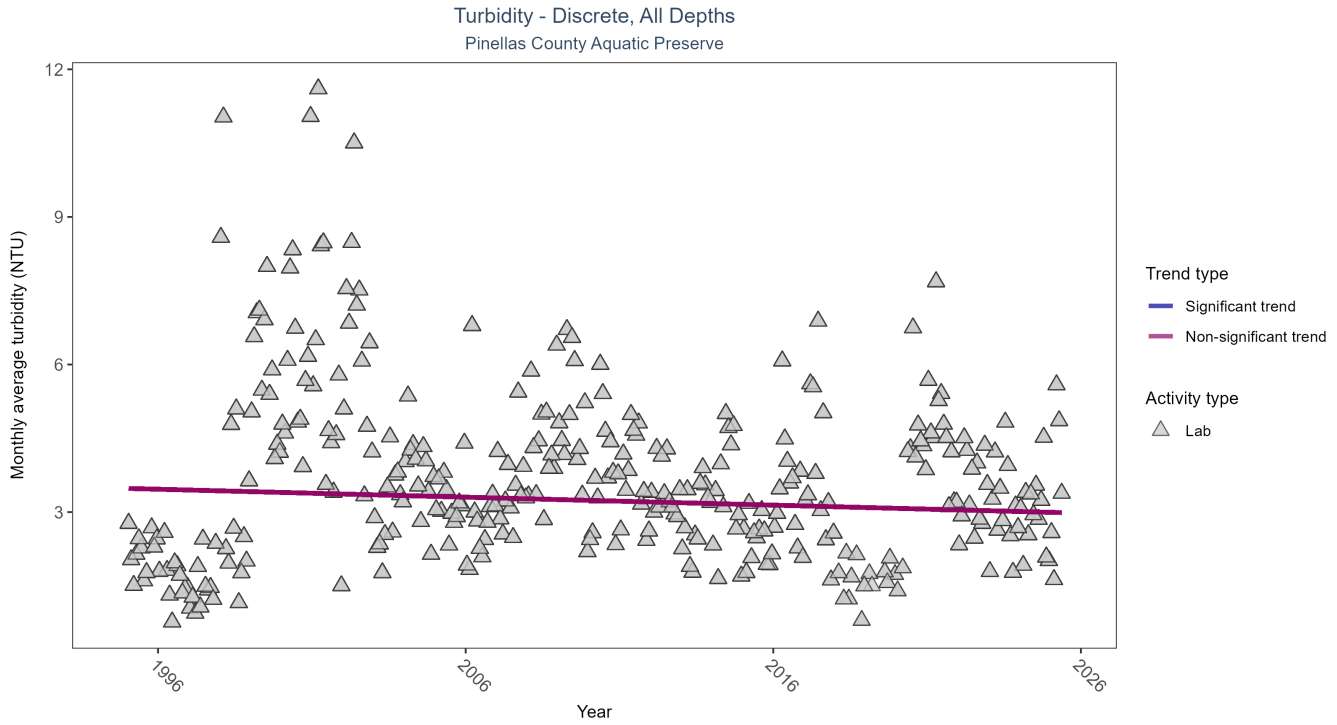

Figure 23: Scatter plot of monthly average turbidity over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only turbidity values measured in the laboratory (triangles) are included in the plot.

Table 28: Seasonal Kendall-Tau Trend Analysis for Turbidity

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
Lab	No significant trend	21742	31	1995 - 2025	2.5	-0.0563	3.481	-0.0162	0.1399

Turbidity showed no detectable trend between 1995 and 2025.

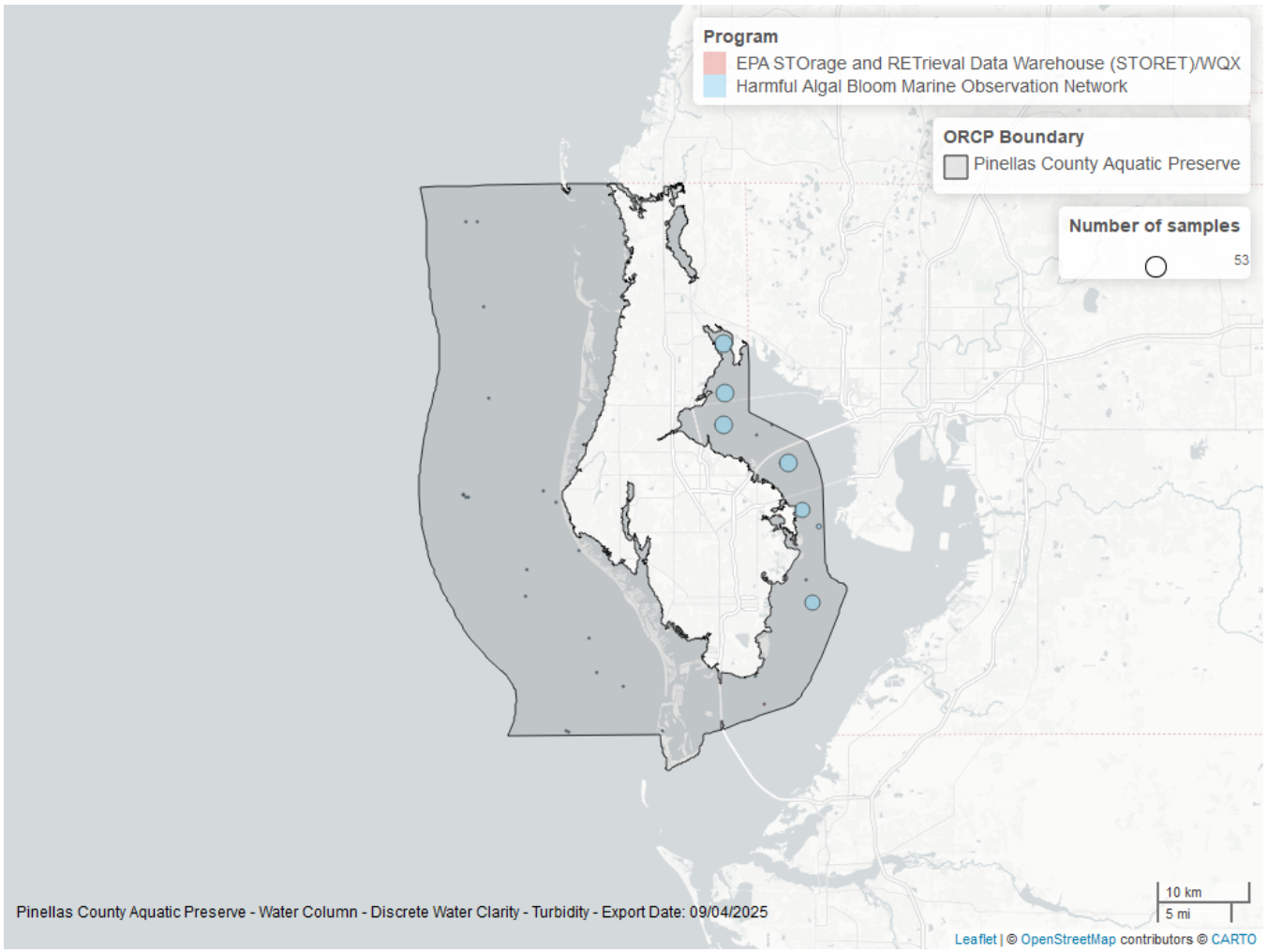

Figure 24: Map showing location of discrete water quality sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 29: Programs contributing data for Turbidity

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	22525	1995	2025
95	323	2000	2016
479	13	2016	2024
103	4	2006	2006

Program names:

95 - Harmful Algal Bloom Marine Observation Network[6]
103 - EPA STOrage and RETrieval Data Warehouse (STORET)/WQX[7]
479 - Southwest Florida Water Management District - Water Quality Monitoring[10]
5002 - Florida STORET / WIN[2]

Water Temperature - Discrete

Seasonal Kendall-Tau Trend Analysis

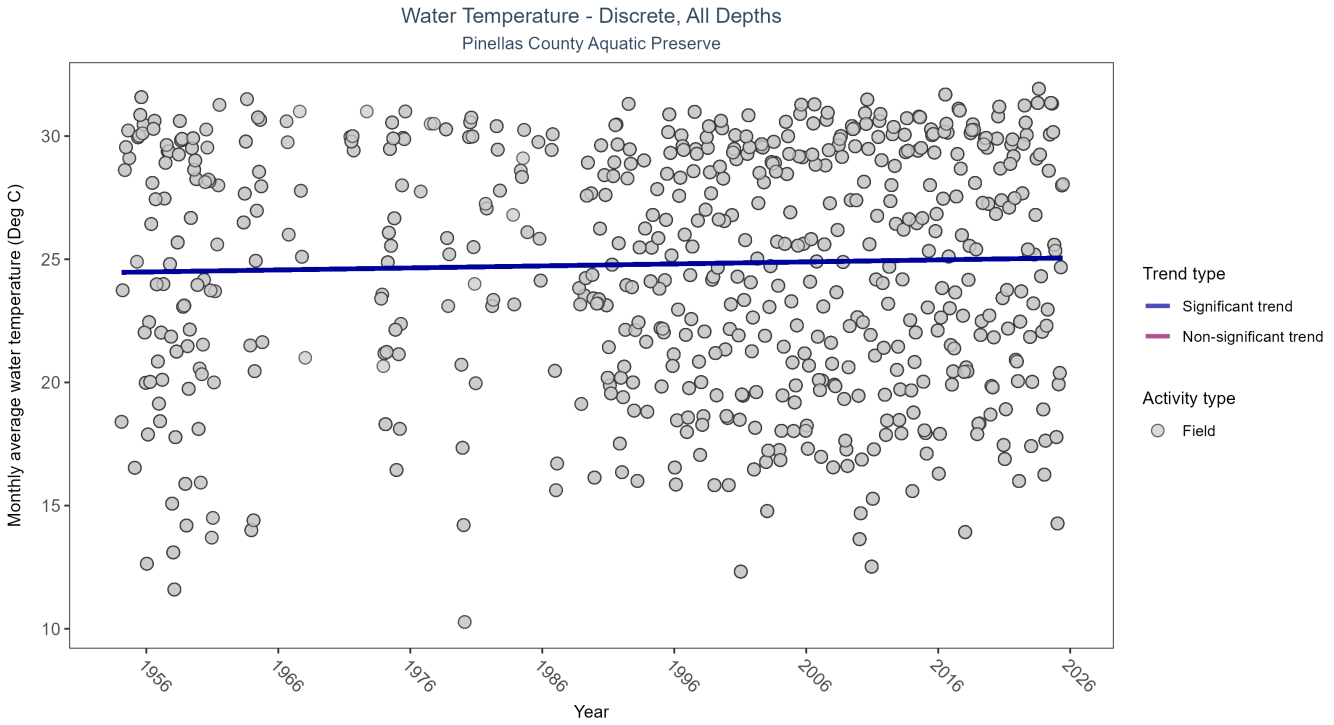

Figure 25: Scatter plot of monthly average water temperature over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only water temperature measurements taken in the field (circles) are included in the plot.

Table 30: Seasonal Kendall-Tau Trend Analysis for Water Temperature

Activity Type	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
Field	Significantly increasing trend	102905	68	1954 - 2025	26.55	0.0908	24.4676	0.0082	0.0015

Monthly average water temperature increased by 0.01°C per year.

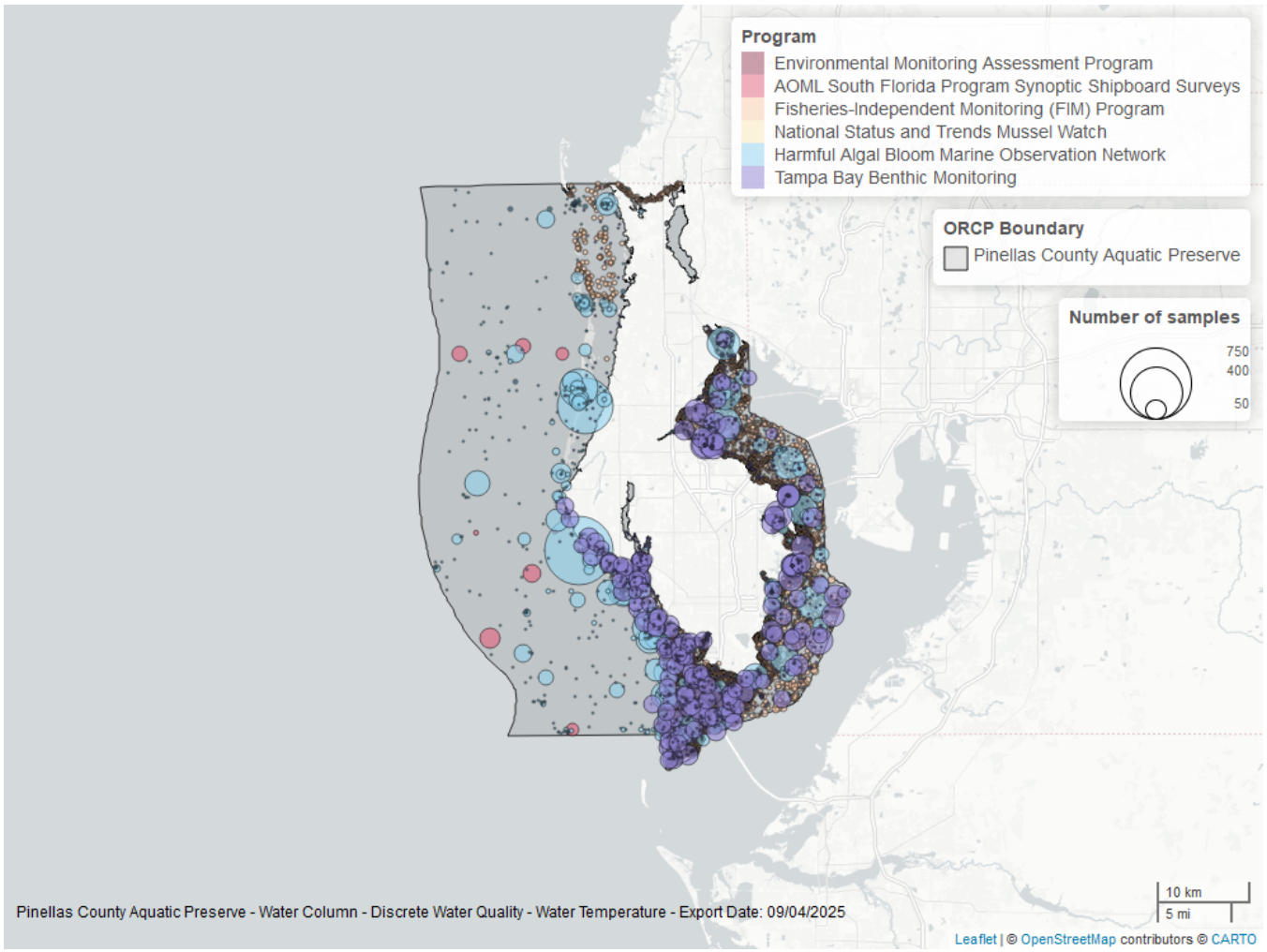

Figure 26: Map showing location of discrete water quality sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 31: Programs contributing data for Water Temperature

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	52771	1995	2025
69	31611	1989	2024
4067	10489	1993	2023
95	7597	1954	2018
3	233	2018	2024
5008	98	2021	2025
102	66	1992	1992
115	29	2000	2004
60	19	2008	2013
479	10	2016	2024

Program names:

3 - Atlantic Oceanographic and Meteorological Laboratory (AOML) South Florida Program Synoptic Shipboard Surveys[4]
60 - Southeast Area Monitoring and Assessment Program (SEAMAP) - Gulf of Mexico Fall & Summer

Shrimp/Groundfish Survey[5]
69 - Fisheries-Independent Monitoring (FIM) Program[11]
95 - Harmful Algal Bloom Marine Observation Network[6]
102 - National Status and Trends Mussel Watch[13]
115 - Environmental Monitoring Assessment Program[8]
479 - Southwest Florida Water Management District - Water Quality Monitoring[10]
4067 - Tampa Bay Benthic Monitoring[12]
5002 - Florida STORET / WIN[2]
5008 - Project COAST (Coastal Assessment Team) - Springs Coast Ecosystem Region[3]

Water Quality - Continuous

The following files were used in the continuous analysis:

- *Combined_WQ_WC_NUT_cont_Dissolved_Oxygen_SW-2025-Sep-19.txt*
- *Combined_WQ_WC_NUT_cont_Dissolved_Oxygen_Saturation_SW-2025-Sep-19.txt*
- *Combined_WQ_WC_NUT_cont_pH_SW-2025-Sep-19.txt*
- *Combined_WQ_WC_NUT_cont_Salinity_SW-2025-Sep-19.txt*
- *Combined_WQ_WC_NUT_cont_Turbidity_SW-2025-Sep-19.txt*
- *Combined_WQ_WC_NUT_cont_Water_Temperature_SW-2025-Sep-19.txt*

Continuous monitoring locations in Pinellas County Aquatic Preserve

Table 32: Station overview for Continuous parameters by Program

ProgramID	*ProgramLocationID*	*Years of Data*	*Use in Analysis*	*Parameters*
5	CWBF1	21	TRUE	TempW
5	FHPF1	4	FALSE	TempW
7	02310175	4	FALSE	TempW
7	02310207	3	FALSE	TempW

Program names:

5 - National Data Buoy Center[15]
7 - National Water Information System[16]

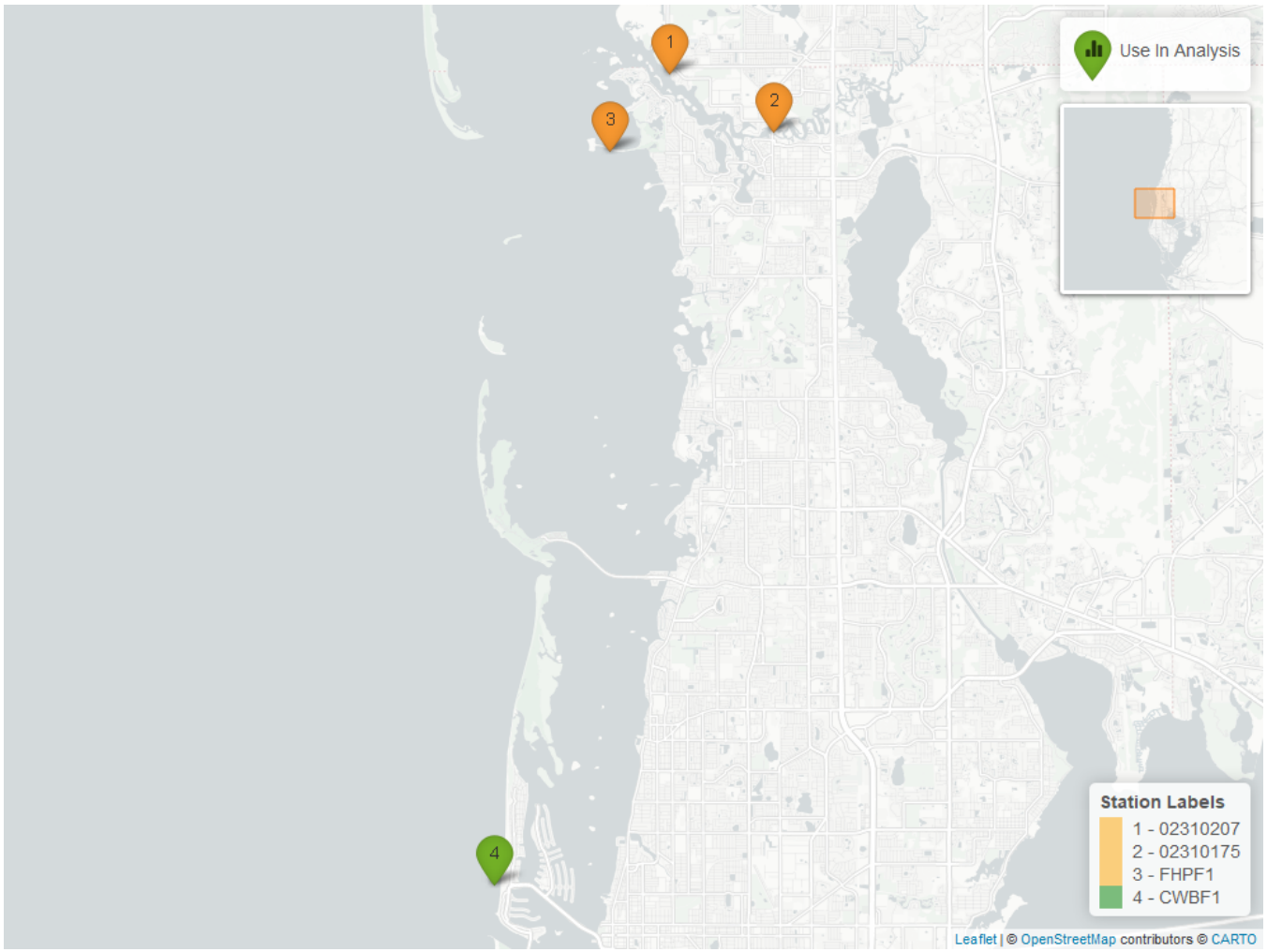

Figure 27: Map showing continuous water quality sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. Sites marked as *Use In Analysis* (green) are featured in this report.

Water Temperature - Continuous

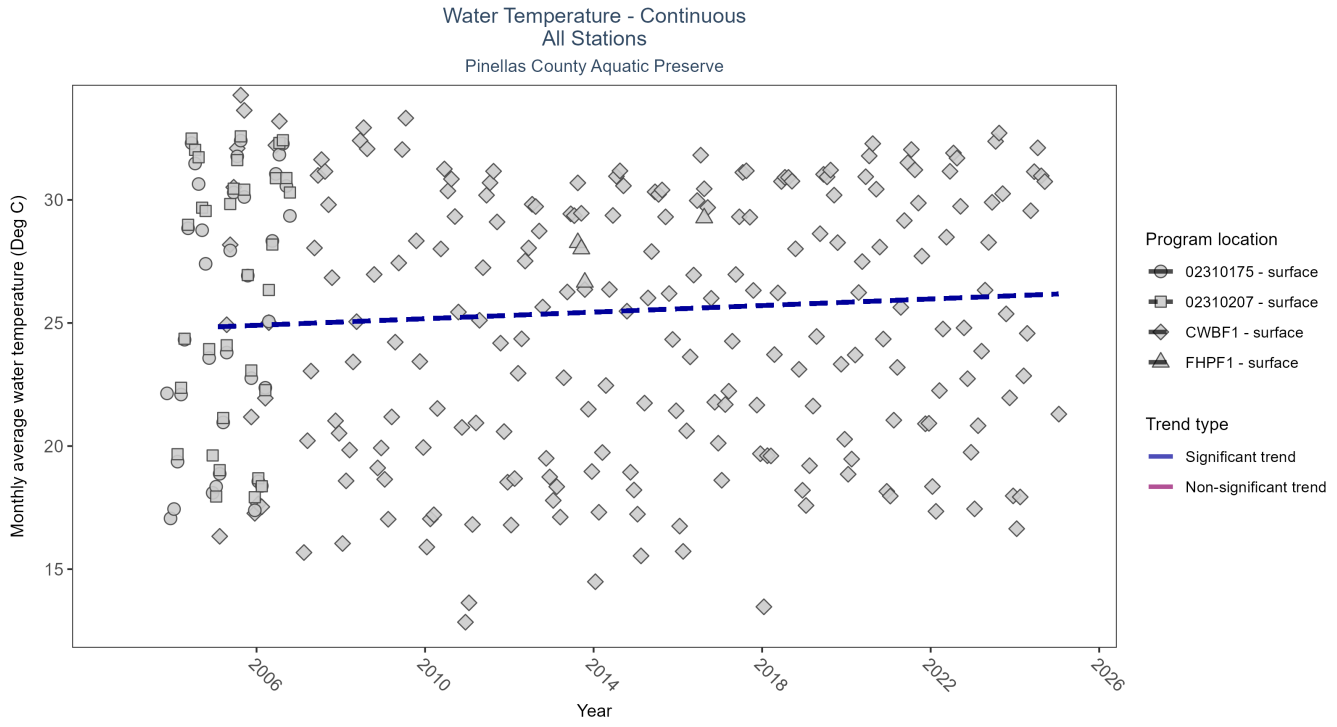

Figure 28: Scatter plot of monthly average water temperature over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 33: Seasonal Kendall-Tau Results for Water Temperature - All Stations

Station	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
CWBF1	Significantly increasing trend	1399911	21	2005 - 2025	25.40	0.19	24.84	0.07	0
FHPF1	Insufficient data to calculate trend	12636	2	2013 - 2016	27.90	-	-	-	-
02310207	Insufficient data to calculate trend	1424	3	2004 - 2006	27.55	-	-	-	-
02310175	Insufficient data to calculate trend	1421	4	2003 - 2006	26.50	-	-	-	-

At one program location, monthly average water temperature increased by 0.07°C per year. There was insufficient data to fit a model for three locations.

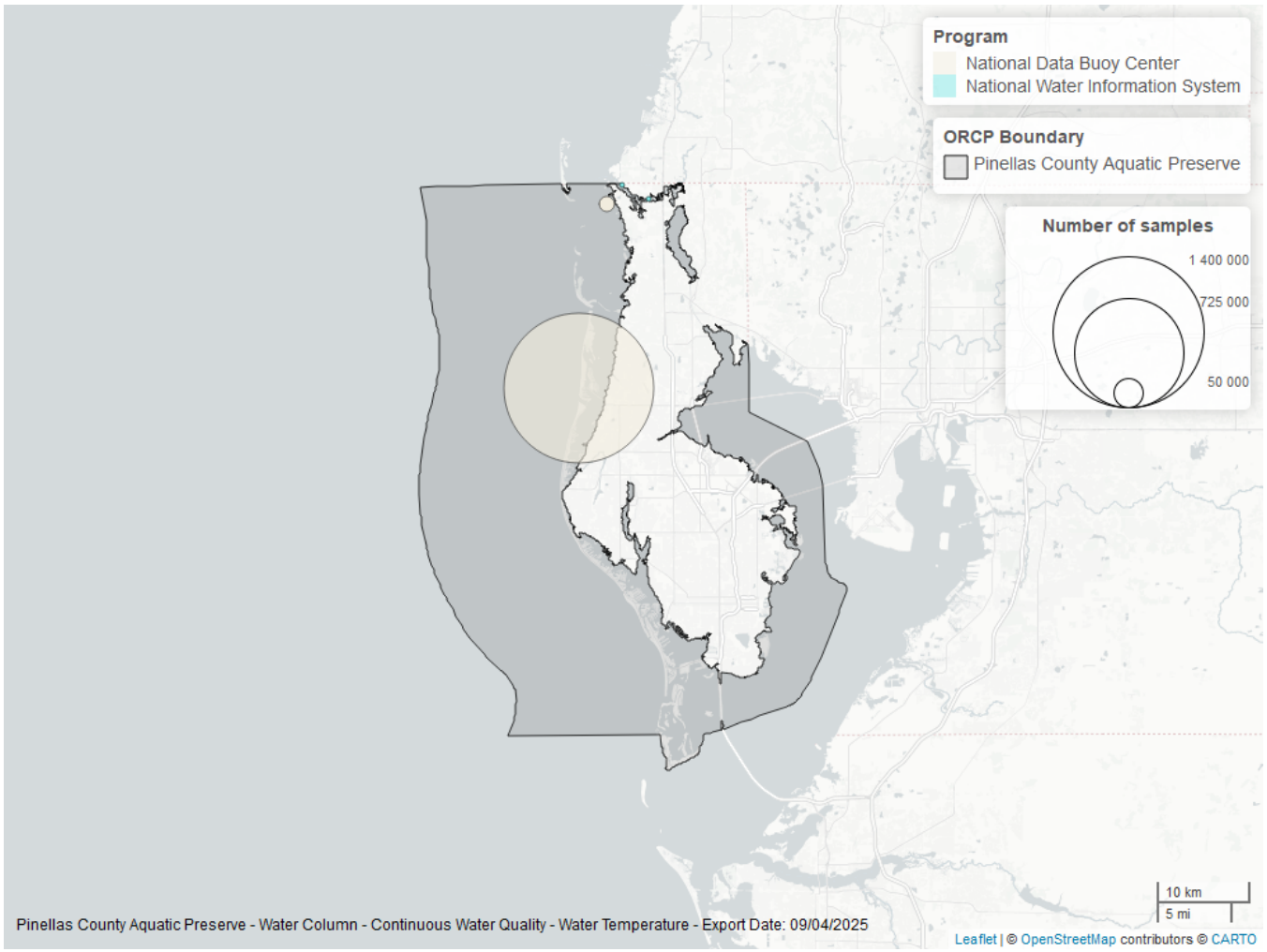

Figure 29: Map showing location of water temperature continuous water quality sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Submerged Aquatic Vegetation

The data file used is: **All_SAV_Parameters-2025-Sep-04.txt**

Submerged aquatic vegetation (*SAV*) refers to plants and plant-like macroalgae species that live entirely underwater. The two primary categories of *SAV* inhabiting Florida estuaries are *benthic macroalgae* and *seagrasses*. They often grow together in dense beds or meadows that carpet the seafloor. *Macroalgae* include multicellular species of green, red and brown algae that often live attached to the substrate by a holdfast. They tend to grow quickly and can tolerate relatively high nutrient levels, making them a threat to seagrasses and other benthic habitats in areas with poor water quality. In contrast, *seagrasses* are grass-like, vascular, flowering plants that are attached to the seafloor by extensive root systems. *Seagrasses* occur throughout the coastal areas of Florida, including protected bays and lagoons as well as deeper offshore waters on the continental shelf. *Seagrasses* have taken advantage of the broad, shallow shelf and clear water to produce two of the most extensive seagrass beds anywhere in continental North America.

Parameters

Percent Cover measures the fraction of an area of seafloor that is covered by SAV, usually estimated by evaluating multiple small areas of seafloor. Percent cover is often estimated for total SAV, individual types of vegetation (seagrass, attached algae, drift algae) and individual species.

Frequency of Occurrence was calculated as the number of times a taxon was observed in a year divided by the number of sampling events, multiplied by 100. Analysis is conducted at the quadrat level and is inclusive of all quadrats (i.e., quadrats evaluated using Braun-Blanquet, modified Braun-Blanquet, and percent cover."

Species

Turtle grass (*Thalassia testudinum*) is the largest of the Florida seagrasses, with longer, thicker blades and deeper root structures than any of the other seagrasses. It is considered a climax seagrass species.

Shoal grass (*Halodule wrightii*) is an early colonizer of vegetated areas and usually grows in water too shallow for other species except *widgeon grass*. It can often tolerate larger salinity ranges than other seagrass species. *Shoal grass* is characterized by thin, flat blades, that are narrower than *turtle grass* blades.

Manatee grass (*Syringodium filiforme*) is easily recognizable because its leaves are thin and cylindrical instead of the flat, ribbon-like form shared by many other seagrass species. The leaves can grow up to half a meter in length. *Manatee grass* is usually found in mixed seagrass beds or small, dense monospecific patches.

Widgeon grass (*Ruppia maritima*) grows in both fresh and salt water and is widely distributed throughout Florida's estuaries in less saline areas, particularly in inlets along the east coast. This species resembles *shoal grass* in certain environments but can be identified by the pointed tips of its leaves.

Three species of *Halophila spp.* are found in Florida - **Star grass** (*Halophila engelmannii*), **Paddle grass** (*Halophila decipiens*), and **Johnson's seagrass** (*Halophila johnsonii*). These are smaller, more fragile seagrasses than other Florida species and are considered ephemeral. They grow along a single long rhizome, with short blades. These species are not well-studied, although surveys are underway to define their ecological roles.

Notes

Star grass, *Paddle grass*, and *Johnson's seagrass* will be grouped together and listed as **Halophila spp.** in the following managed areas. This is because several surveys did not specify to the species level:

- Banana River Aquatic Preserve
- Indian River-Malabar to Vero Beach Aquatic Preserve
- Indian River-Vero Beach to Ft. Pierce Aquatic Preserve
- Jensen Beach to Jupiter Inlet Aquatic Preserve
- Loxahatchee River-Lake Worth Creek Aquatic Preserve
- Mosquito Lagoon Aquatic Preserve

- Biscayne Bay Aquatic Preserve
- Florida Keys National Marine Sanctuary

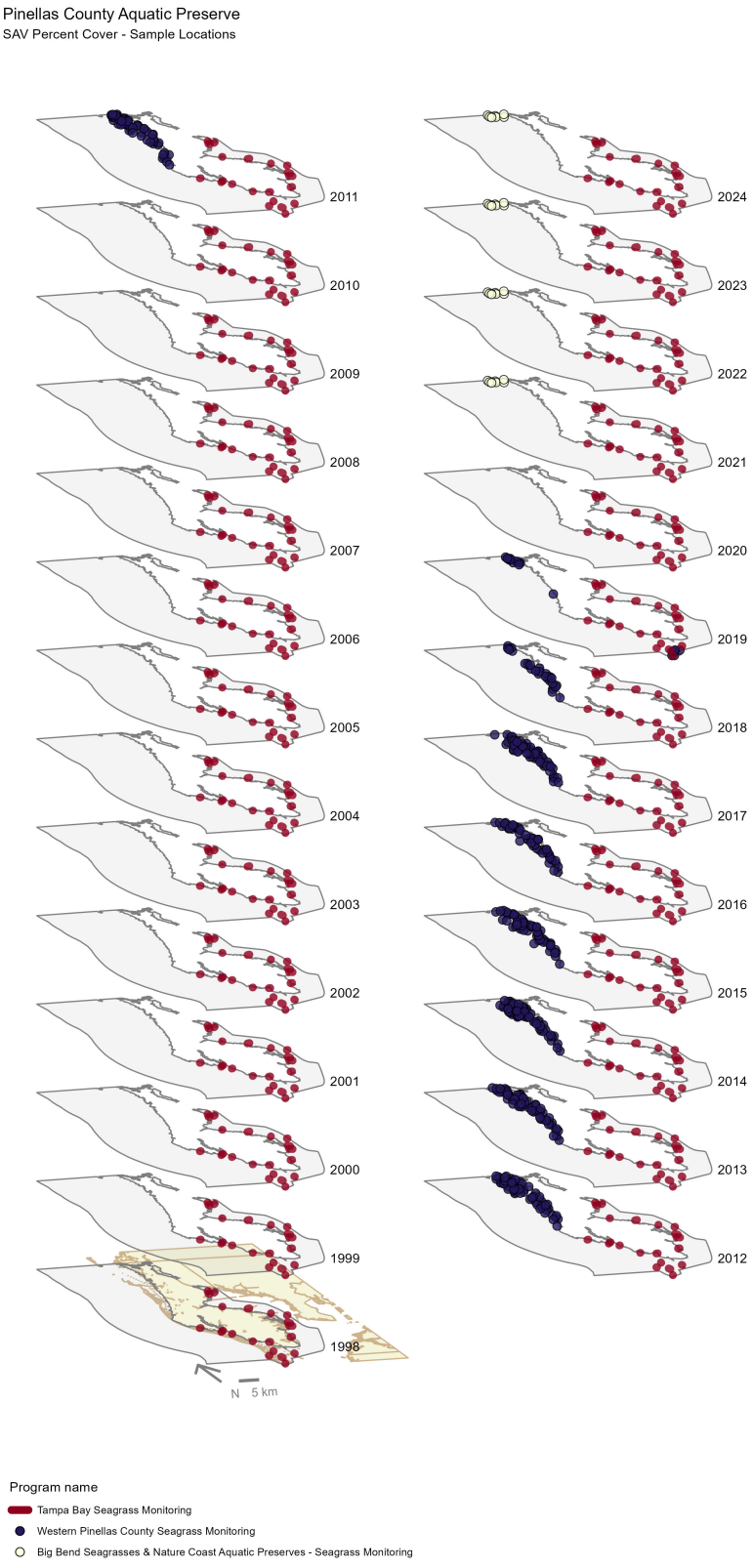

Figure 30: Maps showing the temporal scope of SAV sampling sites within the boundaries of *Pinellas County Aquatic Preserve* by Program name.

Click here to view spatio-temporal plots on GitHub.

Sampling locations by Program:

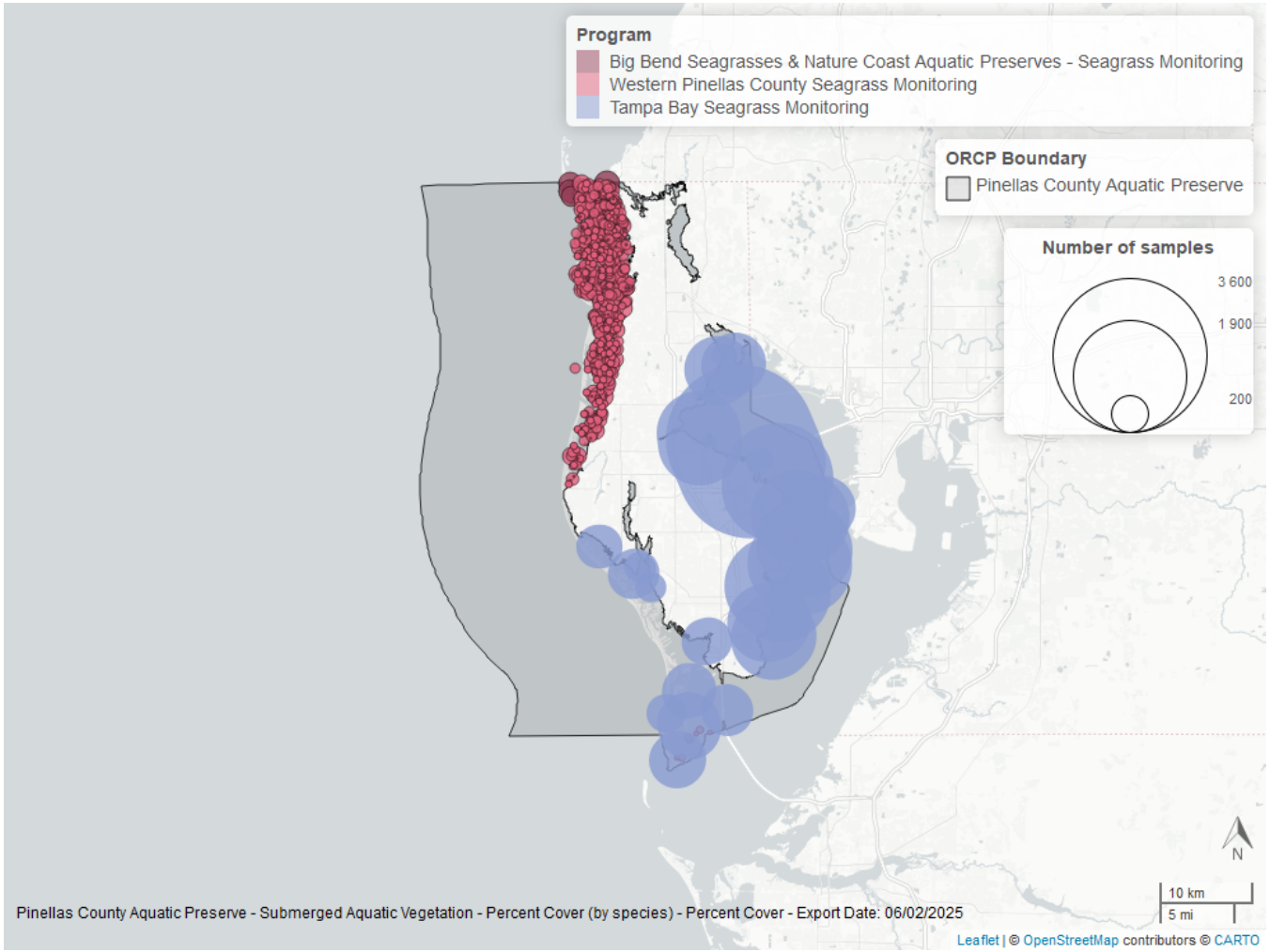

Figure 31: Map showing SAV sampling sites within the boundaries of *Pinellas County Aquatic Preserve*. The point size reflects the number of samples at a given sampling site.

Table 34: Program Information for Submerged Aquatic Vegetation

ProgramID	*N-Data*	*YearMin*	*YearMax*	*method*	*Sample Locations*
565	15964	1998	2024	Braun Blanquet	27
560	347	2021	2024	Modified Braun Blanquet	8
560	325	2021	2024	Percent Cover	8
564	8342	2011	2019	Percent Cover	441

Program names:

560 - Big Bend Seagrasses & Nature Coast Aquatic Preserves - Seagrass Monitoring[14]
560 - Big Bend Seagrasses & Nature Coast Aquatic Preserves - Seagrass Monitoring[14]
564 - Western Pinellas County Seagrass Monitoring[17]
565 - Tampa Bay Seagrass Monitoring[18]

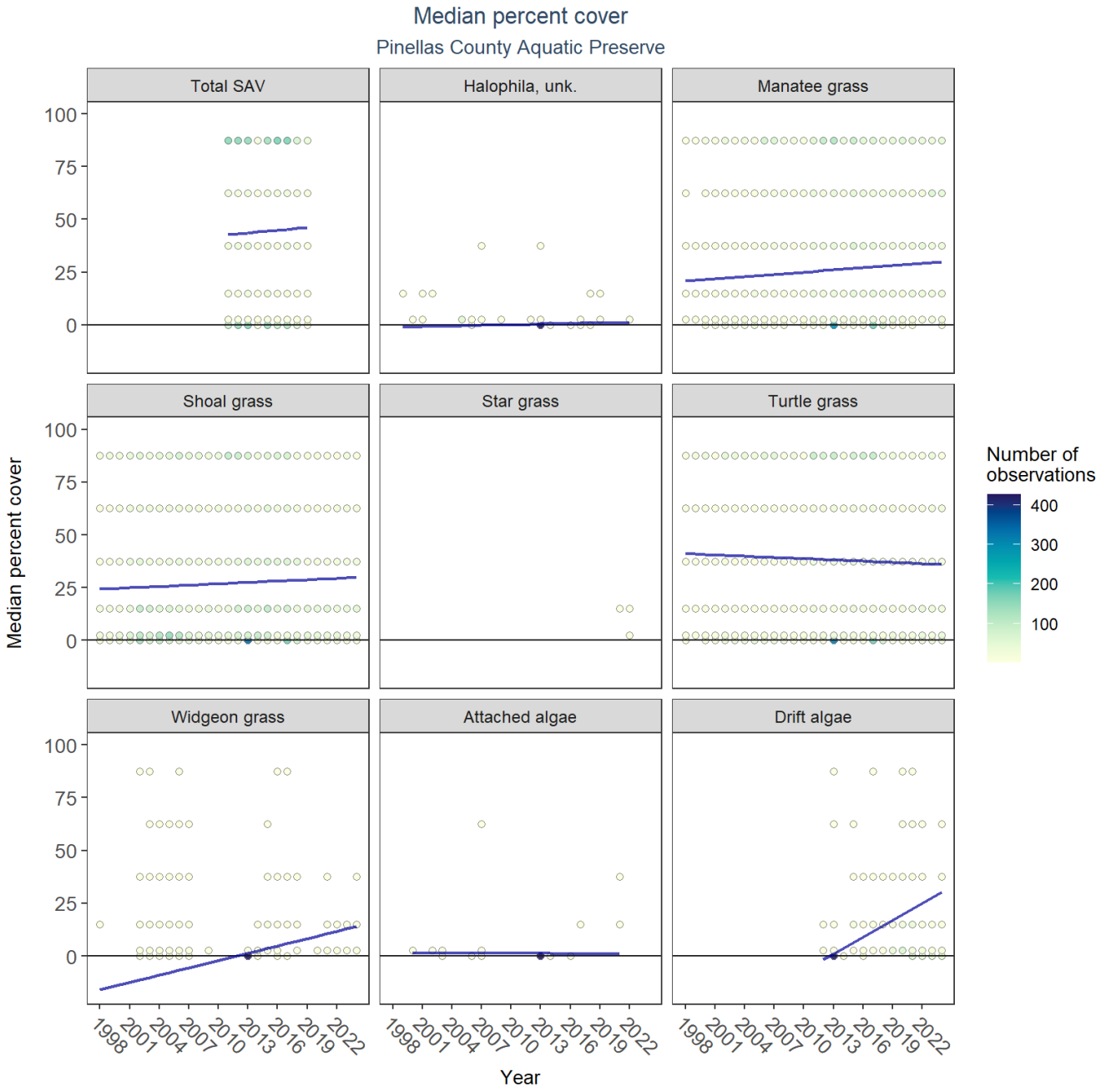

Figure 32: Scatter plots of median percent cover of submerged aquatic vegetation over time by group. Plots for time series that included five or more years of observations show the estimated trend as a blue line.

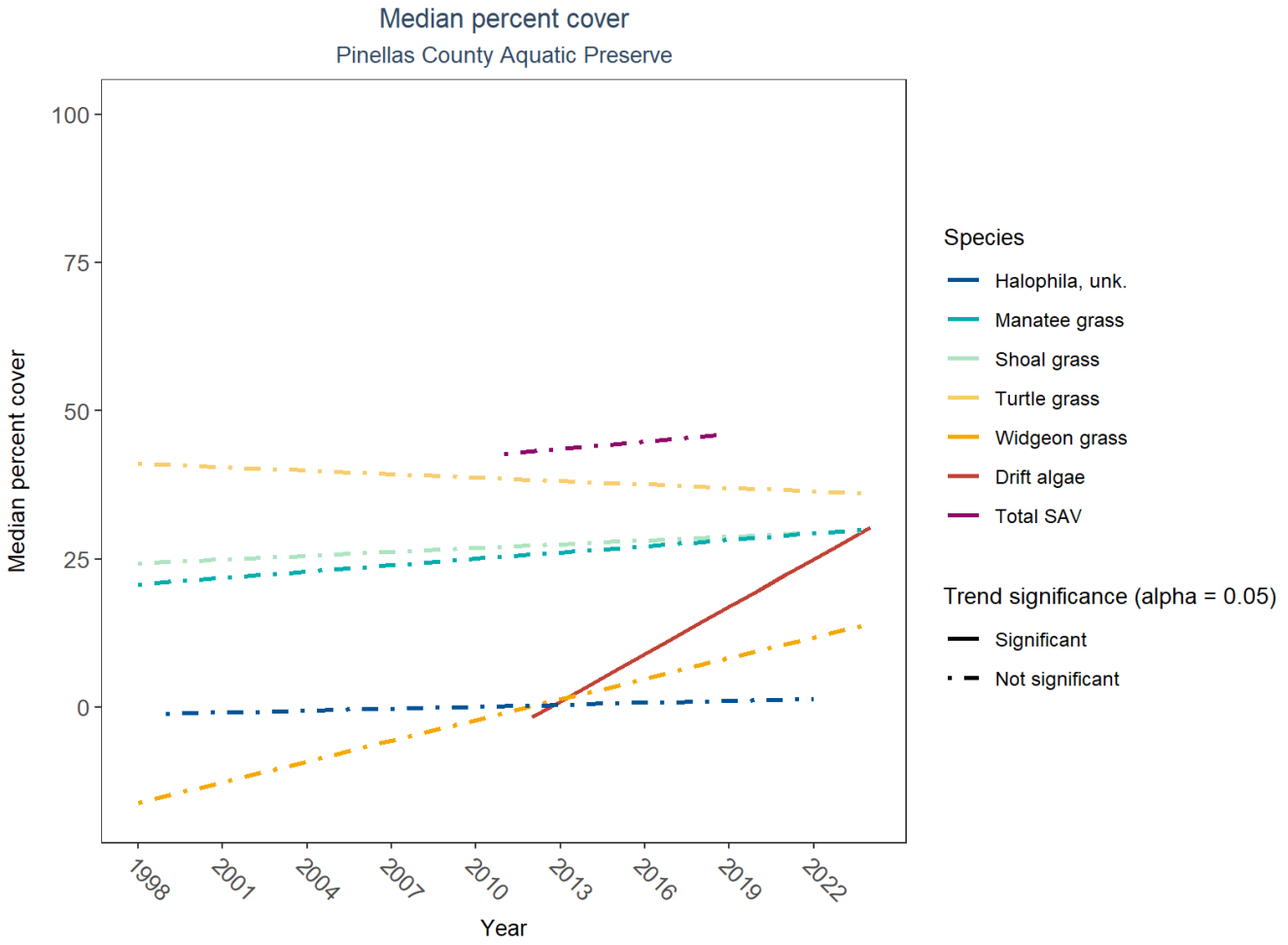

Figure 33: Trends in median percent cover for various seagrass species in Pinellas County Aquatic Preserve - simplified

Table 35: Percent Cover Trend Analysis for Pinellas County Aquatic Preserve

CommonName	*Trend Significance (0.05)*	*Period of Record*	*LME-Intercept*	*LME-Slope*	*p*
Attached algae	No significant trend	2000 - 2021	1.346545	-0.0087296	0.9563238
Drift algae	Significantly increasing trend	2012 - 2024	-49.592080	2.6618673	0.0000024
Shoal grass	No significant trend	1998 - 2024	23.417077	0.2142411	0.1299620
Star grass	Insufficient data to calculate trend	-	-	-	-
No grass in quadrat	Model did not fit the available data	1998 - 2024	-	-	-
Widgeon grass	No significant trend	1998 - 2024	-20.718546	1.1603810	0.3683506
Manatee grass	No significant trend	1998 - 2024	19.304537	0.3571287	0.0782791
Turtle grass	No significant trend	1998 - 2024	41.868898	-0.1951292	0.2324670
Total SAV	No significant trend	2011 - 2019	35.605420	0.4199156	0.5741276
Halophila, unk.	No significant trend	1999 - 2022	-1.636662	0.1093134	0.6581637

An annual increase in percent cover was observed for drift algae (2.7%). Total SAV, unknown *Halophila*, manatee grass, shoal grass, turtle grass, widgeon grass, and attached algae showed no detectable change in percent cover. Trends in percent cover could not be evaluated for star grass due to insufficient data.

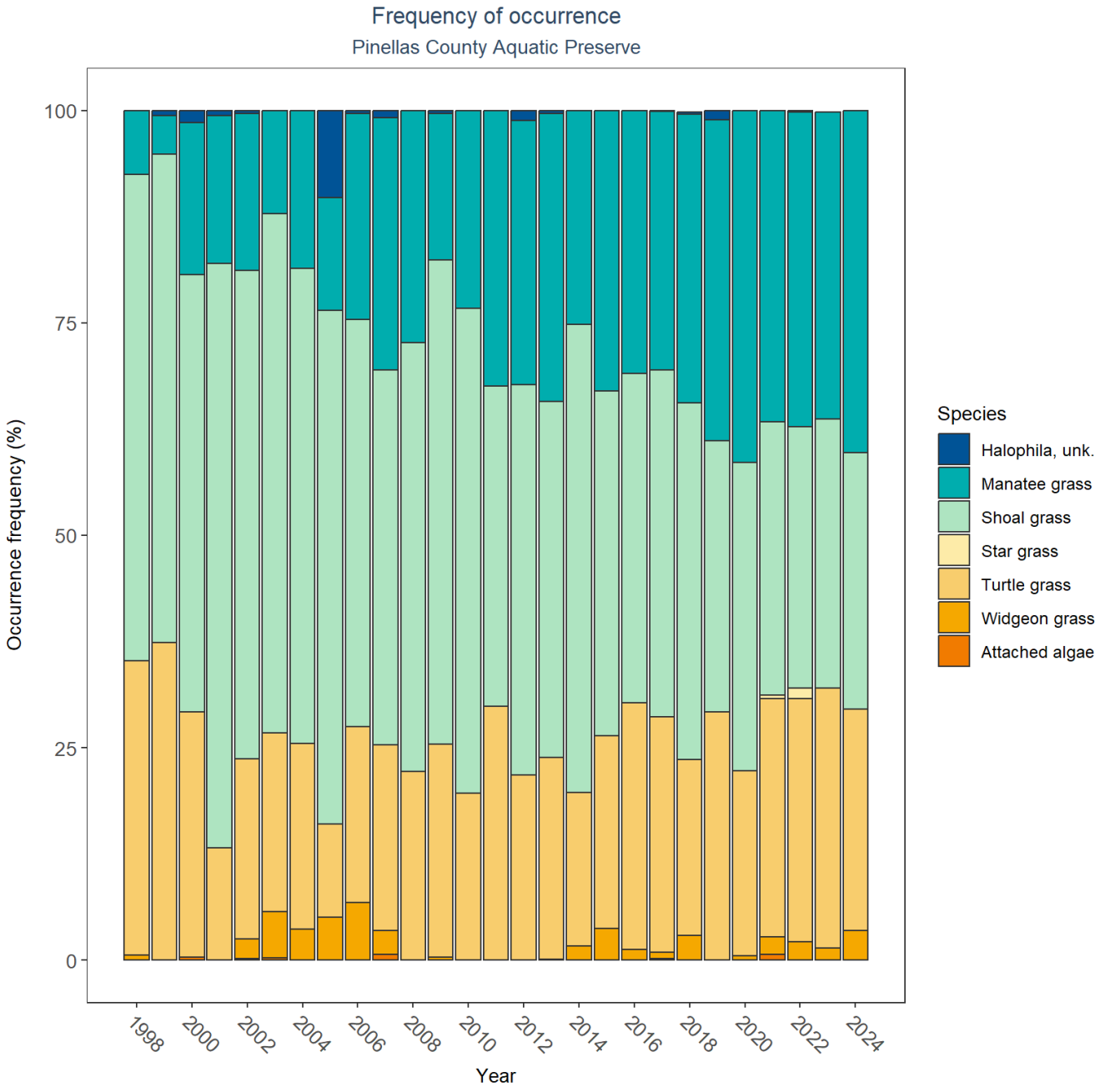

Figure 34: Frequency of occurrence for various seagrass species in Pinellas County Aquatic Preserve

SAV Water Column Analysis

The following parameters are available for Pinellas County Aquatic Preserve within the SAV_WC_Report:

- Colored Disolved Organic Matter
- Chlorophyll a
- Dissolved Oxygen
- Dissolved Oxygen Saturation
- pH
- Salinity

- Secchi Depth
- Water Temperature
- Total Nitrogen
- Total Suspended Solids
- Turbidity

Access the reports here: DRAFT_SAV_WC_Report_2024-11-20.pdf

Nekton

The data file used is: **All_NEKTON_Parameters-2025-Sep-04.txt**

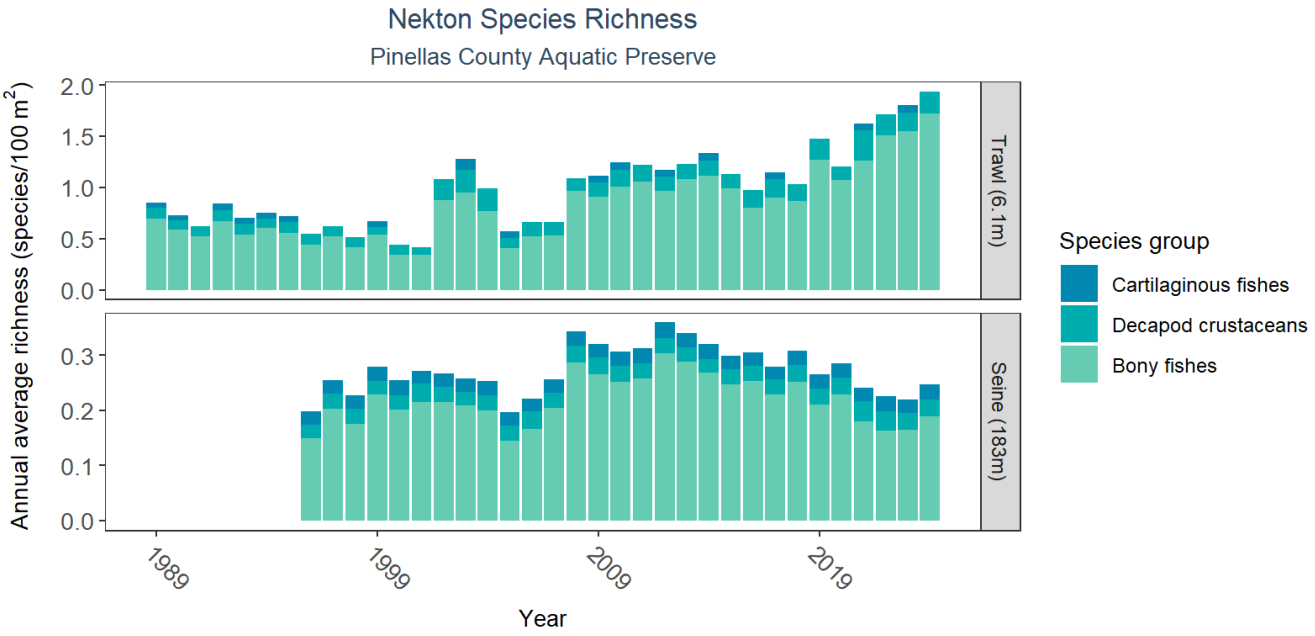

Figure 35: Bar graph(s) of annual average nekton richness over time for species groups occurring in at least 1% of samples. The bar colors represent species groups including bony fishes, cartilaginous fishes, decapod crustaceans (e.g., shrimps, crabs, and lobsters), and cephalopods (e.g., squid). Gear types and sizes are indicated in the panel label.

Table 36: Nekton Species Richness

Gear Type	*Sample Count*	*Number of Years*	*Period of Record*	*Median N of Taxa*	*Mean N of Taxa*
Trawl (6.1)	5561	36	1989 - 2024	0.3	0.57
Seine (183)	4691	29	1996 - 2024	0.1	0.15

The median annual number of taxa was 0.10 based on 4,691 observations collected by 183-meter seine between 1996 and 2024, and the median annual number of taxa was 0.30 based on 5,561 observations collected by 6.1-meter trawl between 1989 and 2024.

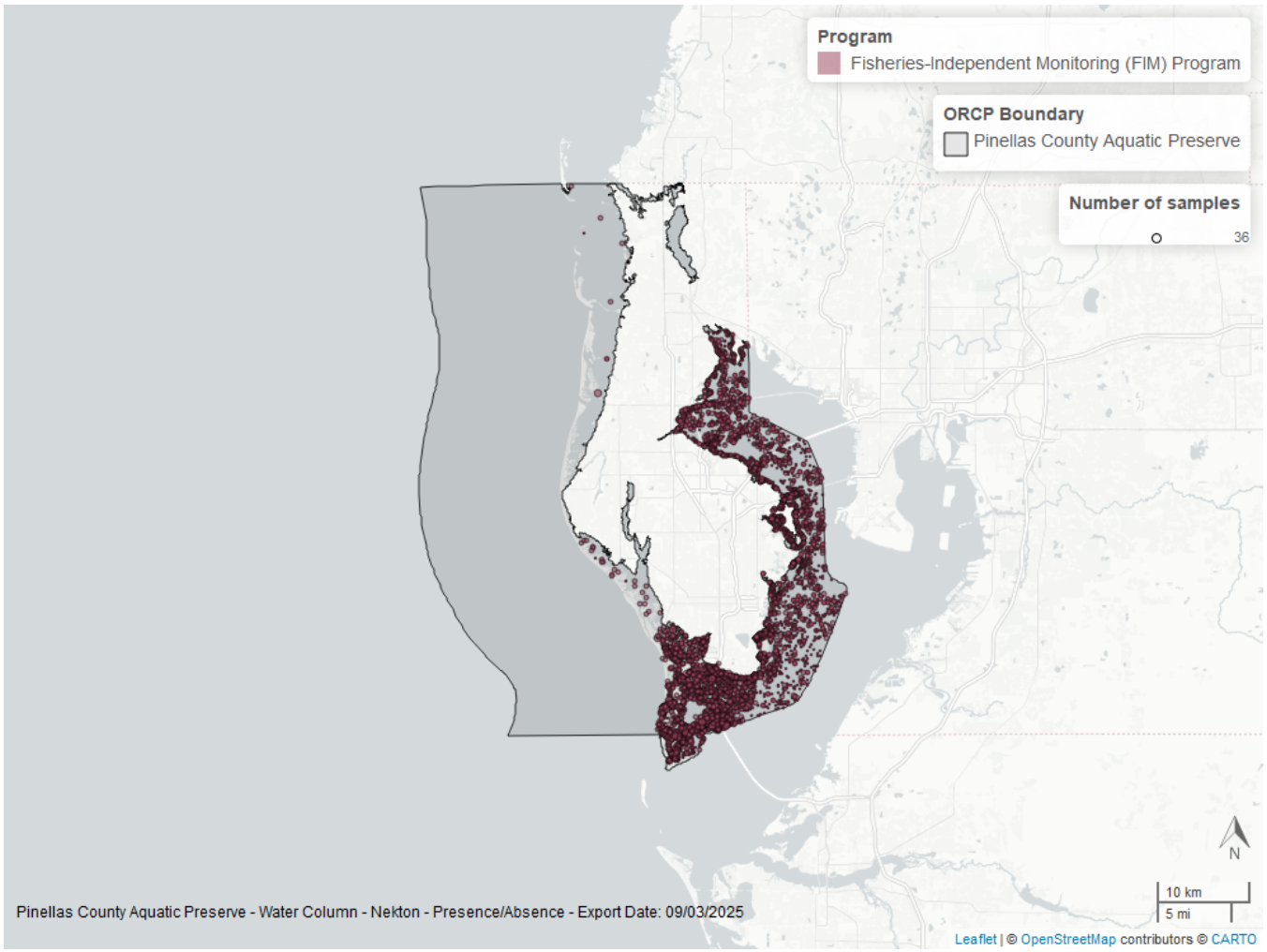

Figure 36: Map showing location of nekton sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Coastal Wetlands

The data file used is: **All_CW_Parameters-2025-Sep-04.txt**

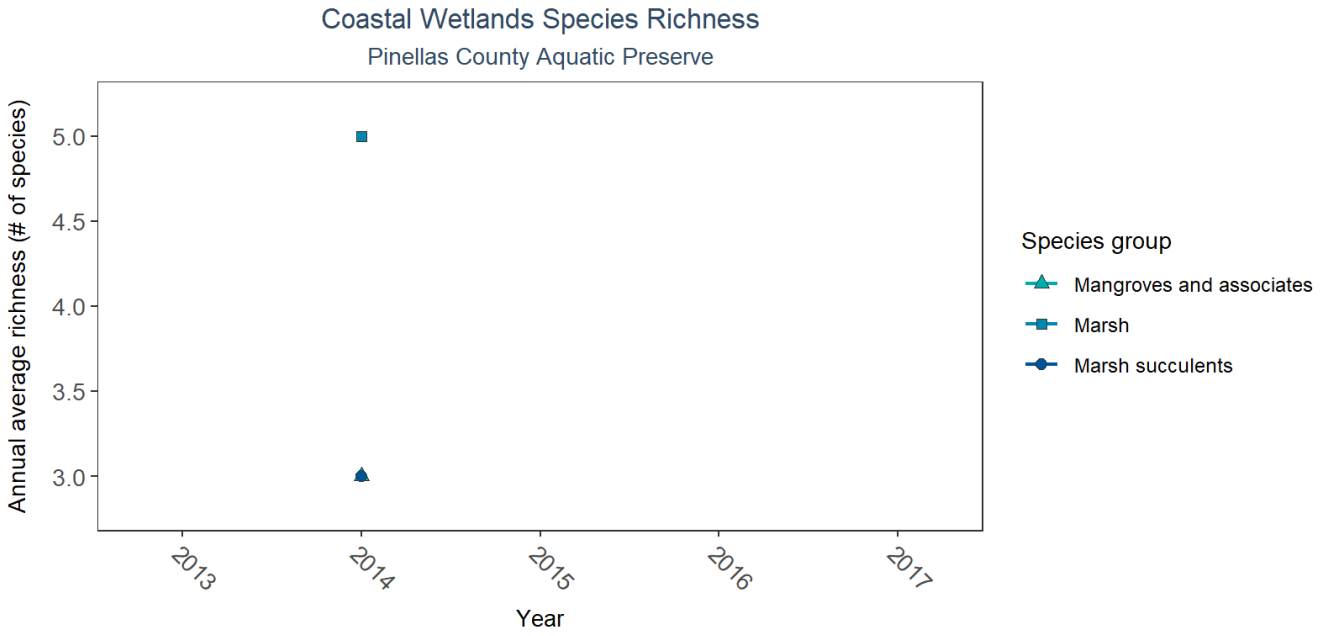

Figure 37: Line graph of annual average coastal wetlands species richness over time for mangroves and associates (triangles), marsh (squares), and marsh succulents (circles). If the time series by species group included more than one year of observations, a line connects data points for visualization.

Table 37: Coastal Wetlands Species Richness

Species Group	*Sample Count*	*Number of Years*	*Period of Record*	*Median N of Taxa*	*Mean N of Taxa*
Mangroves and associates	1	1	2014 - 2014	3	3
Marsh	1	1	2014 - 2014	5	5
Marsh succulents	1	1	2014 - 2014	3	3

In the year 2014, 3 species were observed for *mangroves and associates* based on 1 observation. In the year 2014, 5 species were observed for *marsh* based on 1 observation. In the year 2014, 3 species were observed for *marsh succulents* based on 1 observation.

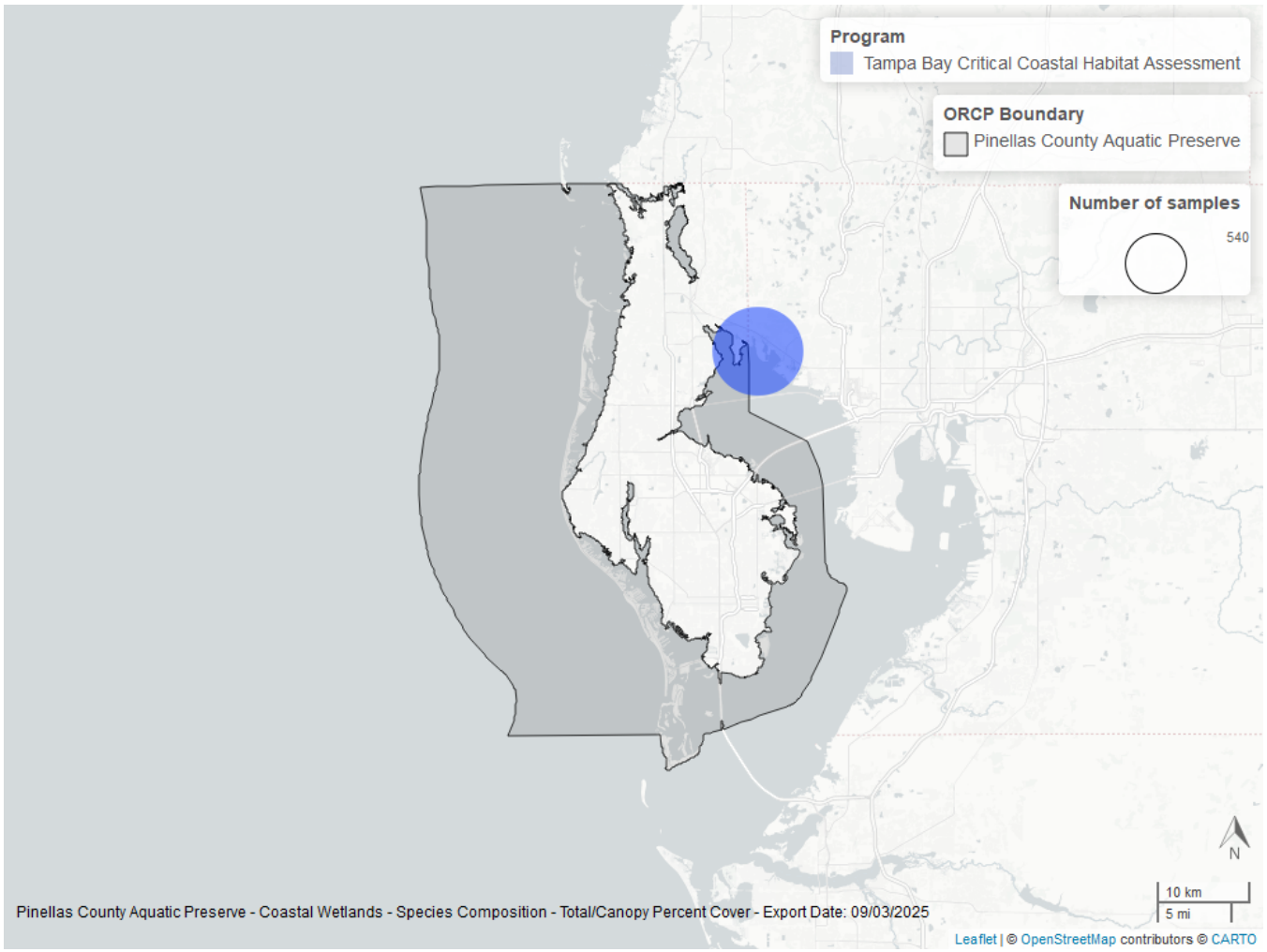

Figure 38: Map showing location of coastal wetlands sampling locations within the boundaries of *Pinellas County Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Species list

Acanthophora sp.[1]
Acanthostracion quadricornis[3]
Achirus lineatus[3]
Acrostichum danaeifolium
Aetobatus narinari[3]
Albula goreensis[3]
Albula spp.[3]
Albula vulpes[3]
Alpheidae spp.[3]
Aluterus schoepfii[3]
Aluterus scriptus[3]
Anarchopterus criniger[3]
Anchoa cubana[3]
Anchoa hepsetus[3]
Anchoa lyolepis[3]
Anchoa mitchilli[3]
Anchoa spp.[3]
Ancylopsetta quadrocellata[3]
Anguilla rostrata[3]
Anguilliformes spp.[3]
Archosargus probatocephalus[3]
Argopecten irradians
Argopecten spp.
Ariopsis felis[3]
Aster subulatus
Astrapogon alutus[3]
Astroscopus ygraecum[3]
Attached algae[1]
Avicennia germinans[2]
Baccharis angustifolia
Baccharis halimifolia
Bacopa monnieri
Bagre marinus[3]
Bairdiella chrysoura[3]
Balistidae spp.[3]
Bascanichthys scuticaris[3]
Bathygobius soporator[3]
Batis maritima[2]
Bidens pilosa
Borrichia frutescens
Bothidae spp.[3]
Brevoortia spp.[3]
Calamus arctifrons[3]
Calamus penna[3]
Calamus proridens[3]
Calamus spp.[3]
Callinectes ornatus[3]
Callinectes sapidus[3]
Callinectes similis[3]
Callinectes spp.[3]
Carangidae spp.[3]
Caranx bartholomaei[3]
Caranx crysos[3]
Caranx hippos[3]
Engraulidae spp.[3]
Epinephelus itajara[3]
Epinephelus morio[3]
Etropus crossotus[3]
Eucinostomus argenteus[3]
Eucinostomus gula[3]
Eucinostomus harengulus[3]
Eucinostomus spp.[3]
Eugerres plumieri[3]
Eupatorium capillifolium
Ficus aurea
Floridichthys carpio[3]
Fundulus grandis[3]
Fundulus similis[3]
Gerres cinereus[3]
Gobiesox strumosus[3]
Gobiidae spp.[3]
Gobionellus oceanicus[3]
Gobiosoma bosc[3]
Gobiosoma longipala[3]
Gobiosoma robustum[3]
Gobiosoma spp.[3]
Gracilaria sp.[1]
Gymnothorax saxicola[3]
Haemulon aurolineatum[3]
Haemulon plumierii[3]
Haemulon spp.[3]
Halichoeres bivittatus[3]
Halimeda incrassata[1]
Halodule wrightii[1]
Halophila engelmannii[1]
Halophila sp.[1]
Harengula jaguana[3]
Hemicaranx amblyrhynchus[3]
Hemiramphus brasiliensis[3]
Hemiramphus spp.[3]
Hippocampus erectus[3]
Hippocampus spp.[3]
Hippocampus zosterae[3]
Hypleurochilus caudovittatus[3]
Hypleurochilus geminatus[3]
Hypnea[1]
Hyporhamphus meeki[3]
Hyporhamphus spp.[3]
Hyporhamphus unifasciatus[3]
Hypsoblennius hentz[3]
Ilex cassine
Iva frutescens
Juncus roemerianus[2]
Kyphosus sectatrix[3]
Kyphosus spp.[3]
Lachnolaimus maximus[3]
Lactophrys trigonus[3]
Lagodon rhomboides[3]
Ogcocephalus cubifrons[3]
Ogcocephalus spp.[3]
Oligoplites saurus[3]
Ophichthus gomesii[3]
Ophidion grayi[3]
Ophidion holbrookii[3]
Ophidion josephi[3]
Opisthonema oglinum[3]
Opistognathus robinsi[3]
Opsanus beta[3]
Oreochromis aureus[3]
Orthopristis chrysoptera[3]
Ostraciidae spp.[3]
Other green algae[1]
Paraclinus fasciatus[3]
Paraclinus marmoratus[3]
Paralichthys albigutta[3]
Penaeidae spp.[3]
Penaeus duorarum[3]
Penicillus spp.[1]
Peprilus burti[3]
Peprilus paru[3]
Phoenix reclinata
Pinus elliottii
Pluchea baccharis
Poecilia latipinna[3]
Pogonias cromis[3]
Pomatomus saltatrix[3]
Portunus spp.[3]
Prionotus rubio[3]
Prionotus scitulus[3]
Prionotus spp.[3]
Prionotus tribulus[3]
Pseudocrenilabrinae[3]
Quercus virginiana
Rachycentron canadum[3]
Rhinoptera bonasus[3]
Rhizophora mangle[2]
Rhizophytic algae[1]
Rhizoprionodon terraenovae[3]
Rimapenaeus constrictus[3]
Rimapenaeus spp.[3]
Ruppia maritima[1]
Sabal palmetto
Salicornia bigelovii[2]
Sardinella aurita[3]
Sarotherodon melanotheron[3]
Schinus terebinthifolia
Sciaenidae spp.[3]
Sciaenops ocellatus[3]
Scomberomorus maculatus[3]
Scorpaena brasiliensis[3]
Selene vomer[3]
Serenoa repens

Caranx latus[3]	Laguncularia racemosa[2]	Serraniculus pumilio[3]
Caranx spp.[3]	Leiostomus xanthurus[3]	Serranidae spp.[3]
Carcharhinus acronotus[3]	Lepisosteus osseus[3]	Serranus subligarius[3]
Carcharhinus leucas[3]	Limulus polyphemus	Sesuvium portulacastrum[2]
Carcharhinus limbatus[3]	Lobotes surinamensis[3]	Sicyonia brevirostris[3]
Caulerpa[1]	Lophogobius cyprinoides[3]	Sicyonia laevigata[3]
Caulerpa mexicana[1]	Lucania parva[3]	Sicyonia spp.[3]
Caulerpa prolifera[1]	Lutjanus analis[3]	Sicyonia typica[3]
Caulerpa sertularioides[1]	Lutjanus apodus[3]	Smilax auriculata
Caulerpa spp.[1]	Lutjanus griseus[3]	Solidago sempervirens
Centropomus undecimalis[3]	Lutjanus spp.[3]	Spartina bakeri[2]
Centropristis philadelphica[3]	Lutjanus synagris[3]	Spartina patens[2]
Centropristis striata[3]	Lycium carolinianum	Sphoeroides nephelus[3]
Chaetodipterus faber[3]	Lyngbya sp.	Sphoeroides spengleri[3]
Chaetodon capistratus[3]	Malaclemys terrapin[3]	Sphyraena barracuda[3]
Chaetodon ocellatus[3]	Maytenus phyllanthoides	Sphyraena borealis[3]
Chasmodes saburrae[3]	Menidia spp.[3]	Sphyraena guachancho[3]
Chelonia mydas[3]	Menippe mercenaria[3]	Sphyrna tiburo[3]
Chilomycterus schoepfii[3]	Menippe spp.[3]	Sporobolus virginicus[2]
Chloroscombrus chrysurus[3]	Menticirrhus americanus[3]	Stephanolepis setifer[3]
Citharichthys macrops[3]	Menticirrhus littoralis[3]	Strongylura marina[3]
Cladium mariscus	Menticirrhus saxatilis[3]	Strongylura notata[3]
Conocarpus erectus[2]	Menticirrhus spp.[3]	Strongylura timucu[3]
Cyanobacteria	Microgobius gulosus[3]	Syacium papillosum[3]
Cynoscion arenarius[3]	Microgobius spp.[3]	Symphurus plagiusa[3]
Cynoscion nebulosus[3]	Microgobius thalassinus[3]	Syngnathus floridae[3]
Cyperus odoratus	Micropogonias undulatus[3]	Syngnathus louisianae[3]
Cyprinodon variegatus[3]	Mikania scandens	Syngnathus scovelli[3]
Diapterus auratus[3]	Monacanthus ciliatus[3]	Syngnathus springeri[3]
Digenea simplex[1]	Monacanthus spp.[3]	Synodus foetens[3]
Diodon holocanthus[3]	Mugil cephalus[3]	Syringodium filiforme[1]
Diplectrum formosum[3]	Mugil curema[3]	Taxodium distichum
Diplectrum spp.[3]	Mugil spp.[3]	Telmatoblechnum serrulatum
Diplodus holbrookii[3]	Mugil trichodon[3]	Thalassia testudinum[1]
Distichlis littoralis[2]	Mycteroperca bonaci[3]	Total SAV[1]
Dorosoma cepedianum[3]	Mycteroperca microlepis[3]	Toxicodendron radicans
Dorosoma petenense[3]	Myrica cerifera	Trachinotus carolinus[3]
Drift algae[1]	Myrophis punctatus[3]	Trachinotus falcatus[3]
Drift red algae[1]	Narcine bancroftii[3]	Trinectes maculatus[3]
Echeneis naucrates[3]	Negaprion brevirostris[3]	Tylosurus crocodilus[3]
Echeneis neucratoides[3]	Nicholsina usta[3]	Unidentified species
Echeneis spp.[3]	No fish	Urophycis floridana[3]
Eleocharis interstincta	No gear set	Vaucheria[1]
Elopiformes spp.[3]	No grass in quadrat[1]	Vigna luteola
Elops saurus[3]	Ocyurus chrysurus[3]	Acanthophora sp.[1]

1 - Submerged Aquatic Vegetation, 2 - Coastal Wetlands, 3 - Nekton

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