Coupon Bight Aquatic Preserve

SEACAR Habitat Analyses

Last compiled on 02 July, 2025

Contents

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-Mar-06.txt*
- *Combined_WQ_WC_NUT_Chlorophyll_a_uncorrected_for_pheophytin-2025-Mar-06.txt*
- *Combined_WQ_WC_NUT_Colored_dissolved_organic_matter_CDOM-2025-Mar-06.txt*
- *Combined_WQ_WC_NUT_Dissolved_Oxygen-2025-Mar-06.txt*
- *Combined_WQ_WC_NUT_Dissolved_Oxygen_Saturation-2025-Mar-06.txt*
- *Combined_WQ_WC_NUT_pH-2025-Mar-06.txt*
- *Combined_WQ_WC_NUT_Salinity-2025-Mar-06.txt*
- *Combined_WQ_WC_NUT_Secchi_Depth-2025-Mar-06.txt*
- *Combined_WQ_WC_NUT_Total_Nitrogen-2025-Mar-06.txt*
- *Combined_WQ_WC_NUT_Total_Phosphorus-2025-Mar-06.txt*
- *Combined_WQ_WC_NUT_Total_Suspended_Solids_TSS-2025-Mar-06.txt*
- *Combined_WQ_WC_NUT_Turbidity-2025-Mar-06.txt*
- *Combined_WQ_WC_NUT_Water_Temperature-2025-Mar-06.txt*

Chlorophyll a, Uncorrected for Pheophytin - Discrete

Seasonal Kendall-Tau Trend Analysis

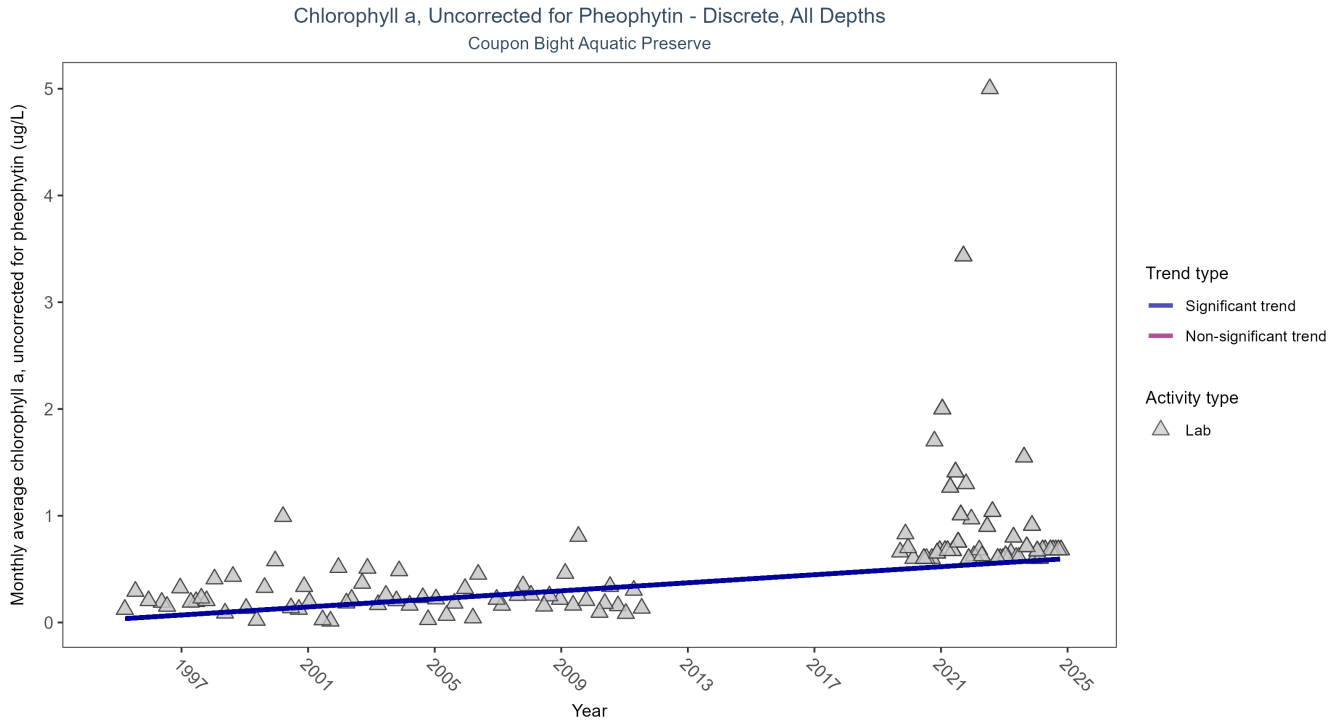

Figure 1: Scatter plot of monthly average levels of chlorophyll a, uncorrected for pheophytin, over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only laboratory-analyzed chlorophyll a (triangles)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

Table 6: 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	184	23	1995 - 2024	0.6	0.435	0.0325	0.0189	0

Monthly average chlorophyll a, uncorrected for pheophytin, increased by 0.02 µg/L per year, indicating a decrease in water clarity.

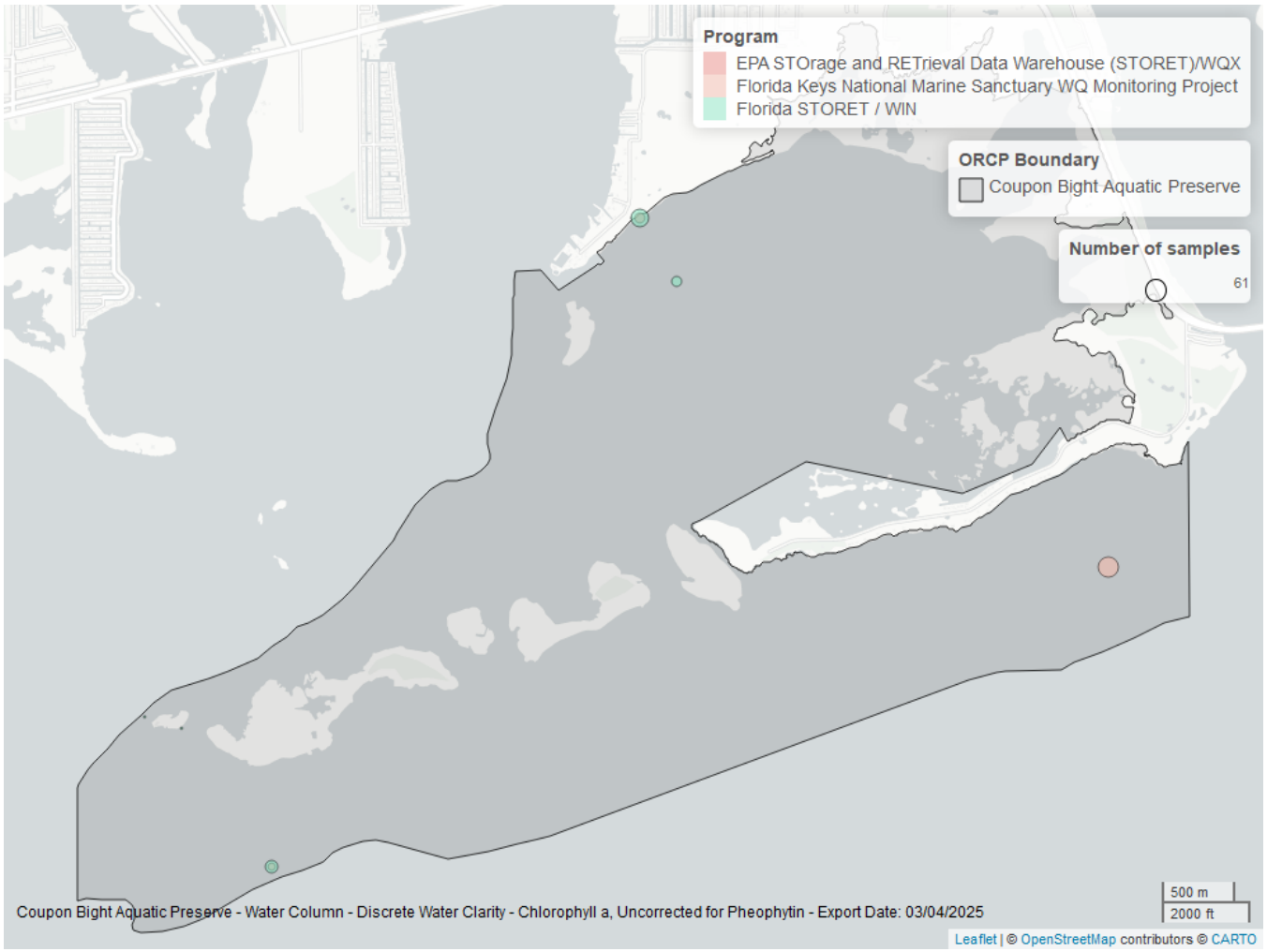

Figure 2: Map showing location of discrete water quality sampling locations within the boundaries of *Coupon Bight Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

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

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	93	2019	2024
297	61	1995	2011
103	32	2020	2021

Program names:

103 - EPA STOrage and RETrieval Data Warehouse (STORET)/WQX[1]
297 - Florida Keys National Marine Sanctuary Water Quality Monitoring Project[2]
5002 - Florida STORET / WIN[3]

Dissolved Oxygen - Discrete

Seasonal Kendall-Tau Trend Analysis

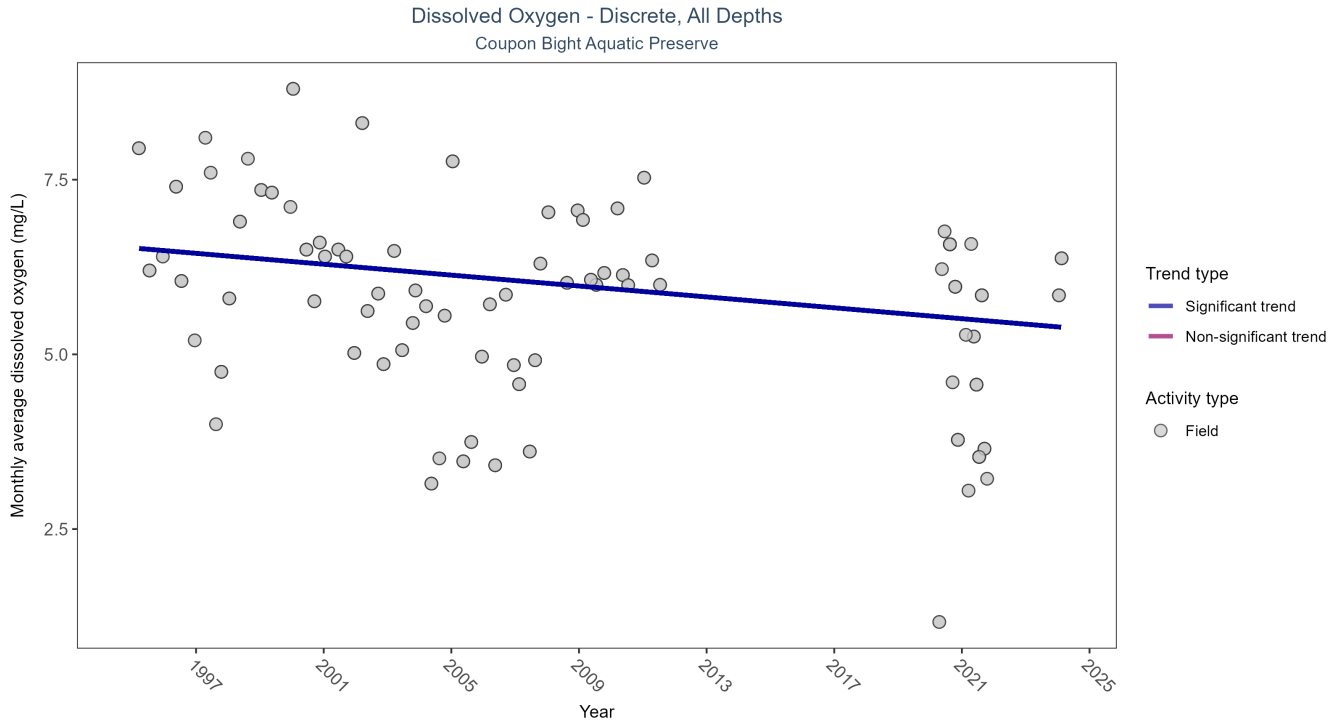

Figure 3: Scatter plot of monthly average dissolved oxygen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen values measured in the field (circles) are included in the plot.

Table 8: 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	Significantly decreasing trend	159	20	1995 - 2024	5.9905	-0.2504	6.5239	-0.039	0.022

Monthly average dissolved oxygen decreased by 0.04 mg/L per year.

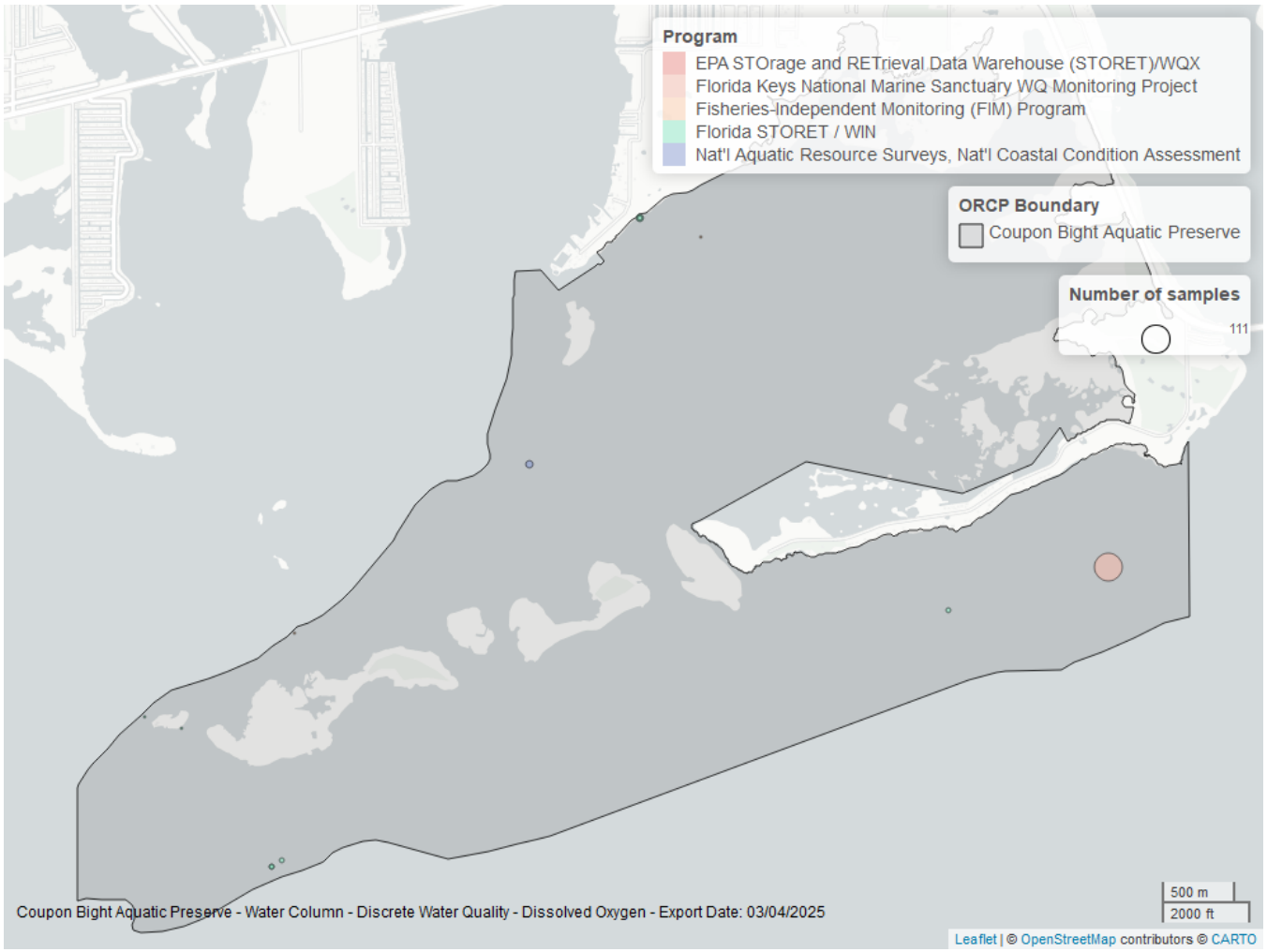

Figure 4: Map showing location of discrete water quality sampling locations within the boundaries of *Coupon Bight Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 9: Programs contributing data for Dissolved Oxygen

ProgramID	*N_Data*	*YearMin*	*YearMax*
297	111	1995	2011
5002	33	2020	2024
118	7	2020	2020
69	4	2000	2000
103	4	2021	2021

Program names:

69 - Fisheries-Independent Monitoring (FIM) Program[4]
103 - EPA STOrage and RETrieval Data Warehouse (STORET)/WQX[1]
118 - National Aquatic Resource Surveys, National Coastal Condition Assessment[5]
297 - Florida Keys National Marine Sanctuary Water Quality Monitoring Project[2]
5002 - Florida STORET / WIN[3]

Dissolved Oxygen Saturation - Discrete

Seasonal Kendall-Tau Trend Analysis

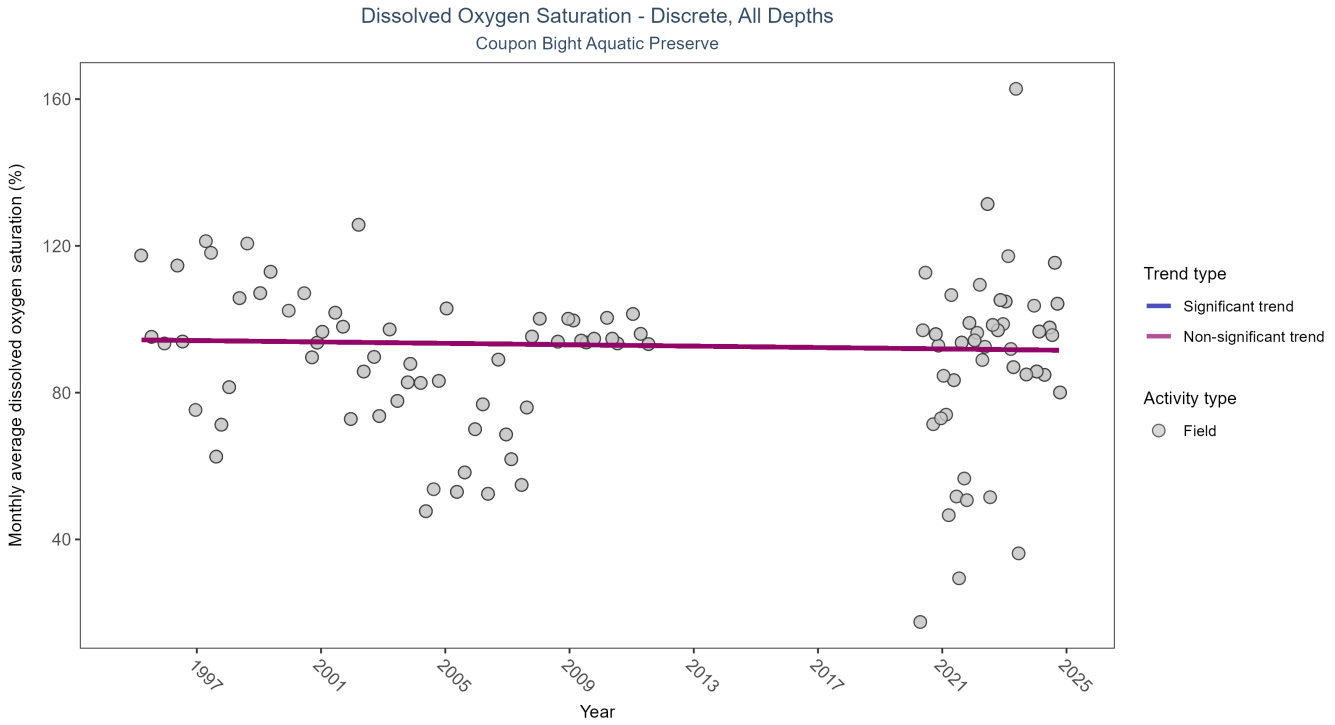

Figure 5: Scatter plot of monthly average dissolved oxygen saturation over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen saturation values measured in the field (circles)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

Table 10: 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	192	22	1995 - 2024	93.6199	-0.018	94.3848	-0.0947	0.7714

Dissolved oxygen saturation showed no detectable trend between 1995 and 2024.

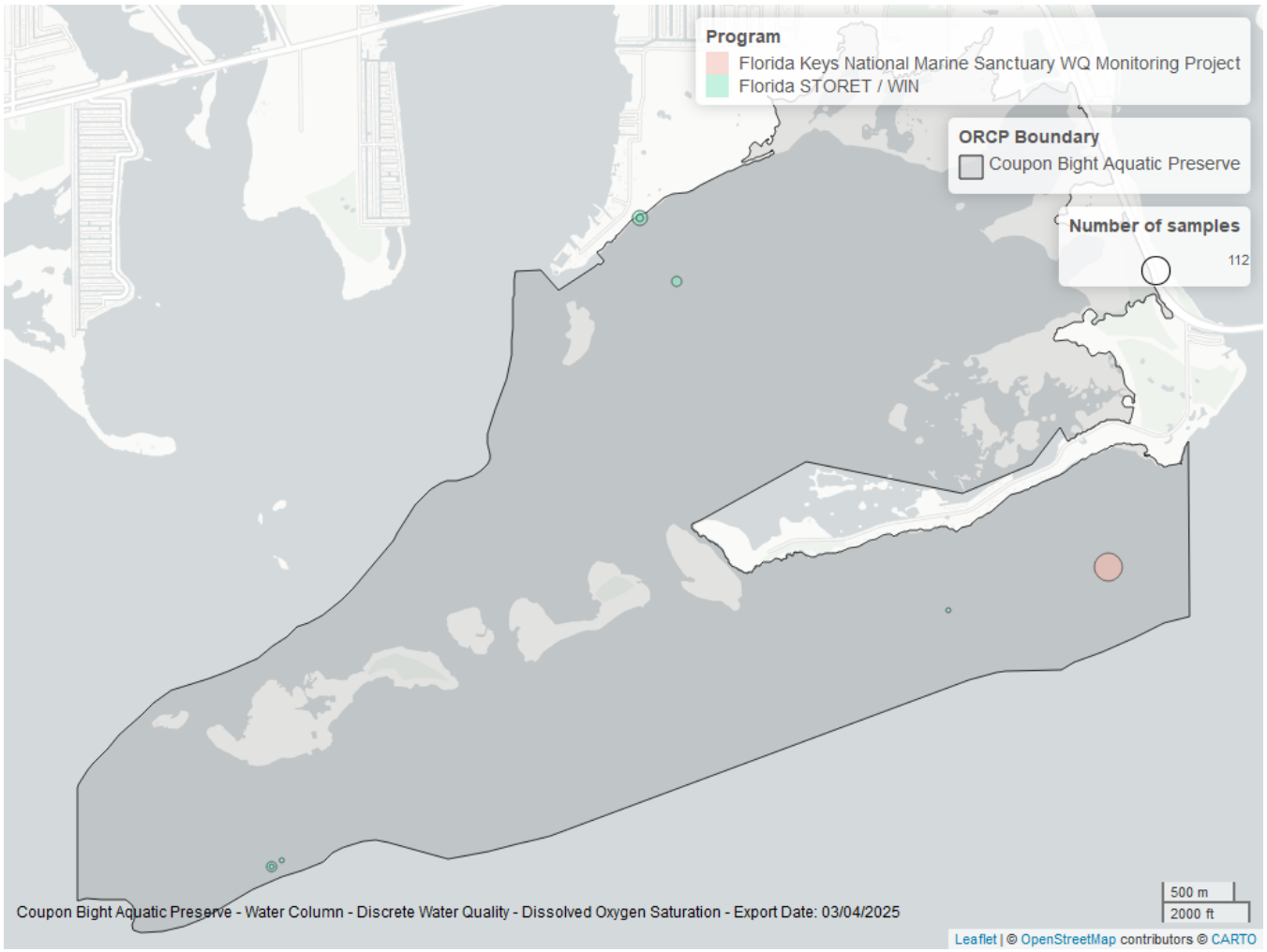

Figure 6: Map showing location of discrete water quality sampling locations within the boundaries of *Coupon Bight Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 11: Programs contributing data for Dissolved Oxygen Saturation

ProgramID	*N_Data*	*YearMin*	*YearMax*
297	112	1995	2011
5002	85	2020	2024

Program names:

297 - Florida Keys National Marine Sanctuary Water Quality Monitoring Project[2]
5002 - Florida STORET / WIN[3]

Salinity - Discrete

Seasonal Kendall-Tau Trend Analysis

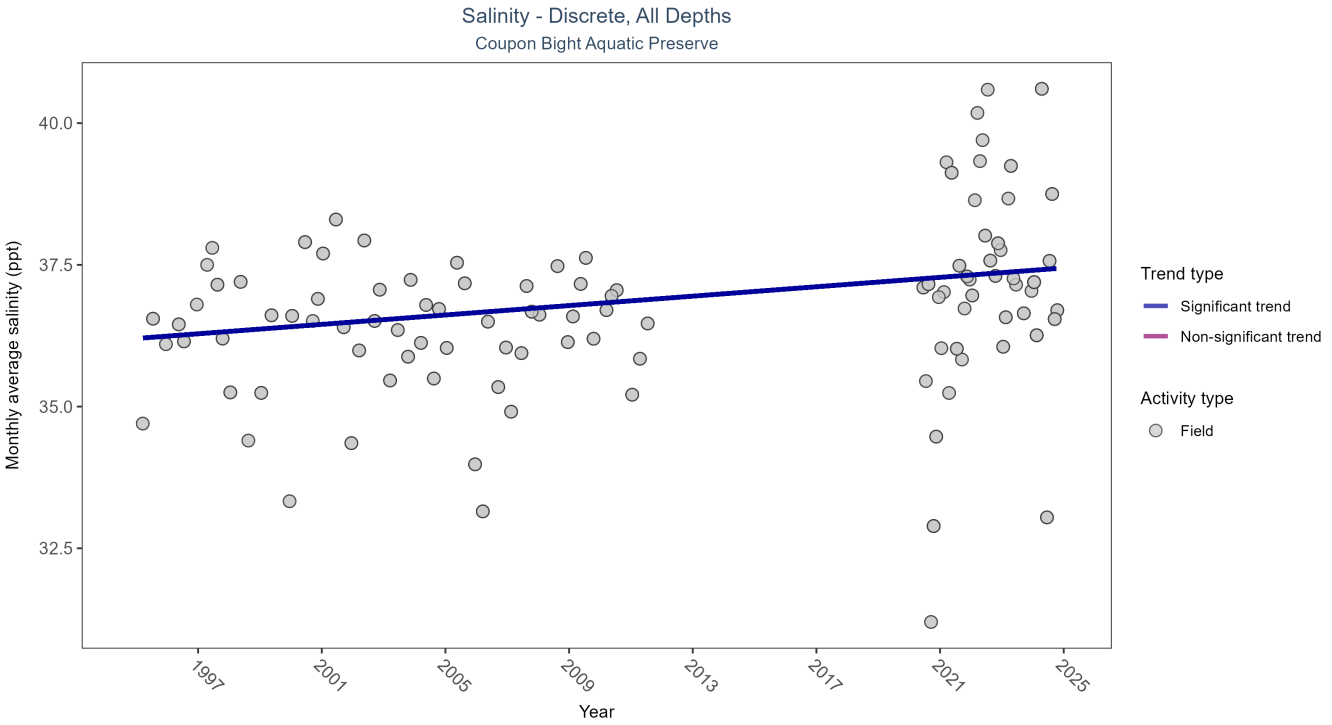

Figure 7: Scatter plot of monthly average salinity over time. If the time series included ten or more years of discrete observations, significant (blue) or non-significant (magenta) trend lines are also shown. Discrete salinity values derived from grab samples analyzed in the field (circles) or the laboratory (triangles) are both included in the plot.

Table 12: 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 increasing trend	202	22	1995 - 2024	36.7	0.3294	36.2011	0.0415	0

Monthly average salinity increased by 0.04 ppt per year.

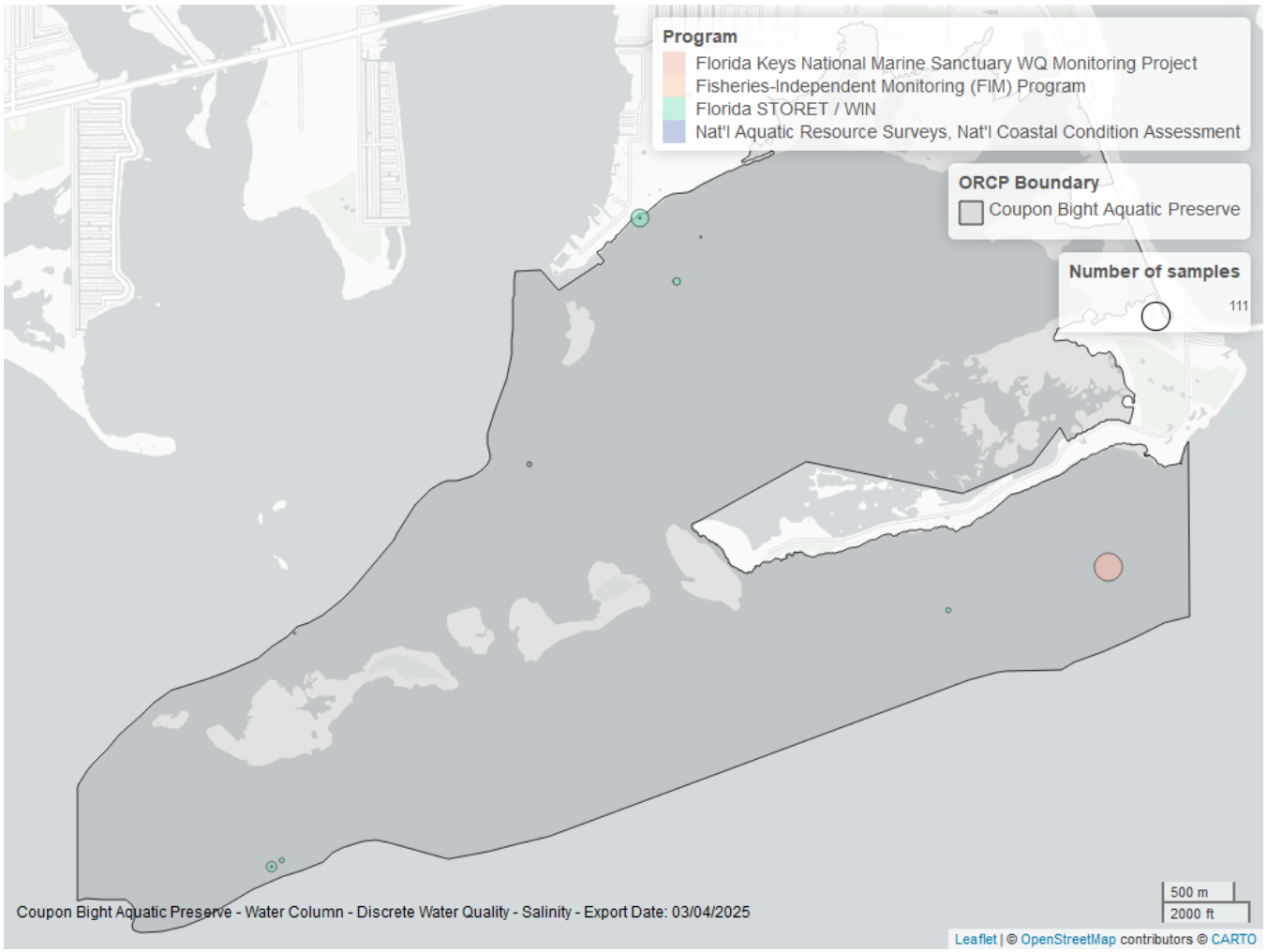

Figure 8: Map showing location of discrete water quality sampling locations within the boundaries of *Coupon Bight Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 13: Programs contributing data for Salinity

ProgramID	*N_Data*	*YearMin*	*YearMax*
297	111	1995	2011
5002	86	2020	2024
118	6	2020	2020
69	4	2000	2000

Program names:

69 - Fisheries-Independent Monitoring (FIM) Program[4]
118 - National Aquatic Resource Surveys, National Coastal Condition Assessment[5]
297 - Florida Keys National Marine Sanctuary Water Quality Monitoring Project[2]
5002 - Florida STORET / WIN[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

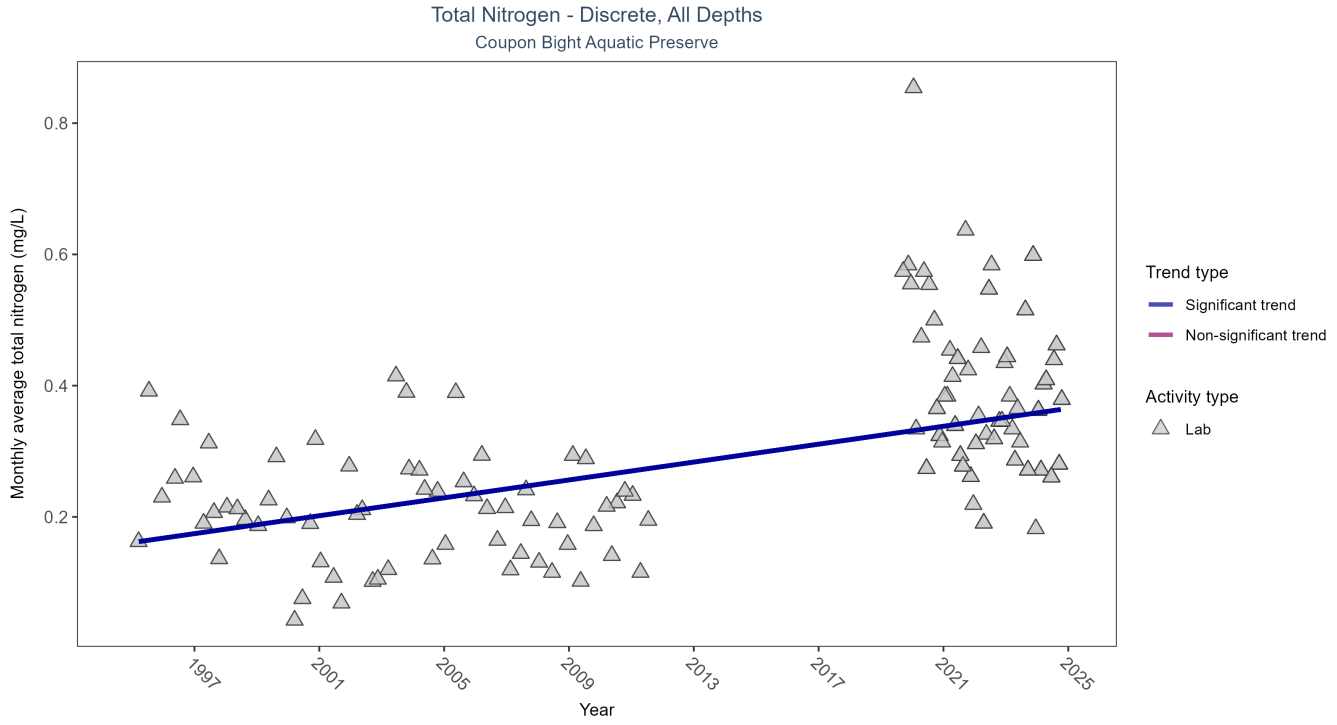

Figure 9: Scatter plot of monthly average total nitrogen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only nitrogen values obtained from laboratory analyses (triangles) are included in the plot.

Table 14: 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 increasing trend	163	23	1995 - 2024	0.2887	0.3505	0.1608	0.0068	0

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

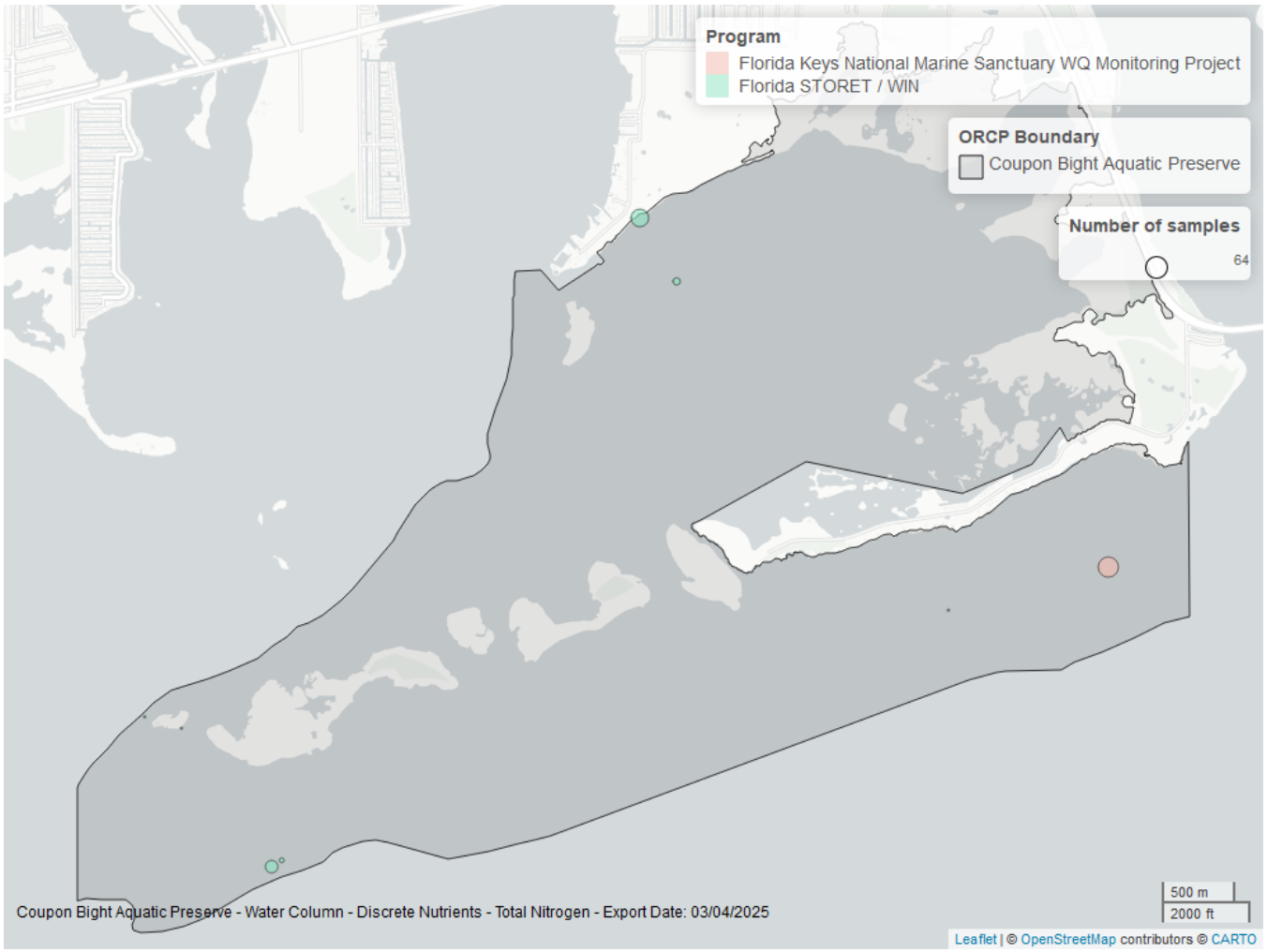

Figure 10: Map showing location of discrete water quality sampling locations within the boundaries of *Coupon Bight Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 15: Programs contributing data for Total Nitrogen

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	99	2019	2024
297	64	1995	2011

Program names:

297 - Florida Keys National Marine Sanctuary Water Quality Monitoring Project[2]
5002 - Florida STORET / WIN[3]

Total Phosphorus - Discrete

Seasonal Kendall-Tau Trend Analysis

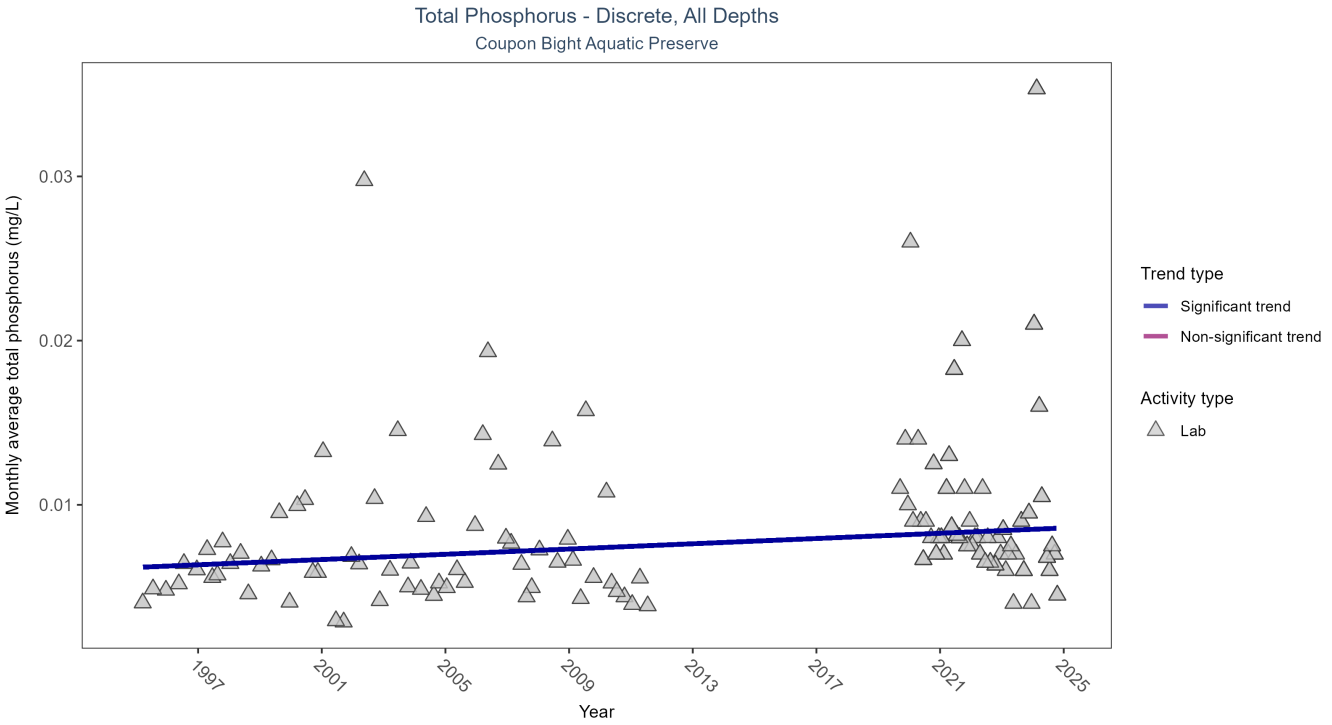

Figure 11: Scatter plot of monthly average total phosphorus over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only phosphorus values obtained from laboratory analyses (triangles) are included in the plot.

Table 16: 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 increasing trend	180	23	1995 - 2024	0.007	0.2005	0.0062	0.0001	0.0081

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

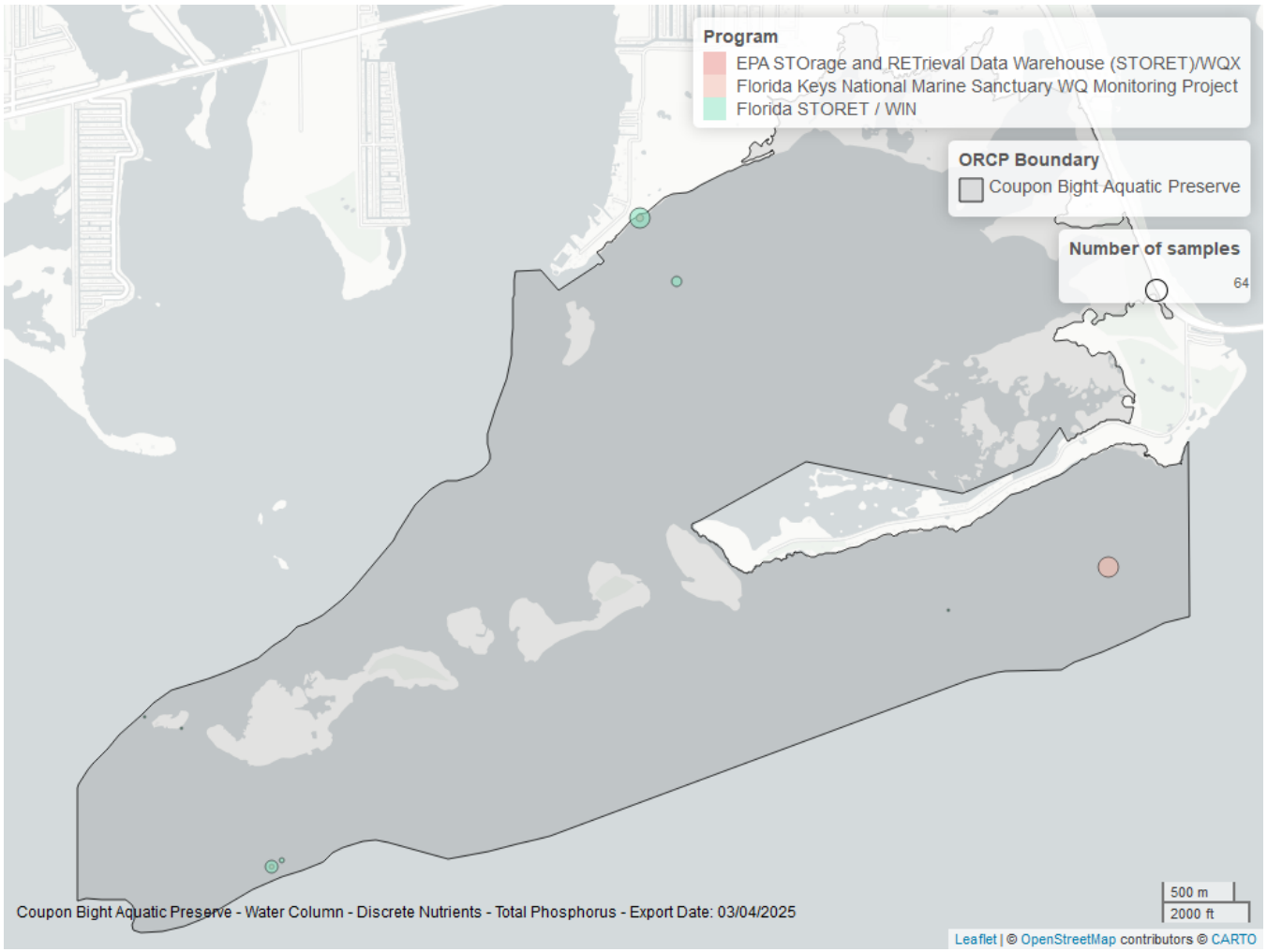

Figure 12: Map showing location of discrete water quality sampling locations within the boundaries of *Coupon Bight Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 17: Programs contributing data for Total Phosphorus

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	102	2019	2024
297	64	1995	2011
103	16	2020	2021

Program names:

103 - EPA STOrage and RETrieval Data Warehouse (STORET)/WQX[1]
297 - Florida Keys National Marine Sanctuary Water Quality Monitoring Project[2]
5002 - Florida STORET / WIN[3]

Turbidity - Discrete

Seasonal Kendall-Tau Trend Analysis

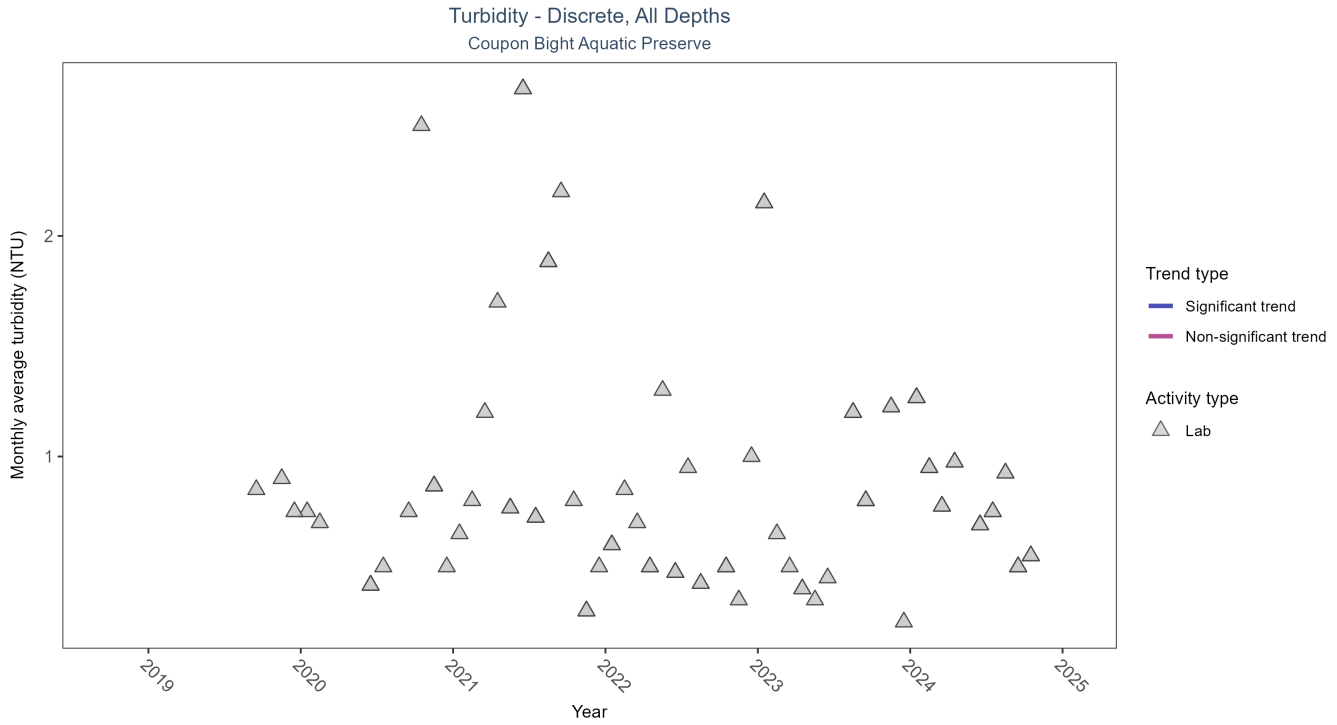

Figure 13: Scatter plot of monthly average turbidity over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only turbidity values measured in the laboratory (triangles) are included in the plot.

Table 18: 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	Insufficient data to calculate trend	97	6	2019 - 2024	0.7	-	-	-	-

There was insufficient data to fit a model for turbidity.

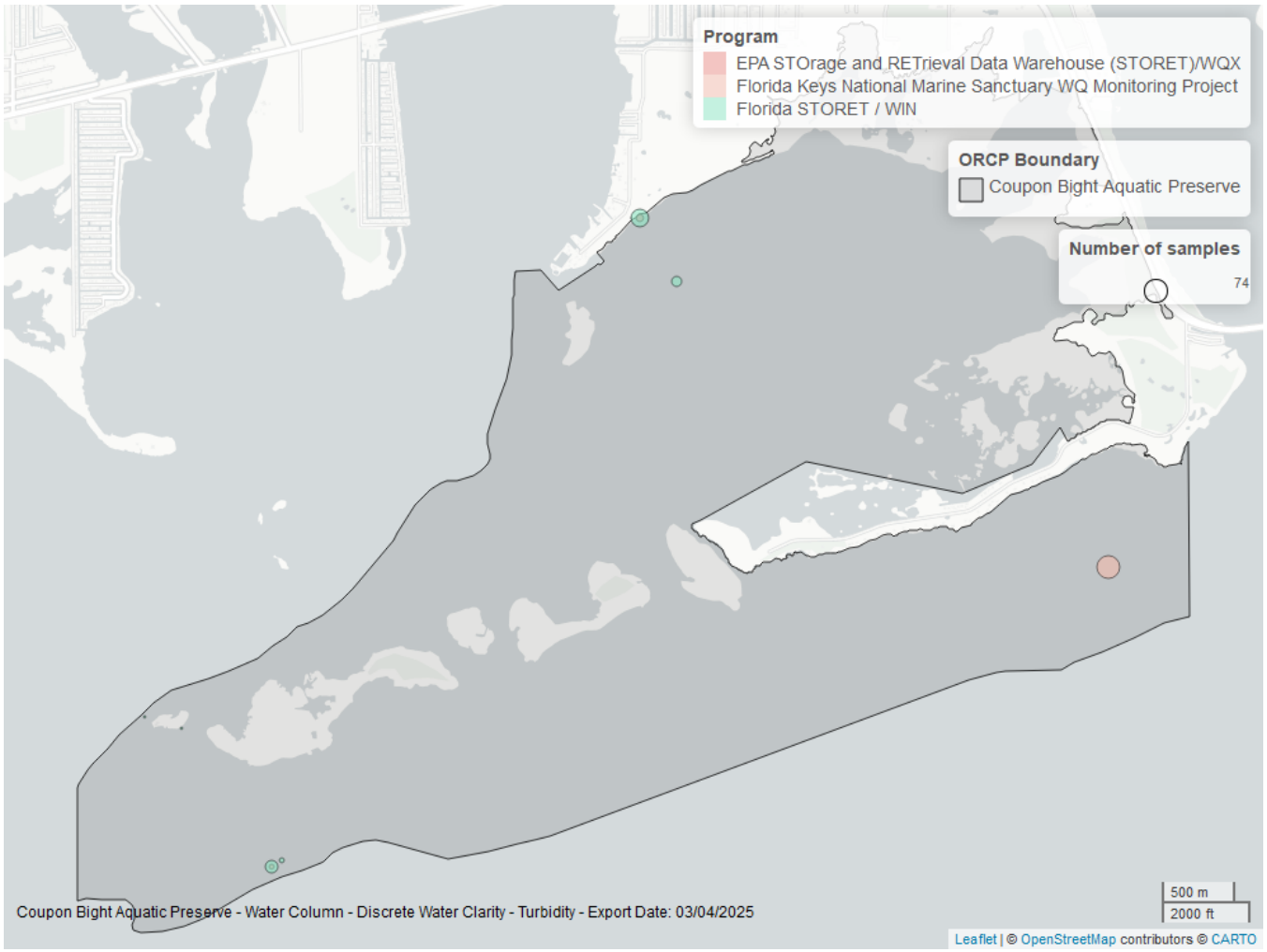

Figure 14: Map showing location of discrete water quality sampling locations within the boundaries of *Coupon Bight Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 19: Programs contributing data for Turbidity

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	99	2019	2024
297	74	1995	2011
103	16	2020	2021

Program names:

103 - EPA STOrage and RETrieval Data Warehouse (STORET)/WQX[1]
297 - Florida Keys National Marine Sanctuary Water Quality Monitoring Project[2]
5002 - Florida STORET / WIN[3]

Water Temperature - Discrete

Seasonal Kendall-Tau Trend Analysis

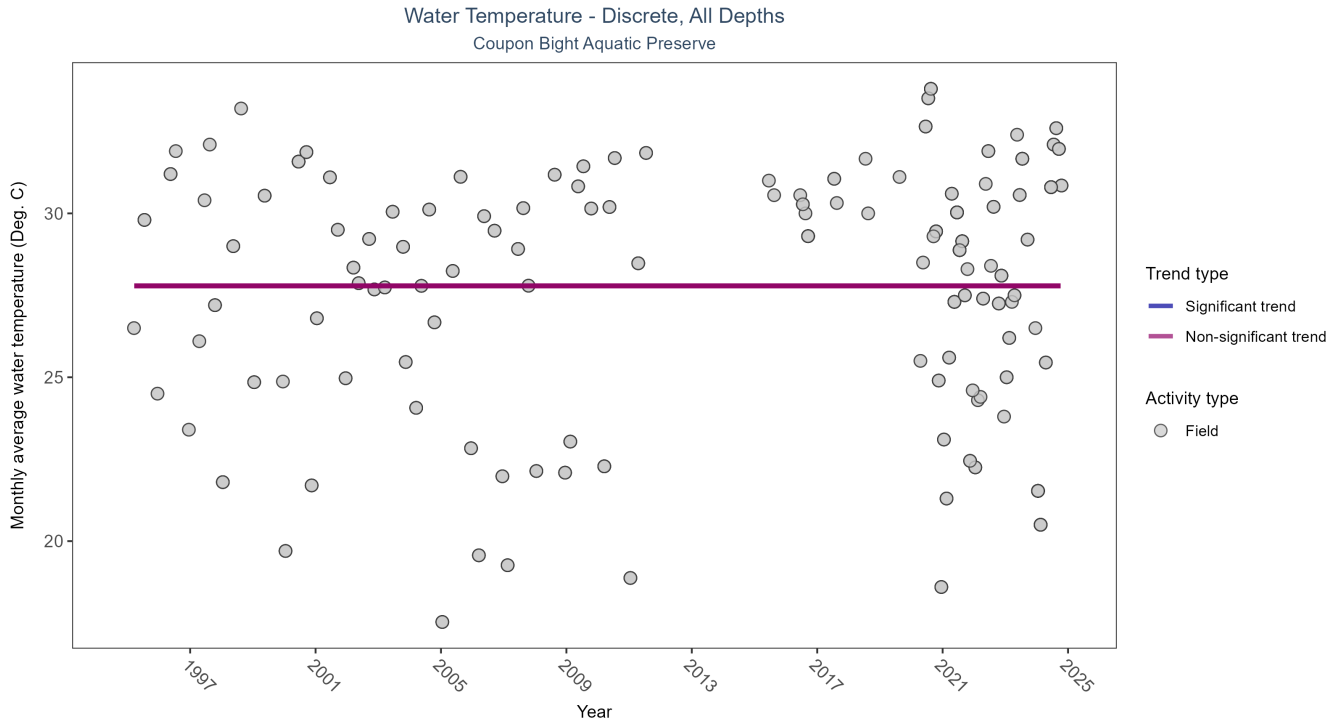

Figure 15: Scatter plot of monthly average water temperature over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only water temperature measurements taken in the field (circles) are included in the plot.

Table 20: 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	No significant trend	242	27	1995 - 2024	28.5	0.0096	27.7916	0	1

Water temperature showed no detectable trend between 1995 and 2024.

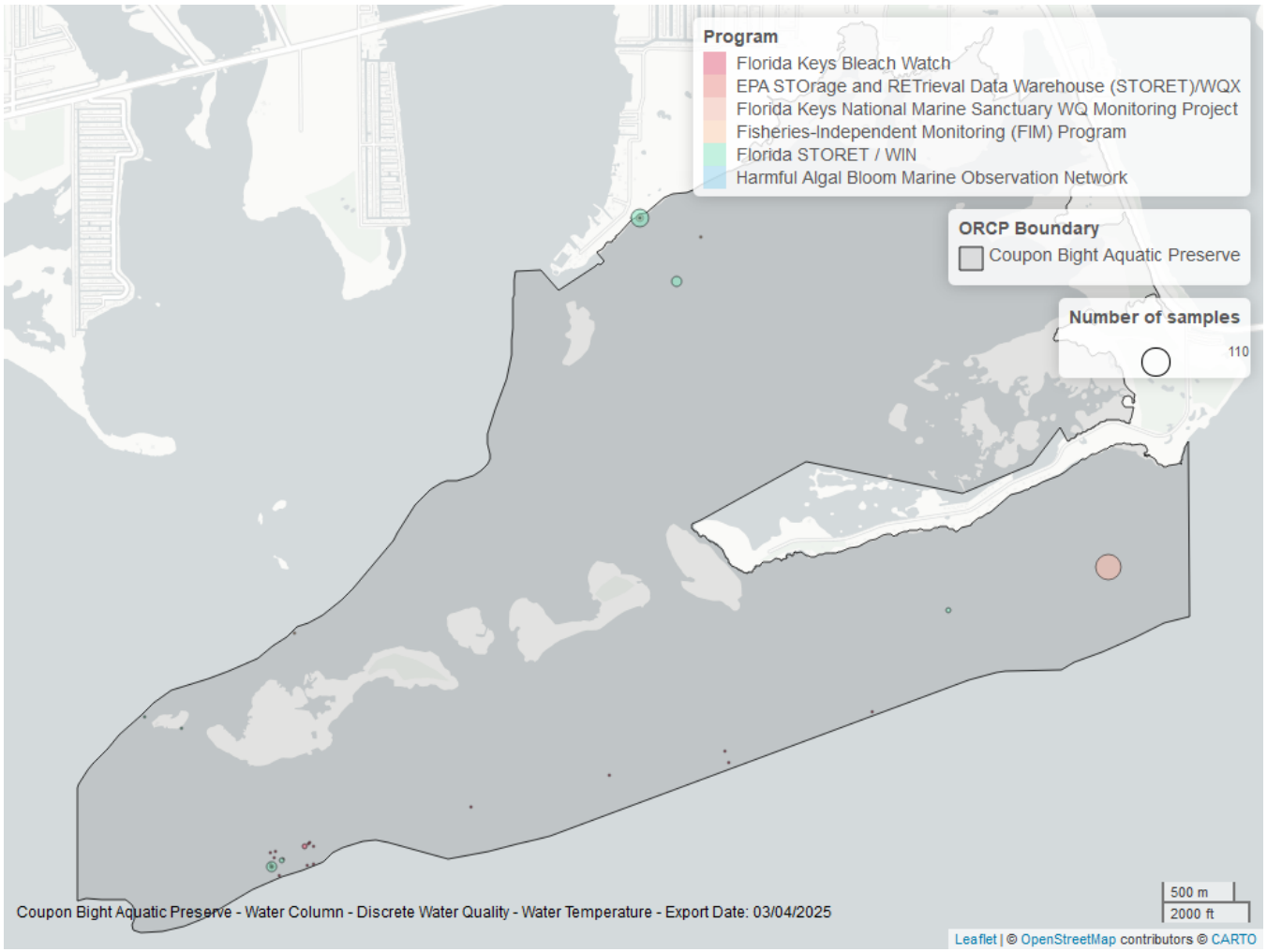

Figure 16: Map showing location of discrete water quality sampling locations within the boundaries of *Coupon Bight Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 21: Programs contributing data for Water Temperature

ProgramID	*N_Data*	*YearMin*	*YearMax*
297	110	1995	2011
5002	98	2020	2024
982	23	2015	2023
103	13	2020	2021
69	4	2000	2000
95	1	2010	2010

Program names:

69 - Fisheries-Independent Monitoring (FIM) Program[4]
95 - Harmful Algal Bloom Marine Observation Network[6]
103 - EPA STOrage and RETrieval Data Warehouse (STORET)/WQX[1]
297 - Florida Keys National Marine Sanctuary Water Quality Monitoring Project[2]
982 - Florida Keys Bleach Watch[7]
5002 - Florida STORET / WIN[3]

Water Quality - Continuous

The following files were used in the continuous analysis:

- *Combined_WQ_WC_NUT_cont_Dissolved_Oxygen_SE-2025-Mar-06.txt*
- *Combined_WQ_WC_NUT_cont_Dissolved_Oxygen_Saturation_SE-2025-Mar-06.txt*
- *Combined_WQ_WC_NUT_cont_pH_SE-2025-Mar-06.txt*
- *Combined_WQ_WC_NUT_cont_Salinity_SE-2025-Mar-06.txt*
- *Combined_WQ_WC_NUT_cont_Turbidity_SE-2025-Mar-06.txt*
- *Combined_WQ_WC_NUT_cont_Water_Temperature_SE-2025-Mar-06.txt*

Continuous monitoring locations in Coupon Bight Aquatic Preserve

Table 22: Station overview for Continuous parameters by Program

ProgramID	*ProgramLocationID*	*Years of Data*	*Use in Analysis*	*Parameters*
10004	FKCB	1	FALSE	DO , DOS , pH , Sal , Turb , TempW

Program names:

10004 - Florida Keys Aquatic Preserves Continuous Water Quality Monitoring[8]

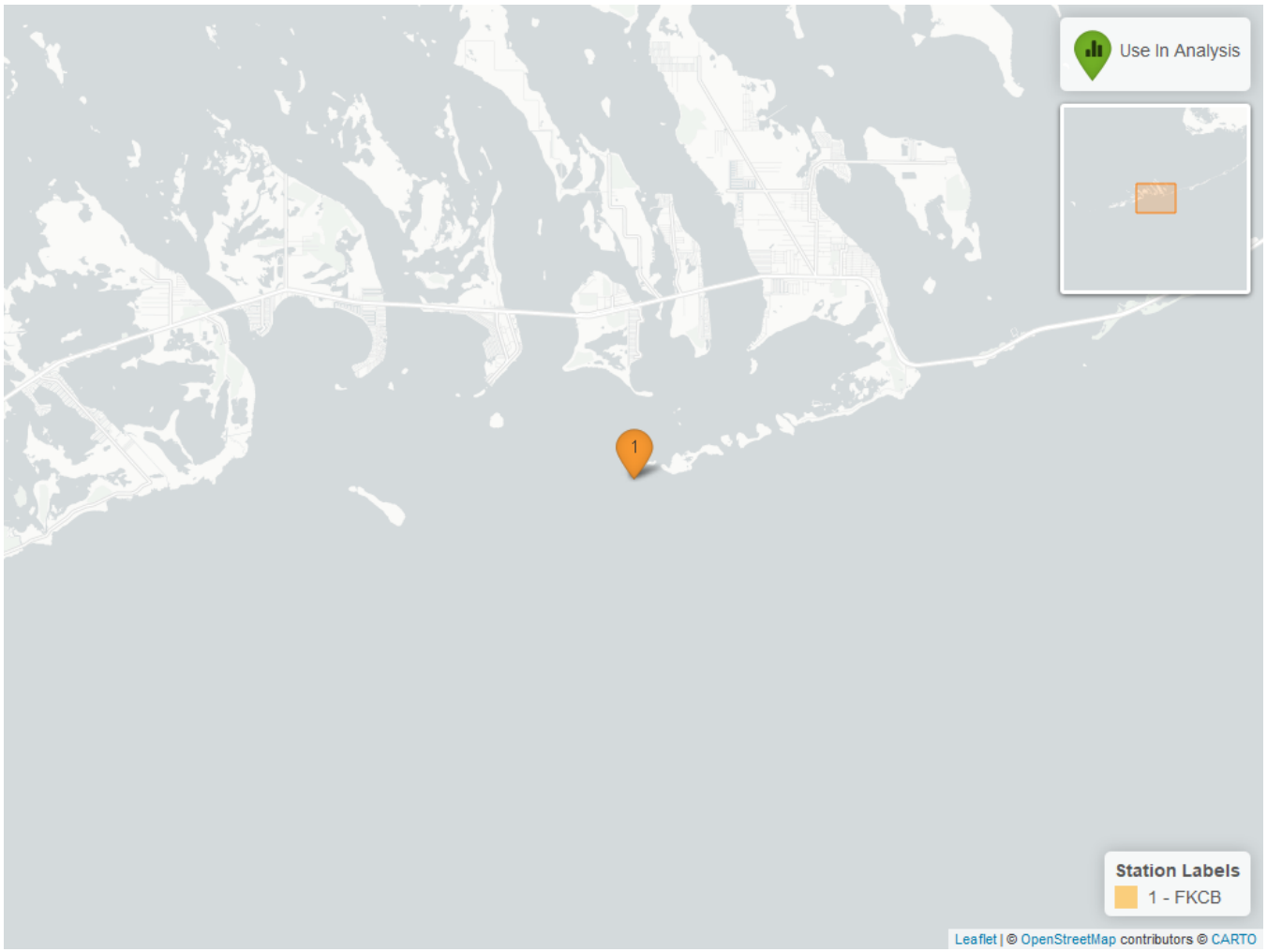

Figure 17: Map showing continuous water quality sampling locations within the boundaries of *Coupon Bight Aquatic Preserve*. Sites marked as *Use In Analysis* (green) are featured in this report.

Dissolved Oxygen - Continuous

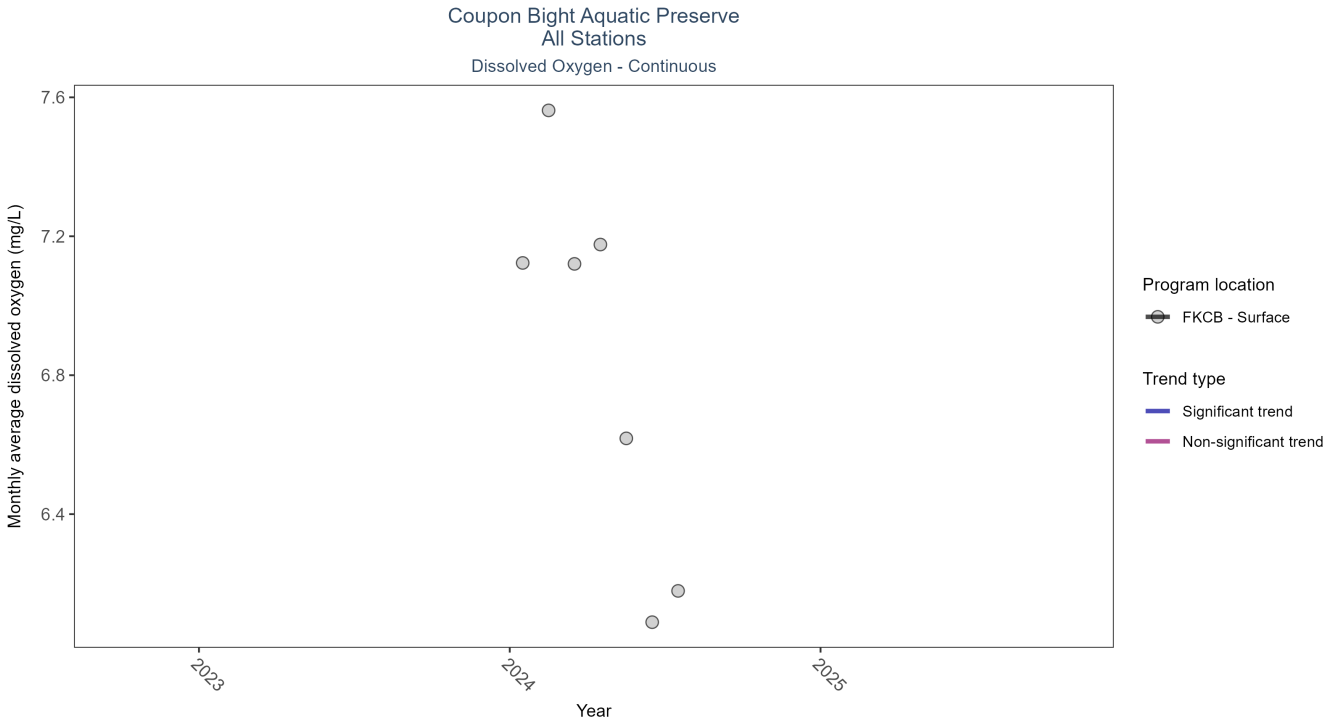

Figure 18: Scatter plot of monthly average dissolved oxygen over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 23: Seasonal Kendall-Tau Results for Dissolved Oxygen - All Stations

Station	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
FKCB	Insufficient data to calculate trend	16262	1	2024 - 2024	6.8	-	-	-	-

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

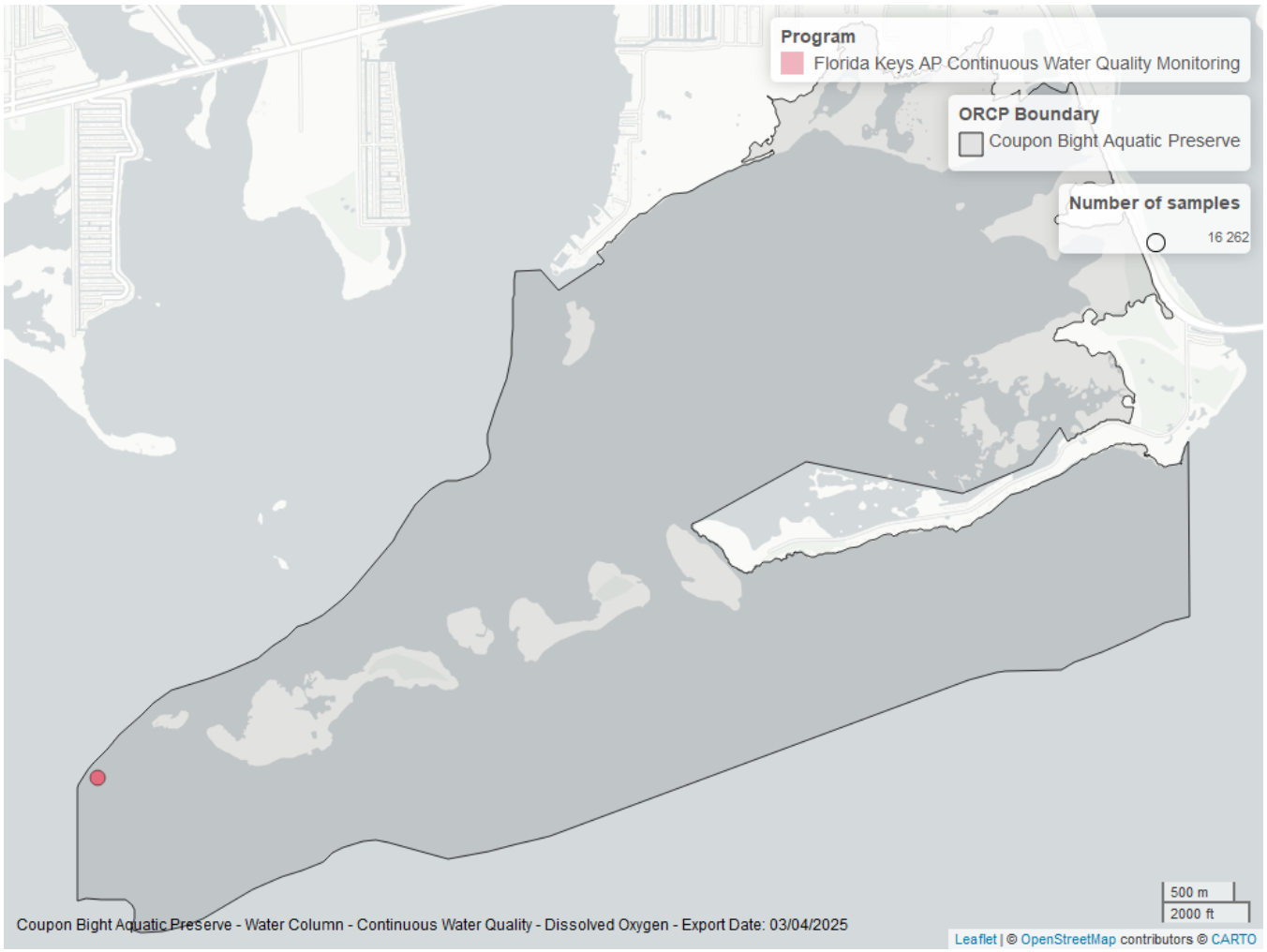

Figure 19: Map showing location of dissolved oxygen continuous water quality sampling locations within the boundaries of *Coupon Bight Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Dissolved Oxygen Saturation - Continuous

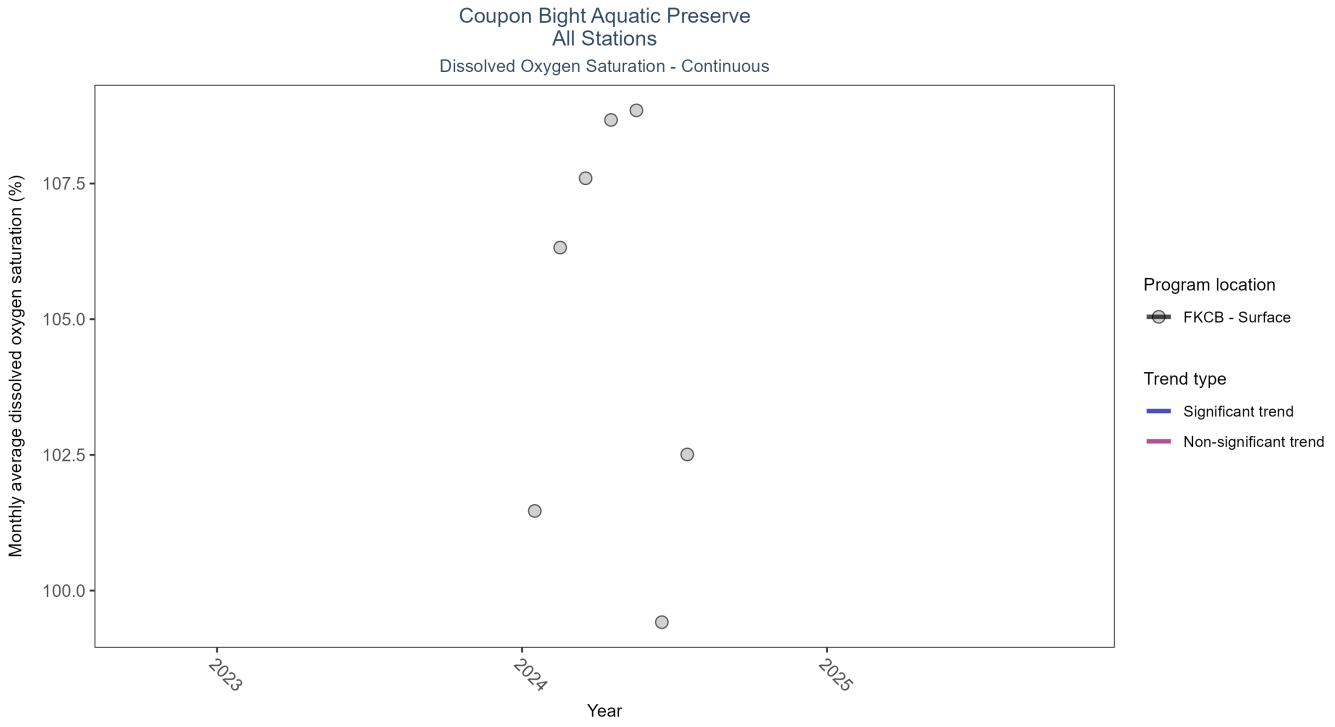

Figure 20: Scatter plot of monthly average dissolved oxygen saturation over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 24: Seasonal Kendall-Tau Results for Dissolved Oxygen Saturation - All Stations

Station	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
FKCB	Insufficient data to calculate trend	16263	1	2024 - 2024	103.3	-	-	-	-

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

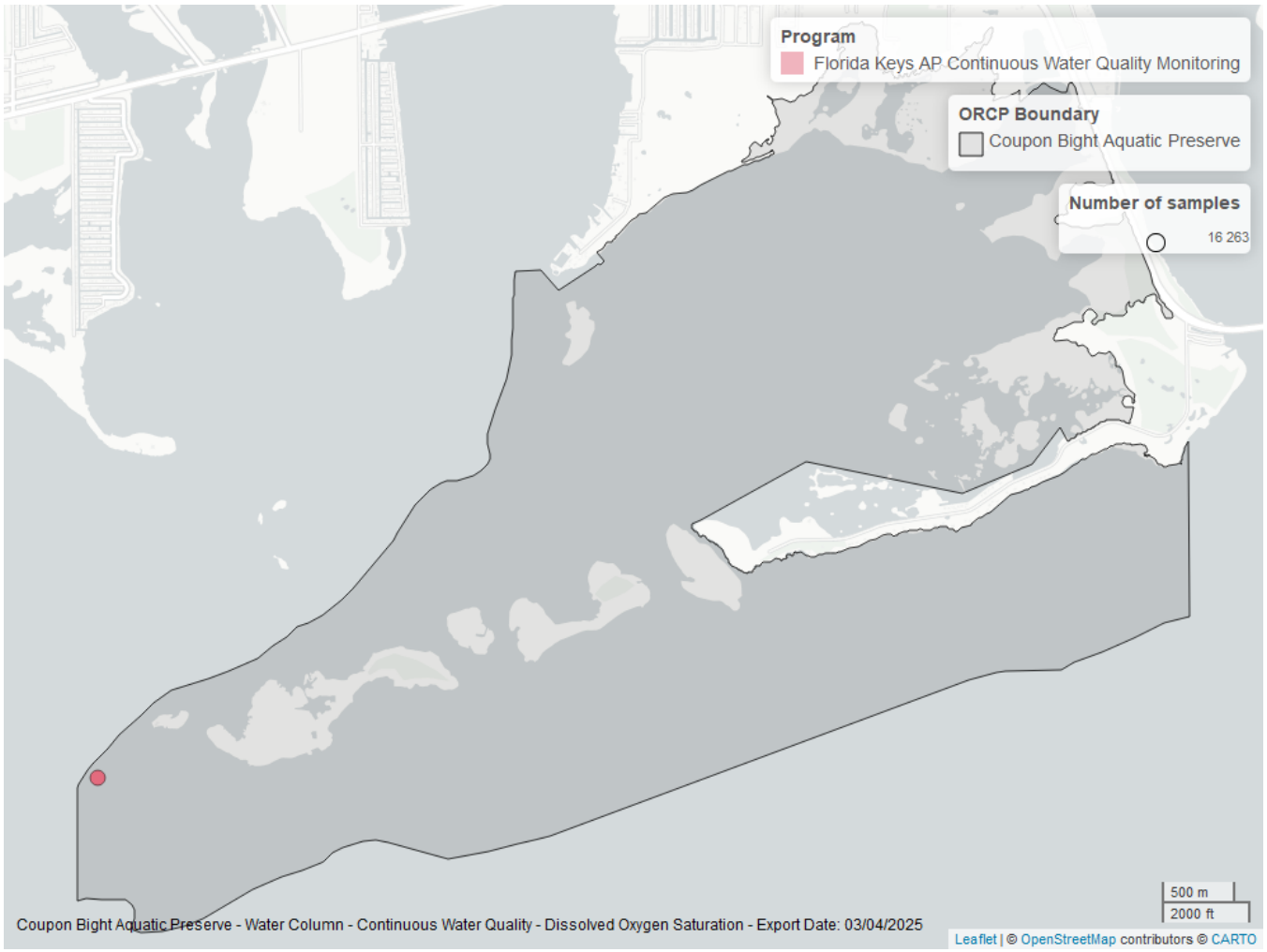

Figure 21: Map showing location of dissolved oxygen saturation continuous water quality sampling locations within the boundaries of *Coupon Bight Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

pH - Continuous

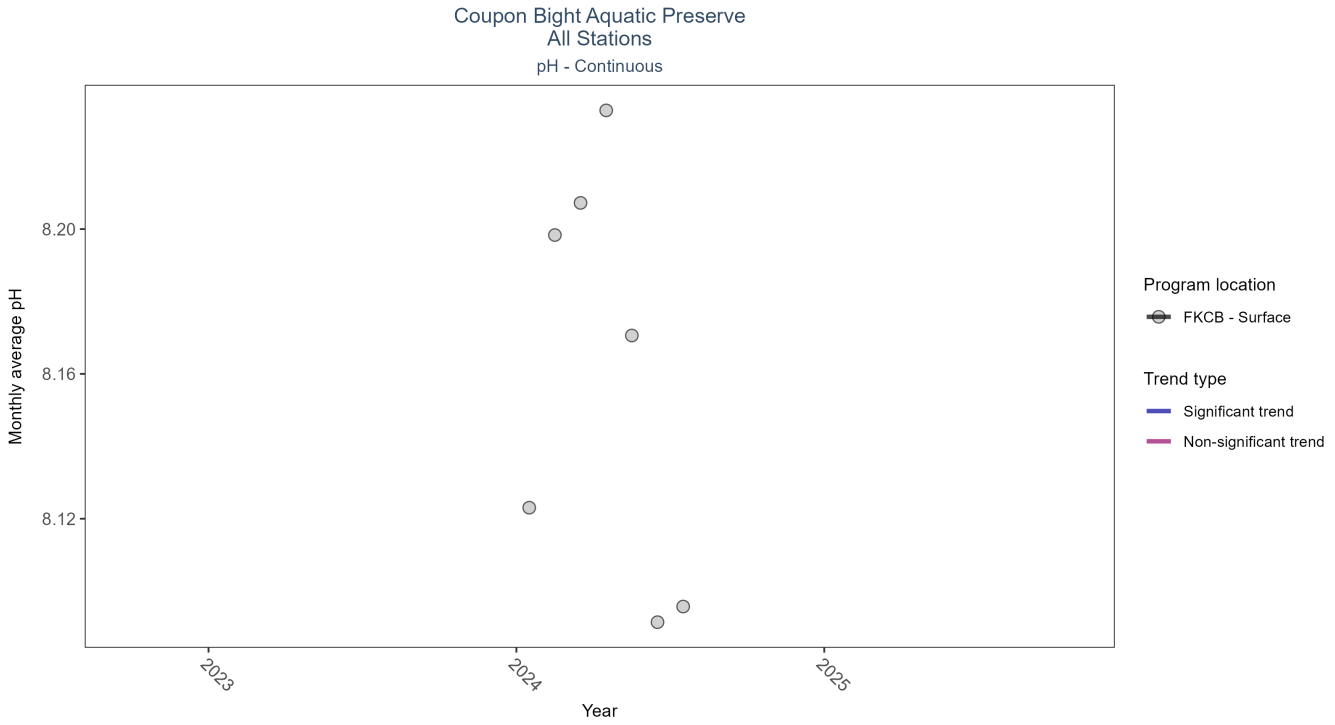

Figure 22: Scatter plot of monthly average pH over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 25: Seasonal Kendall-Tau Results for pH - All Stations

Station	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
FKCB	Insufficient data to calculate trend	16263	1	2024 - 2024	8.2	-	-	-	-

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

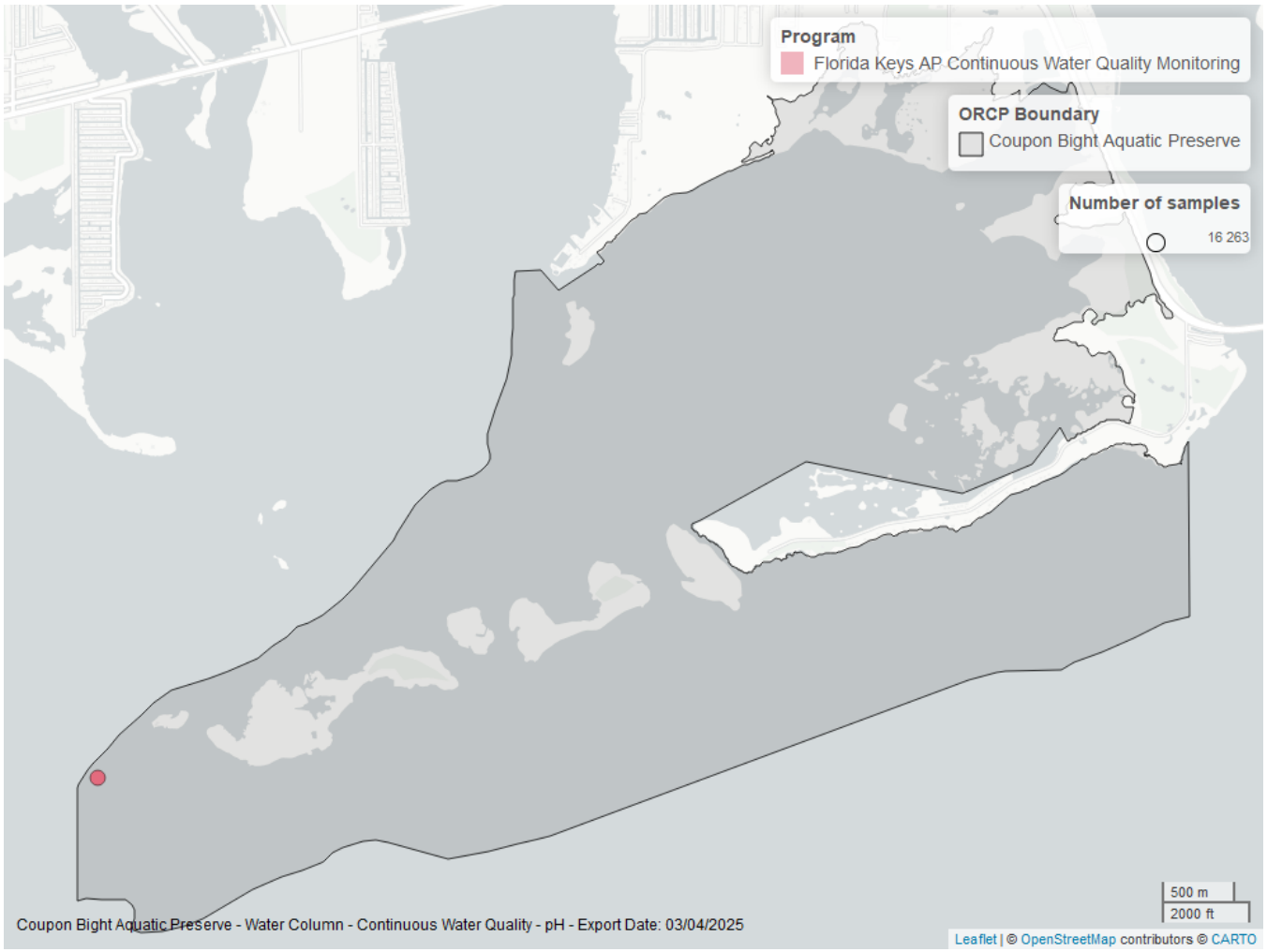

Figure 23: Map showing location of ph continuous water quality sampling locations within the boundaries of *Coupon Bight Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Salinity - Continuous

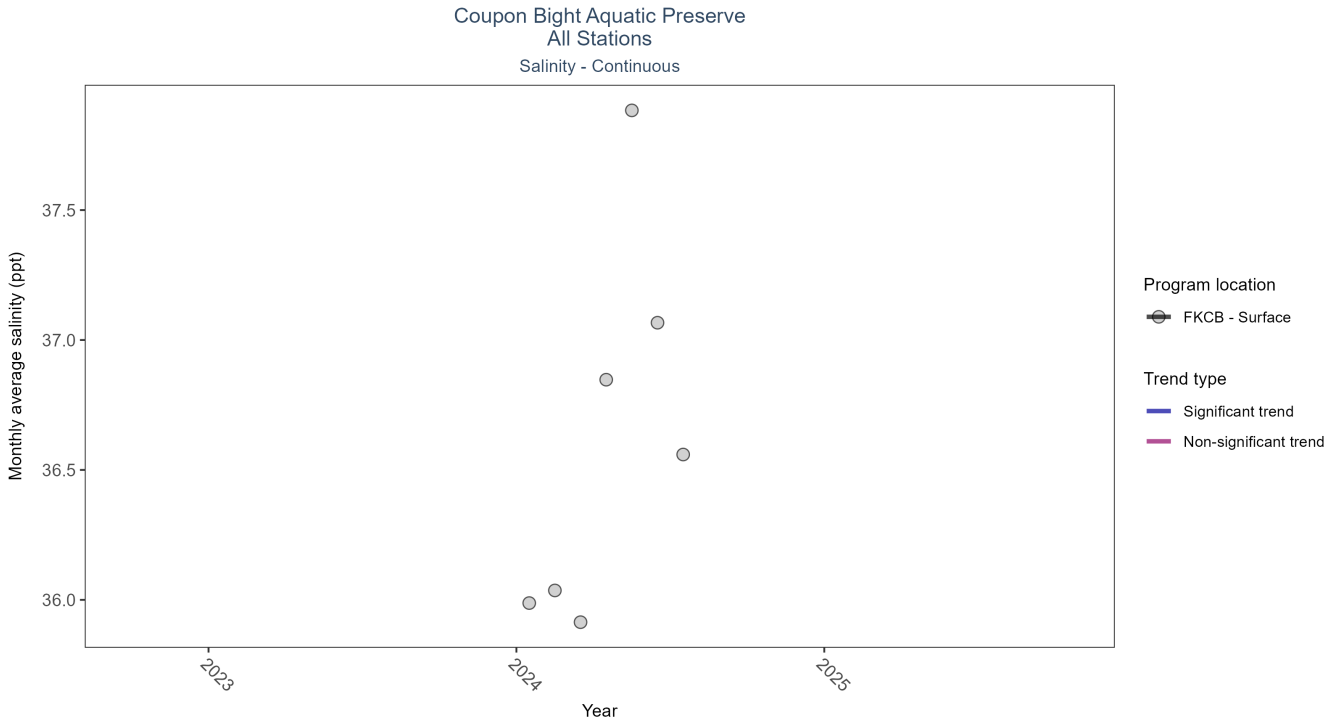

Figure 24: Scatter plot of monthly average salinity over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 26: Seasonal Kendall-Tau Results for Salinity - All Stations

Station	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
FKCB	Insufficient data to calculate trend	16258	1	2024 - 2024	36.5	-	-	-	-

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

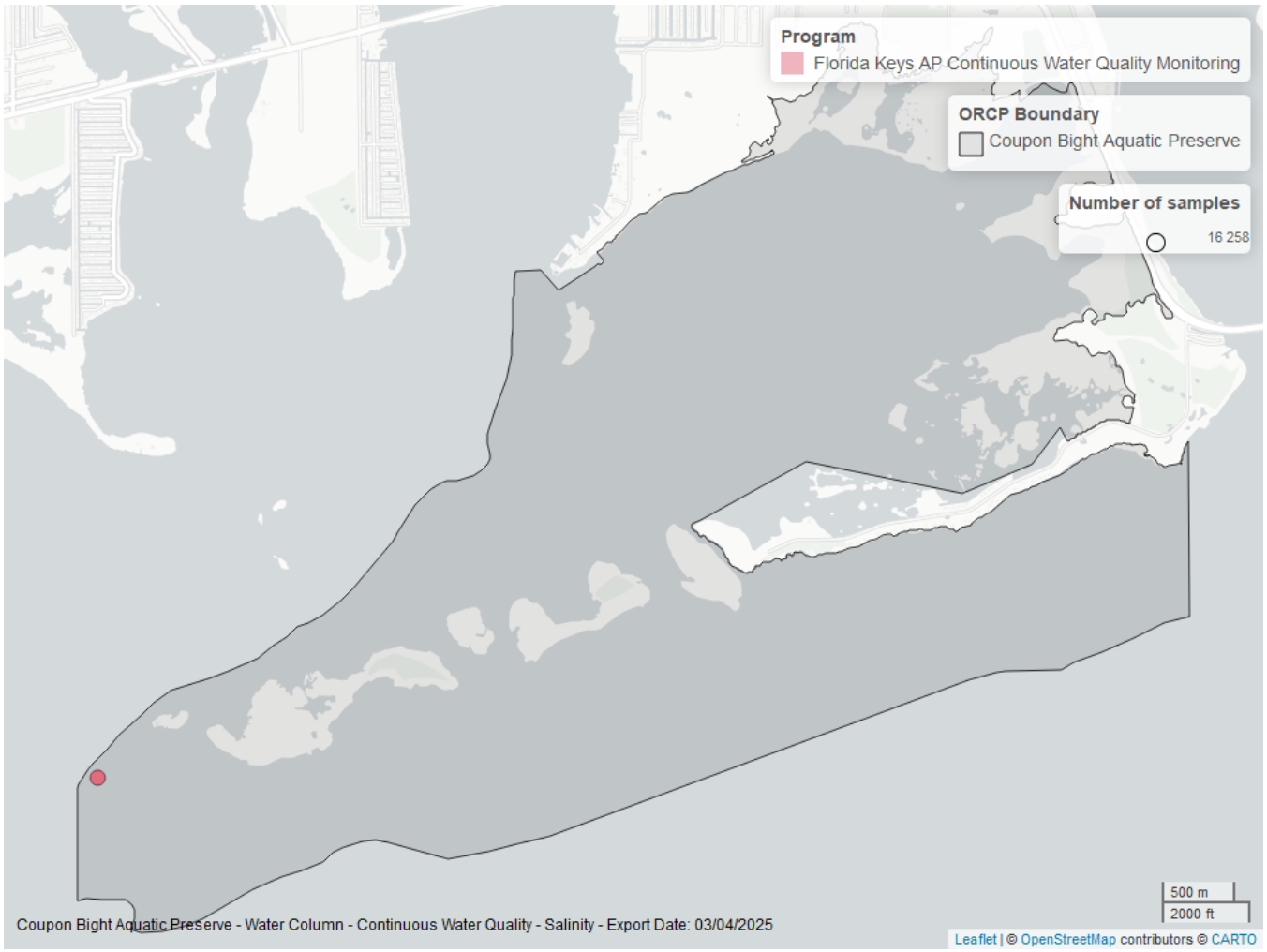

Figure 25: Map showing location of salinity continuous water quality sampling locations within the boundaries of *Coupon Bight Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Turbidity - Continuous

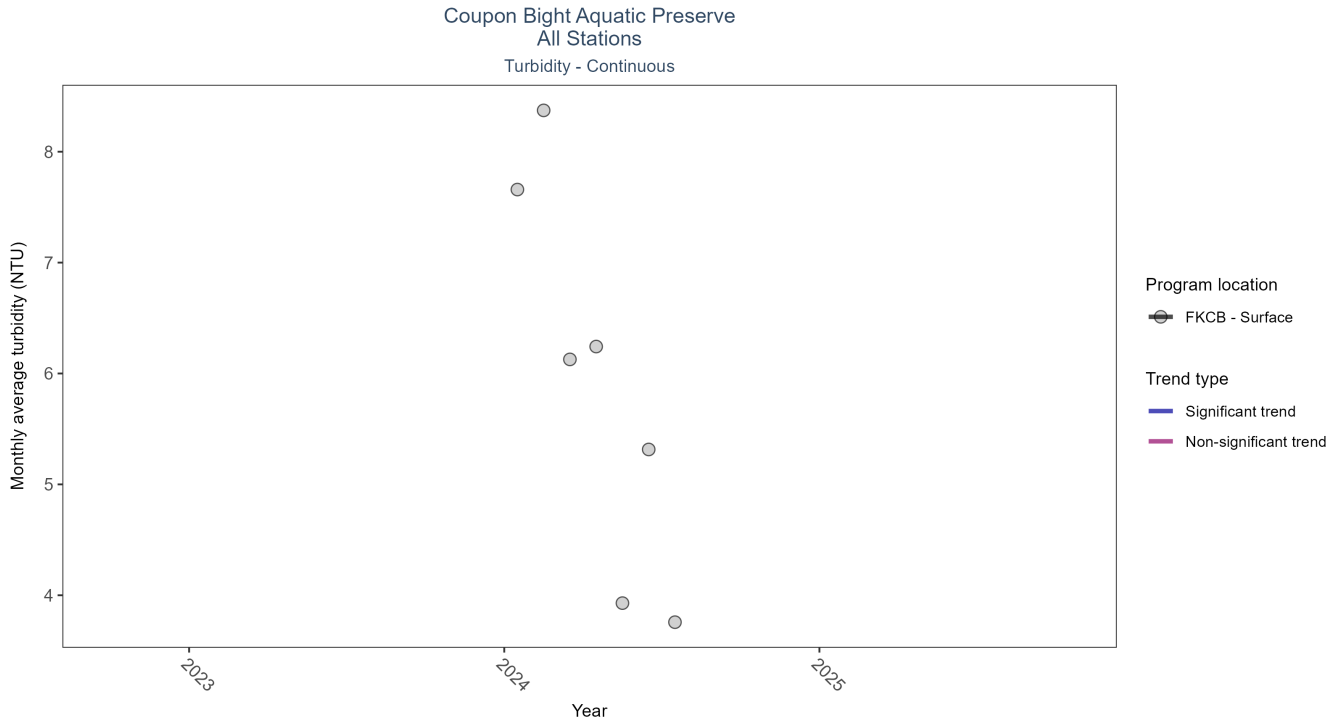

Figure 26: Scatter plot of monthly average turbidity over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 27: Seasonal Kendall-Tau Results for Turbidity - All Stations

Station	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
FKCB	Insufficient data to calculate trend	16240	1	2024 - 2024	4	-	-	-	-

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

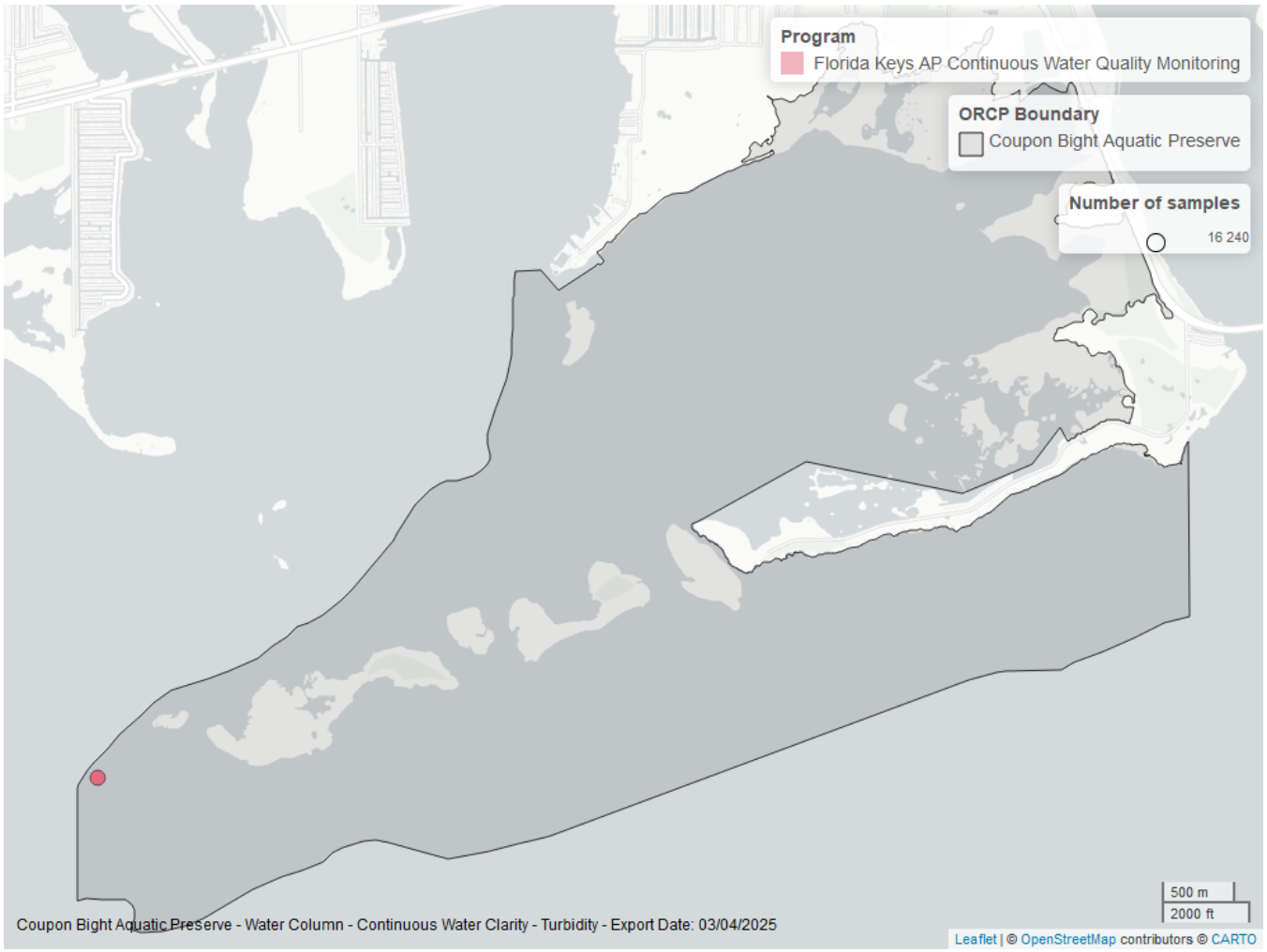

Figure 27: Map showing location of turbidity continuous water quality sampling locations within the boundaries of *Coupon Bight Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Water Temperature - Continuous

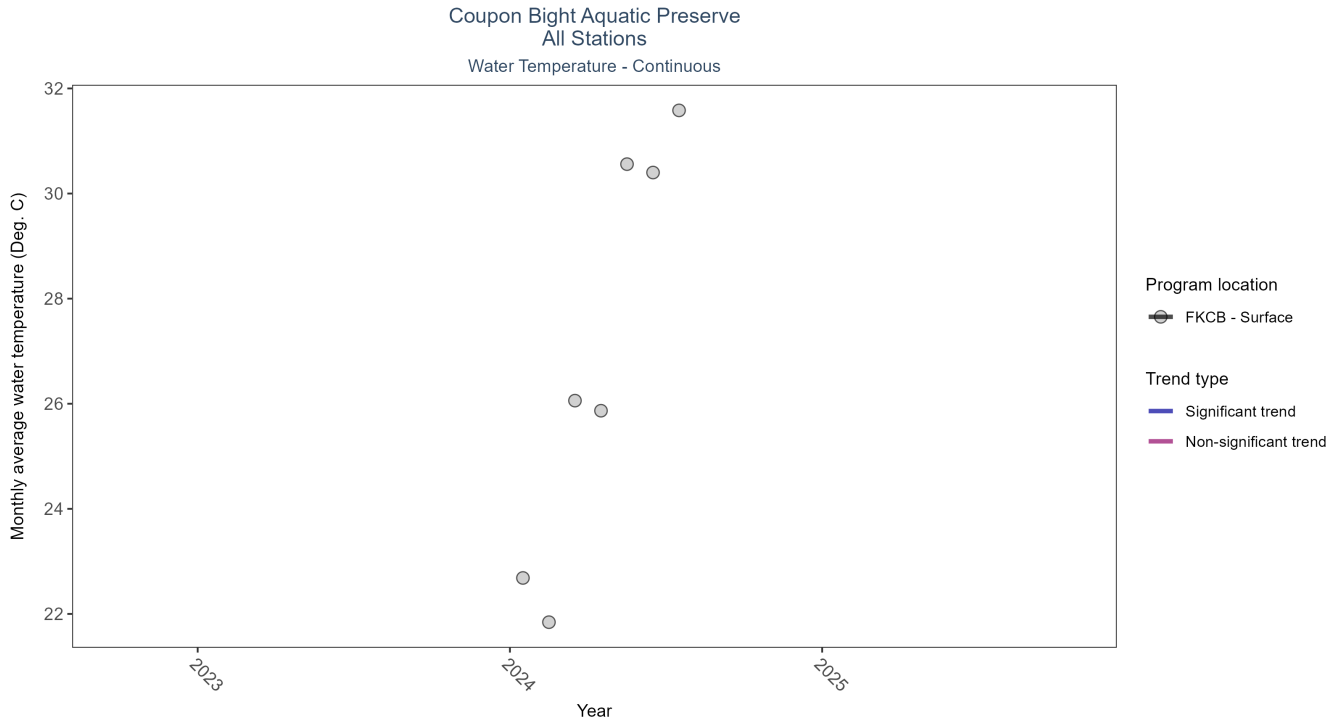

Figure 28: Scatter plot of monthly average water temperature over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 28: 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
FKCB	Insufficient data to calculate trend	16263	1	2024 - 2024	26.8	-	-	-	-

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

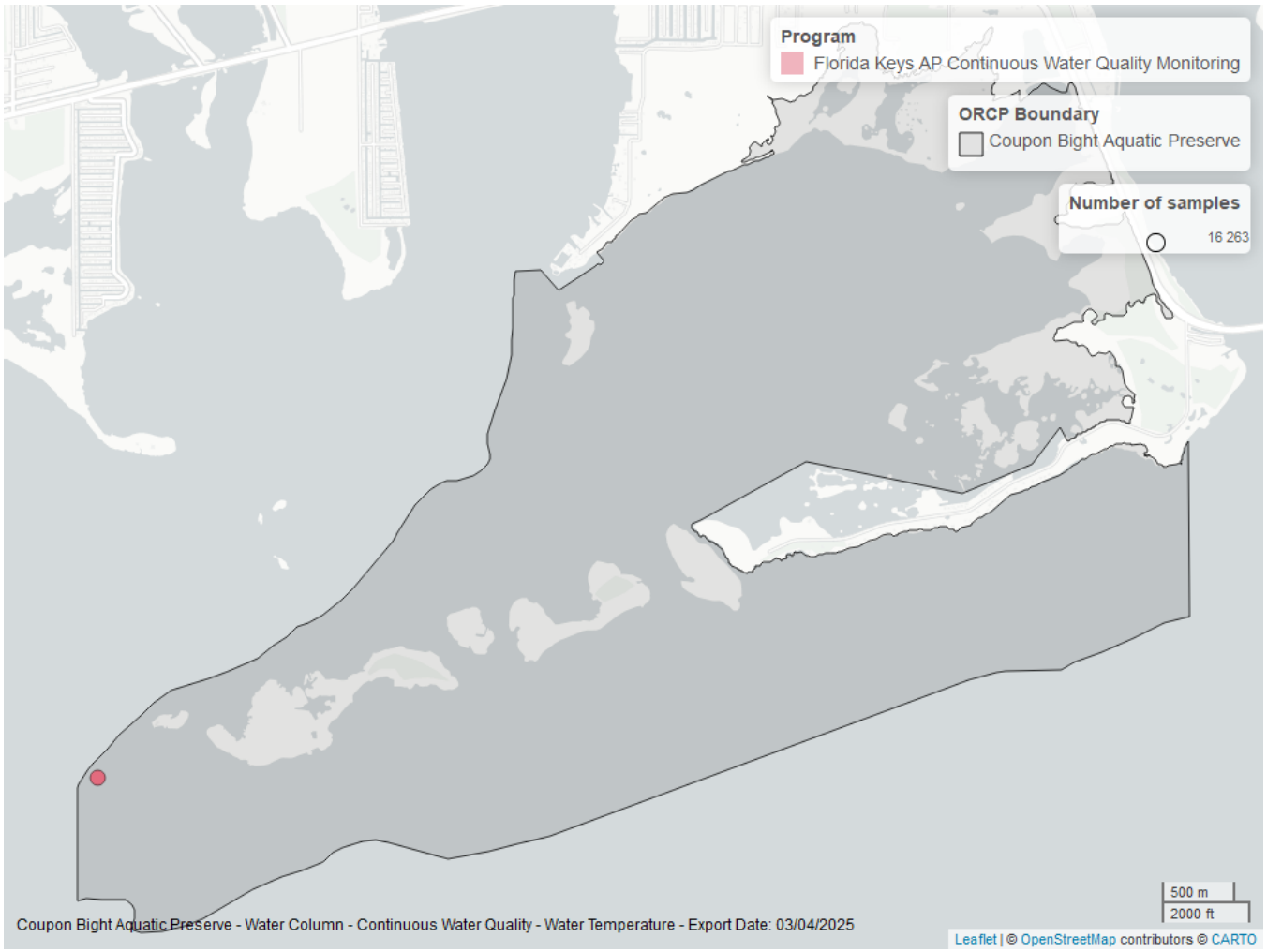

Figure 29: Map showing location of water temperature continuous water quality sampling locations within the boundaries of *Coupon Bight Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Coral Reef

The data file used is: **All_CORAL_Parameters-2025-Mar-06.txt**
Species Richness

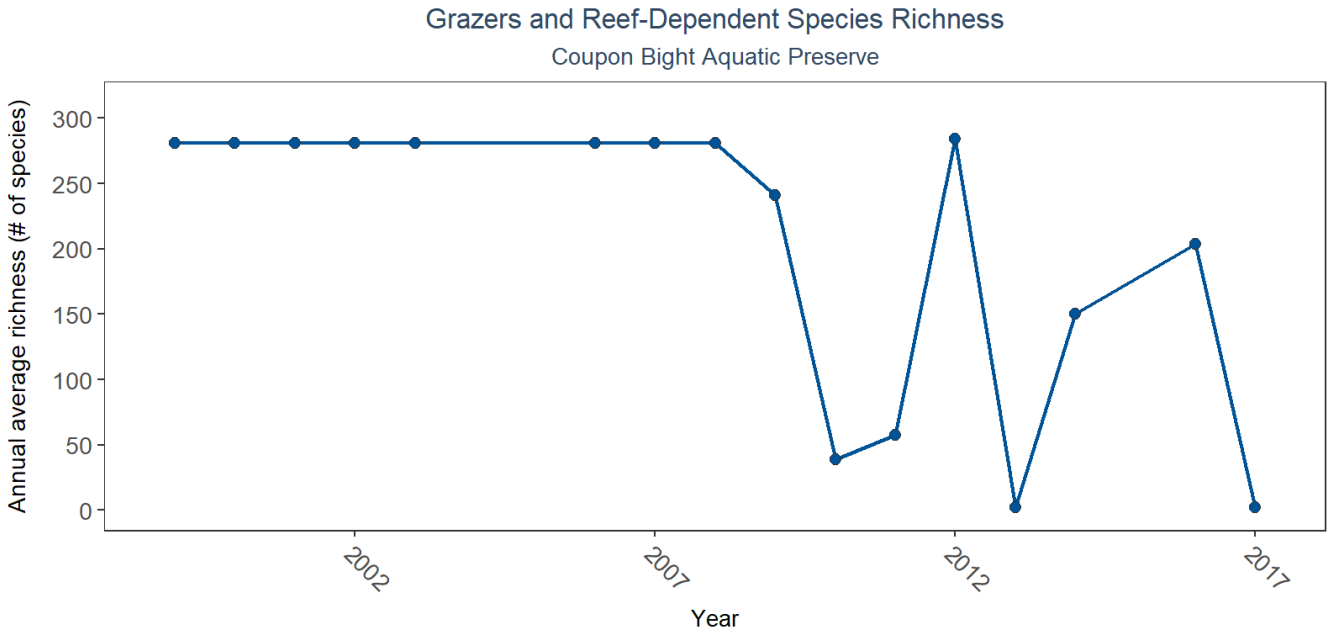

Figure 30: Line graph of annual average species richness of grazers and reef-dependent species over time. If the time series included more than one year of observations, a line connects the data points for visualization.

Table 29: Coral Species Richness

Sample Count	*Number of Years*	*Period of Record*	*Median N of Taxa*	*Mean N of Taxa*
72	16	1999 - 2017	281	182.125

The median annual number of taxa was 281 based on 72 observations collected between 1999 and 2017.

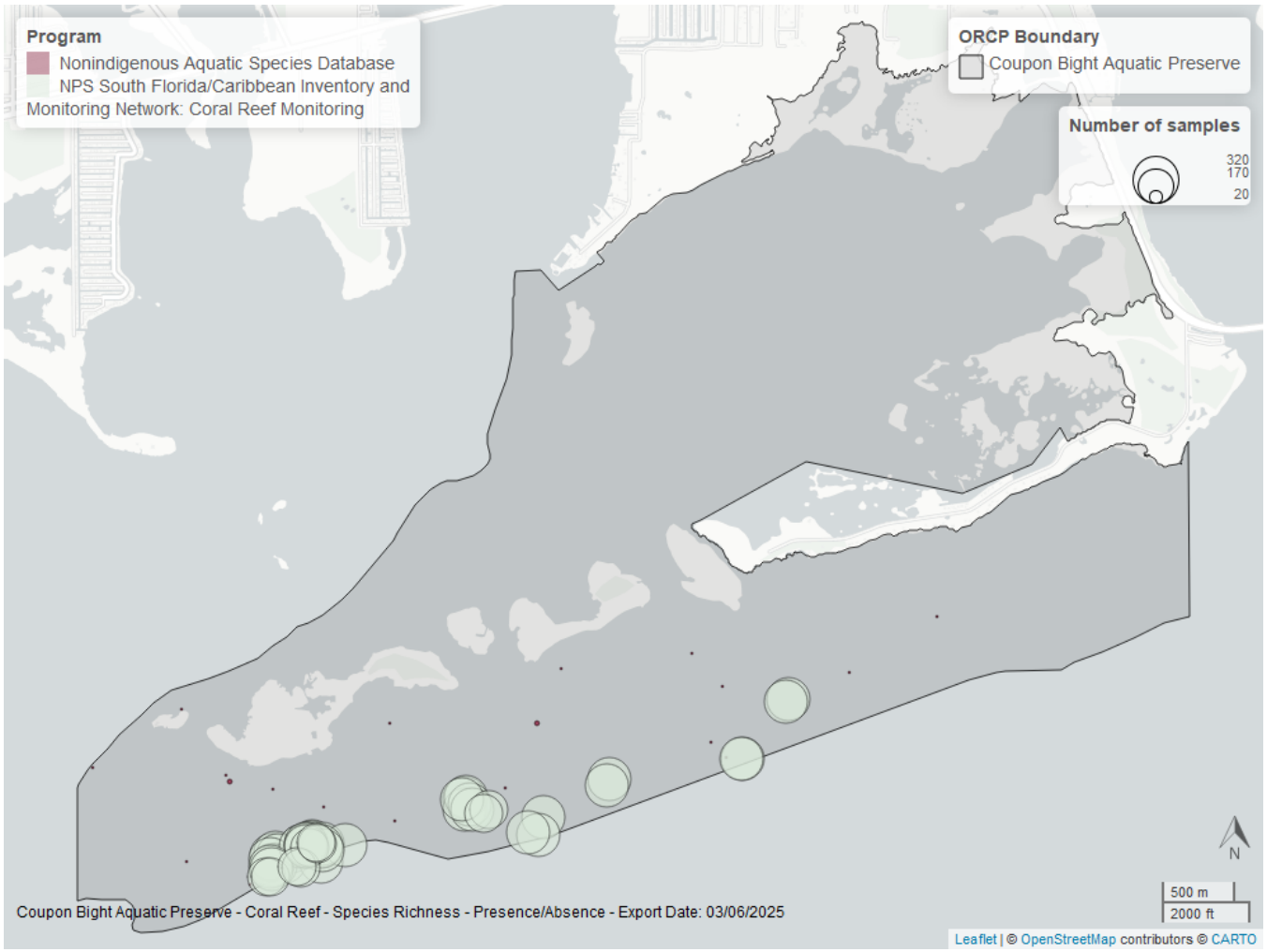

Figure 31: Map showing location of coral species richness sampling locations within the boundaries of *Coupon Bight Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Species list

Abudefduf saxatilis[1]
Acanthemblemaria aspera[1]
Acanthemblemaria chaplini[1]
Acanthemblemaria maria[1]
Acanthemblemaria spinosa[1]
Acanthocybium solandri
Acanthostracion polygonium[1]
Acanthostracion quadricornis[1]
Acanthurus bahianus[1]
Acanthurus chirurgus[1]
Acanthurus coeruleus[1]
Acanthurus sp.[1]
Acropora cervicornis[2]
Acropora palmata[2]
Actiniaria
Aetobatus narinari
Agaricia agaricites[2]
Agaricia fragilis[2]
Agaricia grahamae[2]
Agaricia humilis[2]
Agaricia lamarcki[2]
Agaricia spp.
Agaricia undata[2]
Agelas clathrodes
Agelas conifera
Agelas dispar
Agelas schmidtii
Agelas wiedenmayeri
Ahlia egmontis
Aiolochroia crassa
Albula vulpes
Alcyonacea sp.[2]
Alectis ciliaris[1]
Alphestes afer[1]
Aluterus monoceros[1]
Aluterus schoepfii[1]
Aluterus scriptus[1]
Aluterus sp.[1]
Amblycirrhitus pinos[1]
Amphimedon compressa
Amphimedon viridis
Amphiroa spp.
Anchoa lyolepis
Anisotremus surinamensis[1]
Anisotremus virginicus[1]
Antillogorgia acerosa[2]
Antillogorgia americana[2]
Antillogorgia bipinnata[2]
Antillogorgia kallos[2]
Antillogorgia rigida[2]
Aplysina archeri
Aplysina cauliformis
Aplysina fistularis
Aplysina fulva
Epinephelus drummondhayi[1]
Epinephelus guttatus[1]
Epinephelus itajara[1]
Epinephelus morio[1]
Epinephelus striatus[1]
Eques lanceolatus[1]
Equetus punctatus[1]
Erylus formosus
Erythropodium caribaeorum[2]
Eucinostomus argenteus
Eucinostomus gula
Eucinostomus jonesii
Eunicea calyculata[2]
Eunicea flexuosa[2]
Eunicea fusca[2]
Eunicea knighti[2]
Eunicea laciniata[2]
Eunicea laxispica[2]
Eunicea mammosa[2]
Eunicea palmeri[2]
Eunicea succinea[2]
Eunicea tourneforti[2]
Eusmilia fastigiata[2]
Euthynnus alletteratus
Favia fragum[2]
Fine turf
Fistularia tabacaria[1]
Fowlerichthys ocellatus[1]
Galaxaura spp.
Geodia gibberosa
Geodia neptuni
Gerres cinereus
Ginglymostoma cirratum
Gnatholepis thompsoni[1]
Gobioclinus bucciferus[1]
Gobioclinus filamentosus[1]
Gobioclinus gobio[1]
Gobioclinus kalisherae[1]
Gobiosoma sp.[1]
Gorgonia flabellum[2]
Gorgonia mariae[2]
Gorgonia ventalina[2]
Gramma loreto[1]
Gymnothorax funebris[1]
Gymnothorax miliaris[1]
Gymnothorax moringa[1]
Gymnothorax nigromarginatus[1]
Gymnothorax saxicola[1]
Gymnothorax vicinus[1]
Haemulon album[1]
Haemulon aurolineatum[1]
Haemulon carbonarium[1]
Haemulon flavolineatum[1]
Haemulon macrostomum[1]
Oligoplites saurus[1]
Ophioblennius macclurei[1]
Opistognathus aurifrons
Opistognathus macrognathus
Opistognathus sp.
Opistognathus whitehursti
Orbicella annularis[2]
Orbicella faveolata[2]
Orbicella franksi[2]
Orthopristis chrysoptera[1]
Other calcareous macroalgae
Other fleshy macroalgae
Other green algae
Oxyurichthys stigmalophius[1]
Pagrus pagrus[1]
Palythoa mammillosa
Pandaros acanthifolium
Parablennius marmoreus[1]
Paraclinus marmoratus[1]
Paraclinus nigripinnis[1]
Paralichthys albigutta[1]
Paranthias furcifer[1]
Pareques acuminatus[1]
Pareques umbrosus[1]
Pempheris schomburgkii[1]
Penicillus spp.
Peyssonnelia
Phaeoptyx xenus[1]
Phorbas sp.
Phyllangia americana[2]
Phymanthus crucifer
Plakortis angulospiculatus
Plexaura homomalla[2]
Plexaura kuna[2]
Plexaurella dichotoma[2]
Plexaurella grandiflora[2]
Plexaurella grisea[2]
Plexaurella nutans[2]
Pomacanthus arcuatus[1]
Pomacanthus paru[1]
Porifera
Porifera spp.
Porites astreoides[2]
Porites branneri[2]
Porites colonensis[2]
Porites divaricata[2]
Porites furcata[2]
Porites porites[2]
Porites spp.[2]
Priacanthus arenatus[1]
Priolepis hipoliti[1]
Prionotus ophryas[1]
Pristipomoides aquilonaris[1]
Pristis pectinata

Aplysina lacunosa
Apogon aurolineatus[1]
Apogon binotatus[1]
Apogon maculatus[1]
Apogon phenax[1]
Apogon pseudomaculatus[1]
Apogon quadrisquamatus[1]
Apogon townsendi[1]
Archosargus probatocephalus[1]
Archosargus rhomboidalis[1]
Arturia canariensis
Astrapogon puncticulatus[1]
Astrapogon sp.[1]
Astrapogon stellatus[1]
Astroscopus guttatus
Atherinomorus stipes
Aulostomus maculatus[1]
Axinellida
Azurina cyanea[1]
Balistes capriscus[1]
Balistes sp.[1]
Balistes vetula[1]
Bare substrate
Bartholomea annulata
Blenniidae sp.[1]
Bodianus pulchellus[1]
Bodianus rufus[1]
Bollmannia boqueronensis[1]
Bothus lunatus[1]
Bothus ocellatus[1]
Brachygenys chrysargyreum[1]
Branching gorgonian[2]
Briareum asbestinum[2]
Brockius nigricinctus[1]
Brotula barbata
Brown algae
Bryozoa
Calamus bajonado[1]
Calamus calamus[1]
Calamus nodosus[1]
Calamus penna[1]
Calamus proridens[1]
Calcareous green algae
Callionymus bairdi[1]
Callyspongia (Callyspongia) fallax
Callyspongia (Cladochalina) aculeata
Callyspongia (Cladochalina) plicifera
Callyspongia (Cladochalina) tenerrima
Calyx podatypa
Cantherhines macrocerus[1]
Cantherhines pullus[1]
Canthidermis sufflamen[1]
Canthigaster rostrata[1]
Caranx bartholomaei[1]
Caranx crysos[1]
Caranx hippos[1]
Caranx latus[1]
Haemulon melanurum[1]
Haemulon parra[1]
Haemulon plumierii[1]
Haemulon sciurus[1]
Haemulon sp.[1]
Haemulon striatum[1]
Haemulon vittatum[1]
Halichoeres bivittatus[1]
Halichoeres caudalis[1]
Halichoeres cyanocephalus[1]
Halichoeres garnoti[1]
Halichoeres maculipinna[1]
Halichoeres pictus[1]
Halichoeres poeyi[1]
Halichoeres radiatus[1]
Haliclona (Reneira) aquaeductus
Haliclona (Reniera) tubifera
Haliclona sp.
Halimeda spp.
Halisarca sp.
Harengula humeralis
Harengula jaguana
Helioseris cucullata[2]
Hemiemblemaria simula[1]
Hemiramphus brasiliensis
Heteroconger longissimus
Heteropriacanthus cruentatus[1]
Higginsia strigilata
Hippocampus erectus[1]
Hippospongia sp.
Holacanthus bermudensis[1]
Holacanthus ciliaris[1]
Holacanthus tricolor[1]
Holocentrus adscensionis[1]
Holocentrus rufus[1]
Hypanus americanus
Hypleurochilus bermudensis[1]
Hypoatherina harringtonensis
Hypoplectrus chlorurus[1]
Hypoplectrus gemma[1]
Hypoplectrus guttavarius[1]
Hypoplectrus hybrid[1]
Hypoplectrus indigo[1]
Hypoplectrus nigricans[1]
Hypoplectrus puella[1]
Hypoplectrus sp.[1]
Hypoplectrus tann[1]
Hypoplectrus unicolor[1]
Hyporthodus flavolimbatus[1]
Hyporthodus niveatus[1]
Hyrtios violaceus
Iciligorgia schrammi[2]
Iotrochota birotulata
Ircinia campana
Ircinia felix
Ircinia strobilina
Ircinia variabilis
Prognathodes aculeatus[1]
Pseudobatos lentiginosus
Pseudodiploria clivosa[2]
Pseudodiploria strigosa[2]
Pseudoplexaura crucis[2]
Pseudoplexaura flagellosa[2]
Pseudoplexaura porosa[2]
Pseudoplexaura wagenaari[2]
Pseudupeneus maculatus[1]
Ptereleotris calliura
Ptereleotris helenae
Pterogorgia anceps[2]
Pterogorgia citrina[2]
Pterogorgia guadalupensis[2]
Pterois miles[1]
Pterois volitans[1]
Ptilocaulis sp.
Rachycentron canadum
Razorfish sp.[1]
Red calcareous branching algae
Red frondose algae
Remora remora
Rhodactis osculifera
Rhomboplites aurorubens[1]
Ricordea florida
Rubble
Rypticus maculatus[1]
Rypticus saponaceus[1]
Sand-sand
Sand on hard-bottom
Sardinella aurita
Sargassum spp.
Sargocentron coruscum[1]
Sargocentron vexillarium[1]
Scartella cristata[1]
Scarus coelestinus[1]
Scarus coeruleus[1]
Scarus guacamaia[1]
Scarus iseri[1]
Scarus sp.[1]
Scarus taeniopterus[1]
Scarus vetula[1]
Schultzea beta[1]
Scleractinia[2]
Scolymia sp.
Scolymia spp.[2]
Scomberomorus cavalla
Scomberomorus maculatus
Scomberomorus regalis
Scopalina ruetzleri
Scorpaena plumieri[1]
Scorpaenodes caribbaeus[1]
Selachii
Selene vomer[1]
Seriola dumerili[1]
Seriola rivoliana[1]
Seriola sp.[1]

Caranx lugubris[1]
Caranx ruber[1]
Caranx sp.[1]
Carcharhinus falciformis
Carcharhinus leucas
Carcharhinus limbatus
Carcharhinus perezii
Centropomus undecimalis
Centropyge argi[1]
Cephalopholis cruentata[1]
Cephalopholis fulva[1]
Chaenopsis limbaughi[1]
Chaetodipterus faber
Chaetodon capistratus[1]
Chaetodon ocellatus[1]
Chaetodon sedentarius[1]
Chaetodon striatus[1]
Chilomycterus antennatus[1]
Chilomycterus reticulatus[1]
Chilomycterus schoepfii[1]
Chloroscombrus chrysurus[1]
Chondrilla nucula
Chondrosia sp.
Chriodorus atherinoides
Chromis enchrysurus[1]
Chromis insolata[1]
Chromis multilineata[1]
Chromis scotti[1]
Cinachyra sp.
Cladocora arbuscula[2]
Clathria (Thalysias) venosa
Clathria (Thalysias) virgultosa
Clathria sp.
Clepticus parrae[1]
Cliona caribbaea
Cliona delitrix
Cliona sp.
Cliona spp.
Cliona varians
Colpophyllia natans[2]
Condylactis gigantea
Corallimorpharians
Coryphopterus dicrus[1]
Coryphopterus eidolon[1]
Coryphopterus glaucofraenum[1]
Coryphopterus lipernes[1]
Coryphopterus personatus[1]
Coryphopterus punctipectophorus[1]
Coryphopterus sp.[1]
Cribrochalina vasculum
Crustose coralline algae
Cryptotomus roseus[1]
Ctenogobius saepepallens[1]
Cyanobacteria
Dactylopterus volitans
Decapterus macarellus[1]
Decapterus punctatus[1]
Isophyllia rigida[2]
Isophyllia sinuosa[2]
Istiophorus platypterus
Jania spp.
Jenkinsia sp.
Kallymenia spp.
Kyphosus sectatrix[1]
Labrisomidae sp.[1]
Labrisomus nuchipinnis[1]
Lachnolaimus maximus[1]
Lactophrys bicaudalis[1]
Lactophrys trigonus[1]
Lactophrys triqueter[1]
Lagodon rhomboides[1]
Laurencia spp.
Lebrunia neglecta
Liagora spp.
Liopropoma eukrines[1]
Liopropoma mowbrayi[1]
Liopropoma rubre[1]
Lobophora spp.
Lutjanus analis[1]
Lutjanus apodus[1]
Lutjanus buccanella[1]
Lutjanus cyanopterus[1]
Lutjanus griseus[1]
Lutjanus jocu[1]
Lutjanus mahogoni[1]
Lutjanus synagris[1]
Madracis carmabi[2]
Madracis decactis[2]
Madracis formosa[2]
Madracis myriaster[2]
Madracis senaria[2]
Malacanthus plumieri
Malacoctenus aurolineatus[1]
Malacoctenus gilli[1]
Malacoctenus macropus[1]
Malacoctenus triangulatus[1]
Malacoctenus versicolor[1]
Manicina areolata[2]
Meandrina meandrites[2]
Megalops atlanticus
Melichthys niger[1]
Menidia sp.
Microgobius carri[1]
Microgobius microlepis[1]
Microspathodon chrysurus[1]
Millepora alcicornis[2]
Millepora complanata[2]
Mobula birostris
Monacanthus ciliatus[1]
Monacanthus tuckeri[1]
Monanchora arbuscula
Montastraea cavernosa[2]
Mulloidichthys martinicus[1]
Muraena retifera[1]
Serranid sp.[1]
Serranus annularis[1]
Serranus baldwini[1]
Serranus phoebe[1]
Serranus subligarius[1]
Serranus tabacarius[1]
Serranus tigrinus[1]
Serranus tortugarum[1]
Siderastrea radians[2]
Siderastrea siderea[2]
Silt on hard-bottom
Siphonodictyon coralliphagum
Siphonodictyon siphonum
Snapper sp.[1]
Solenastrea bournoni[2]
Solenastrea hyades[2]
Sparidae sp.[1]
Sparisoma atomarium[1]
Sparisoma aurofrenatum[1]
Sparisoma chrysopterum[1]
Sparisoma radians[1]
Sparisoma rubripinne[1]
Sparisoma sp.[1]
Sparisoma viride[1]
Spheciospongia vesparium
Sphoeroides[1]
Sphoeroides spengleri[1]
Sphoeroides testudineus[1]
Sphyraena barracuda[1]
Sphyraena guachancho
Sphyraena picudilla
Sphyrna lewini
Sphyrna mokarran
Sphyrna tiburo
Spirastrella coccinea
Spirastrella mollis
Spongia sp.
Squirrelfish sp.[1]
Stegastes adustus[1]
Stegastes diencaeus[1]
Stegastes leucostictus[1]
Stegastes partitus[1]
Stegastes planifrons[1]
Stegastes sp.[1]
Stegastes variabilis[1]
Stephanocoenia intersepta[2]
Stephanolepis hispida[1]
Stichodactyla helianthus
Strongylacidon sp.
Strongylura notata[1]
Strongylura timucu
Stygnobrotula latebricola
Stypopodium spp.
Syacium micrurum[1]
Syngnathus scovelli[1]
Synodus foetens[1]
Synodus intermedius[1]

Decapterus sp.[1]
Dendrogyra cylindrus[2]
Dermatolepis inermis[1]
Desmapsamma anchorata
Diadema antillarum
Dichocoenia stokesii[2]
Dictyota spp.
Diodon holocanthus[1]
Diodon hystrix[1]
Diodon sp.[1]
Diplastrella megastellata
Diplectrum formosum[1]
Diplodus argenteus[1]
Diplodus holbrookii[1]
Diploria labyrinthiformis[2]
Discosoma carlgreni
Doratonotus megalepis[1]
Dragmacidon lunaecharta
Dysidea etheria
Dysidea fragilis
Dysidea janiae
Echeneis naucrates
Echeneis neucratoides
Ectyoplasia ferox
Elacatinus dilepis[1]
Elacatinus evelynae[1]
Elacatinus horsti[1]
Elacatinus oceanops[1]
Elacatinus randalli[1]
Elacatinus xanthiprora[1]
Elagatis bipinnulata[1]
Elops saurus
Emblemaria pandionis[1]
Emblemariopsis bahamensis[1]
Emmelichthyops atlanticus[1]
Enchelycore nigricans[1]
Encrusting gorgonian[2]
Enneanectes altivelis
Enneanectes boehlkei
Epinephelus adscensionis[1]
Muricea atlantica[2]
Muricea elongata[2]
Muricea laxa[2]
Muricea muricata[2]
Muricea pinnata[2]
Muriceopsis flavida[2]
Mussa angulosa[2]
Mycale (Mycale) laevis
Mycale sp.
Mycetophyllia aliciae[2]
Mycetophyllia danaana[2]
Mycetophyllia ferox[2]
Mycetophyllia lamarckiana[2]
Mycetophyllia spp.[2]
Mycteroperca acutirostris[1]
Mycteroperca bonaci[1]
Mycteroperca interstitialis[1]
Mycteroperca microlepis[1]
Mycteroperca phenax[1]
Mycteroperca tigris[1]
Mycteroperca venenosa[1]
Myrichthys breviceps
Myrichthys ocellatus
Myripristis jacobus[1]
Narcine bancroftii
Needlefish sp.
Negaprion brevirostris
Neofibularia nolitangere
Neoniphon marianus[1]
Neopetrosia carbonaria
Nes longus[1]
Nicholsina usta[1]
Niphates amorpha
Niphates digitalis
Niphates erecta
Oculina diffusa[2]
Oculina sp.
Ocyurus chrysurus[1]
Odontoscion dentex[1]
Ogcocephalus sp.
Synodus synodus[1]
Tectitethya crypta
Tedania (Tedania) ignis
Tethya diploderma
Thalassoma bifasciatum[1]
Thick turf
Tigrigobius macrodon[1]
Tigrigobius saucrus[1]
Trachinotus falcatus[1]
Trachyteleia hispida
Tunicata
Turf algae free of sediment
Turf algae with sediment
Tylosurus crocodilus
Udotea spp.
Umbrina coroides[1]
Unidentified species
Unknown black smooth encrusting sponge
Unknown bowling ball sponge
Unknown brown encrusting sponge
Unknown brown smooth sponge
Unknown brown tube sponge
Unknown brown vein sponge
Unknown green encrusting sponge
Unknown olive sponge
Unknown orange encrusting sponge
Unknown orange massive sponge
Unknown pink lumpy sponge
Unknown red encrusting sponge
Unknown red lumpy tube sponge
Unknown red squishy sponge
Urobatis jamaicensis
Verongula gigantea
Verongula reiswigi
Verongula rigida
Xestospongia muta
Xyrichtys martinicensis[1]
Xyrichtys novacula[1]
Xyrichtys splendens[1]
Zoanthids

1 - Coral Reef - Species Richness, 2 - Coral Reef - Percent Cover

References

1. U.S. Environmental Protection Agency (EPA). EPA STOrage and RETrieval Data Warehouse (STORET)/WQX. (2023).
2. Florida International University (FIU). Florida Keys National Marine Sanctuary Water Quality Monitoring Project. (2023).
3. Florida Department of Environmental Protection (DEP). Florida STORET / WIN. (2024).
4. Florida Fish and Wildlife Conservation Commission (FWC). Fisheries-Independent Monitoring (FIM) Program. (2022).
5. U.S. Environmental Protection Agency (EPA); Office of Water; National Oceanic and Atmospheric Administration (NOAA); U.S. Geological Survey (USGS); U.S. Fish and Wildlife Service (USFWS); National Estuary Program (NEP); coastal states. National Aquatic Resource Surveys, National Coastal Condition Assessment. (2021).
6. Florida Fish and Wildlife Conservation Commission (FWC); Florida Fish and Wildlife Research Institute (FWRI). Harmful Algal Bloom Marine Observation Network. (2018).
7. Mote Marine Laboratory. Florida Keys Bleach Watch. (2023).
8. Florida Department of Environmental Protection (DEP); Office of Resilience and Coastal Protection (RCP); Florida Keys Aquatic Preserves. Florida Keys Aquatic Preserves Continuous Water Quality Monitoring. (2024).