Kristin Jacobs Coral Aquatic Preserve

SEACAR Habitat Analyses

Last compiled on 08 October, 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-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*

Dissolved Oxygen - Discrete

Seasonal Kendall-Tau Trend Analysis

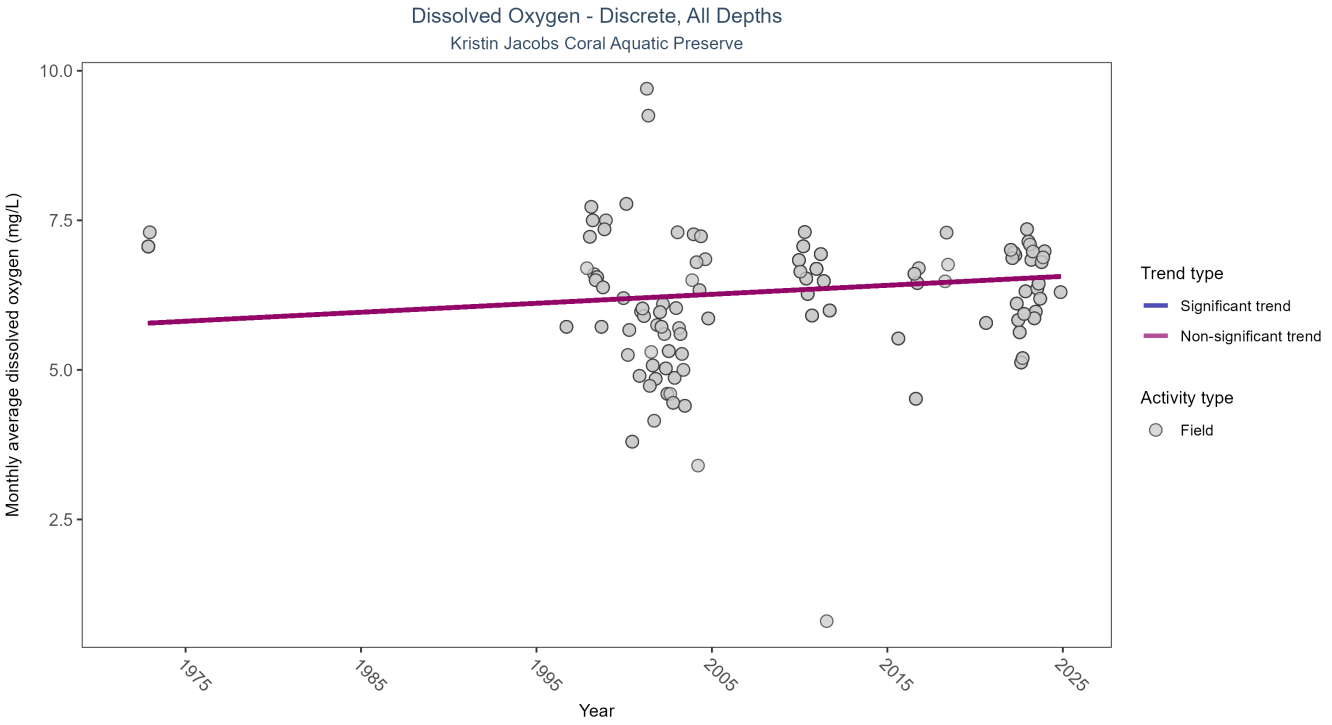

Figure 1: Scatter plot of monthly average dissolved oxygen over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen values measured in the field (circles) are included in the plot.

Table 6: 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	735	20	1972 - 2024	6.49	0.1201	5.7684	0.015	0.241

Dissolved oxygen showed no detectable trend between 1972 and 2024.

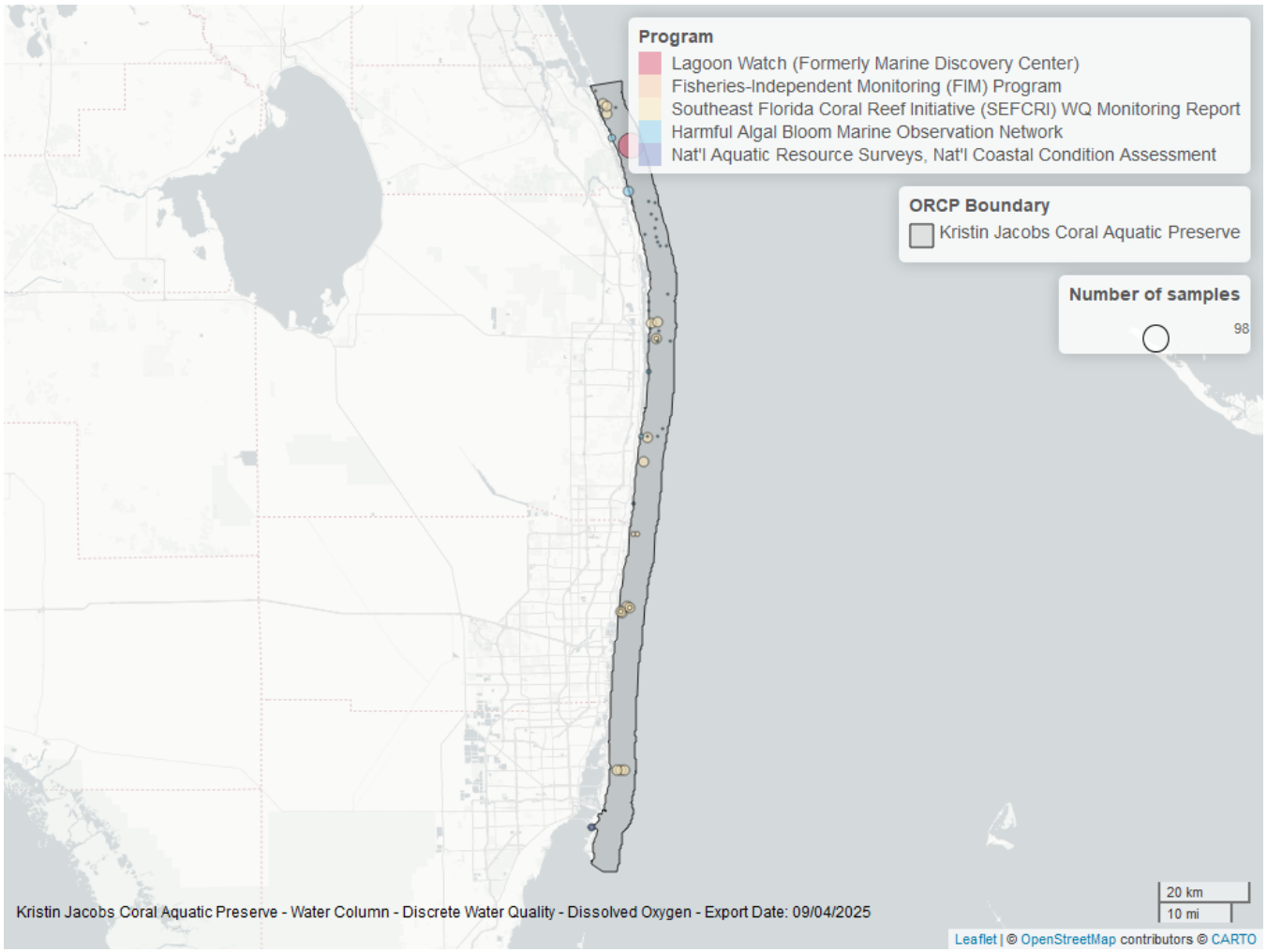

Figure 2: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 7: Programs contributing data for Dissolved Oxygen

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	805	1996	2023
5058	266	2009	2011
3001	98	1999	2003
95	71	1972	2018
118	14	2015	2020
69	5	1998	2024
103	4	2015	2015

Program names:

69 - Fisheries-Independent Monitoring (FIM) Program[1]
95 - Harmful Algal Bloom Marine Observation Network[2]
103 - EPA STOrage and RETrieval Data Warehouse (STORET)/WQX[3]
118 - National Aquatic Resource Surveys, National Coastal Condition Assessment[4]
3001 - Lagoon Watch (Formerly Marine Discovery Center)[5]

5002 - Florida STORET / WIN[6]
5058 - Southeast Florida Coral Reef Initiative (SEFCRI) Water Quality Monitoring Report[7]

Dissolved Oxygen Saturation - Discrete

Seasonal Kendall-Tau Trend Analysis

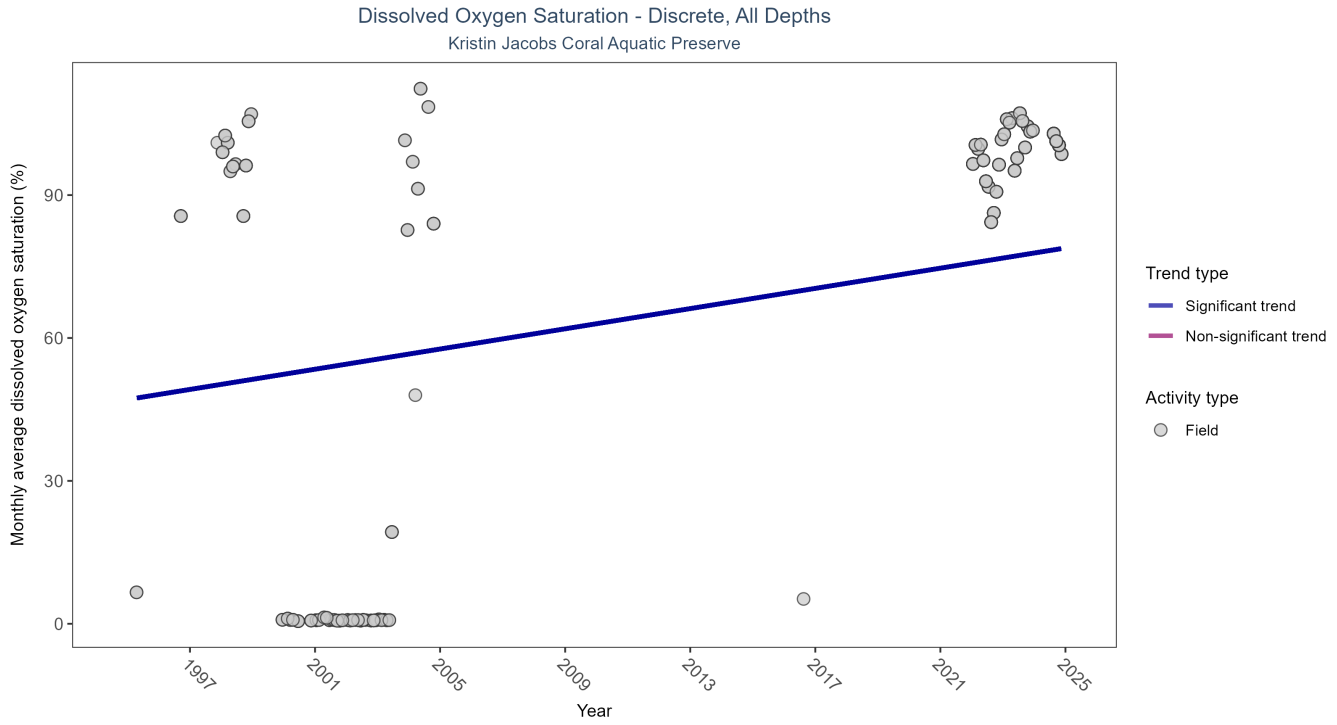

Figure 3: Scatter plot of monthly average dissolved oxygen saturation over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only dissolved oxygen saturation values measured in the field (circles)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

Table 8: 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	Significantly increasing trend	1012	14	1995 - 2024	101.1	0.3419	47.077	1.0608	0.0008

Monthly average dissolved oxygen saturation increased by 1.06% per year.

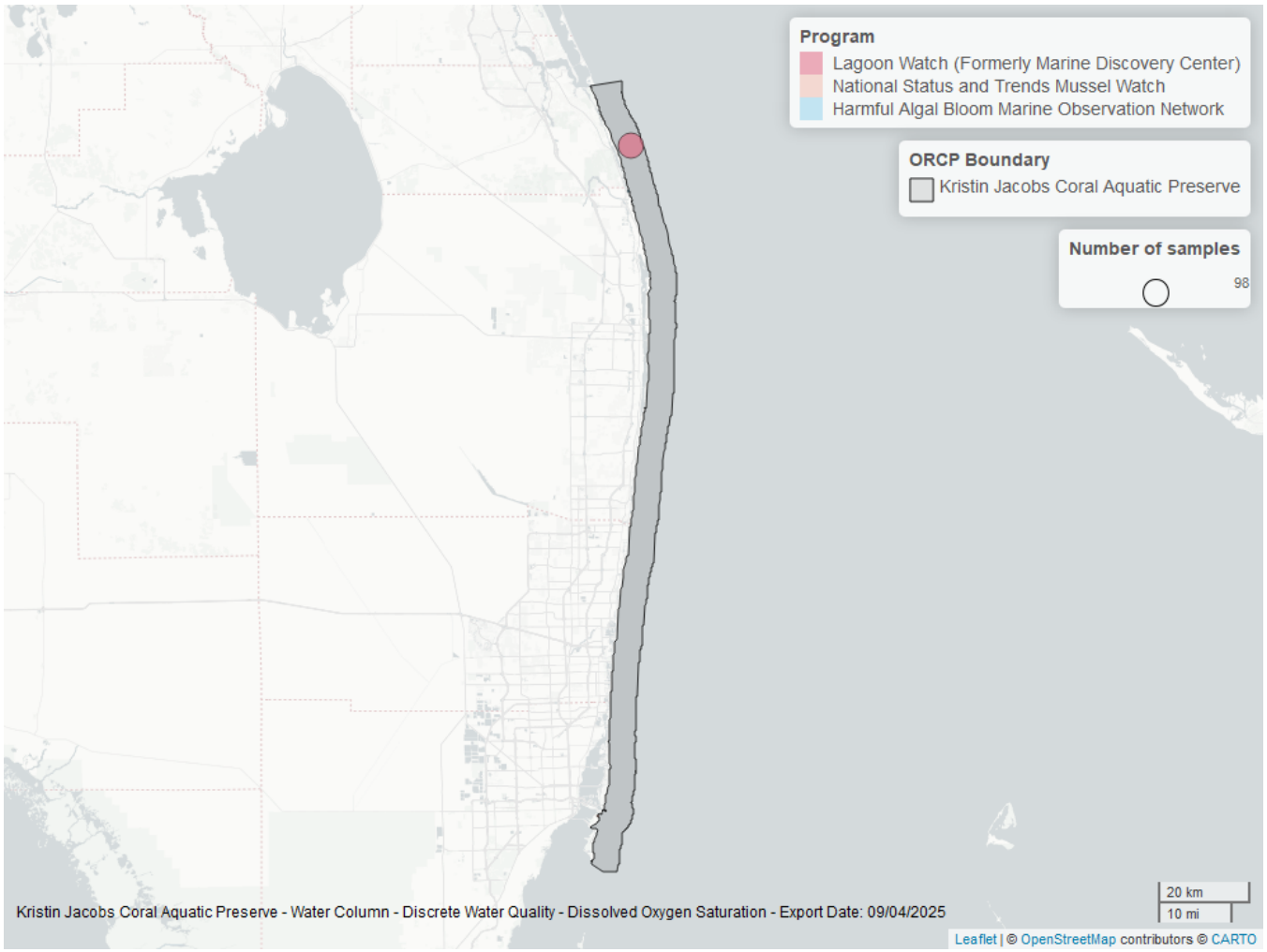

Figure 4: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 9: Programs contributing data for Dissolved Oxygen Saturation

ProgramID	*N_Data*	*YearMin*	*YearMax*
5033	634	2024	2024
5002	277	1996	2023
3001	98	1999	2003
102	2	1995	1995
95	1	2016	2016

Program names:

95 - Harmful Algal Bloom Marine Observation Network[2]
102 - National Status and Trends Mussel Watch[8]
3001 - Lagoon Watch (Formerly Marine Discovery Center)[5]
5002 - Florida STORET / WIN[6]
5033 - Southeast Florida Water Quality Assessment Survey[9]

pH - Discrete

Seasonal Kendall-Tau Trend Analysis

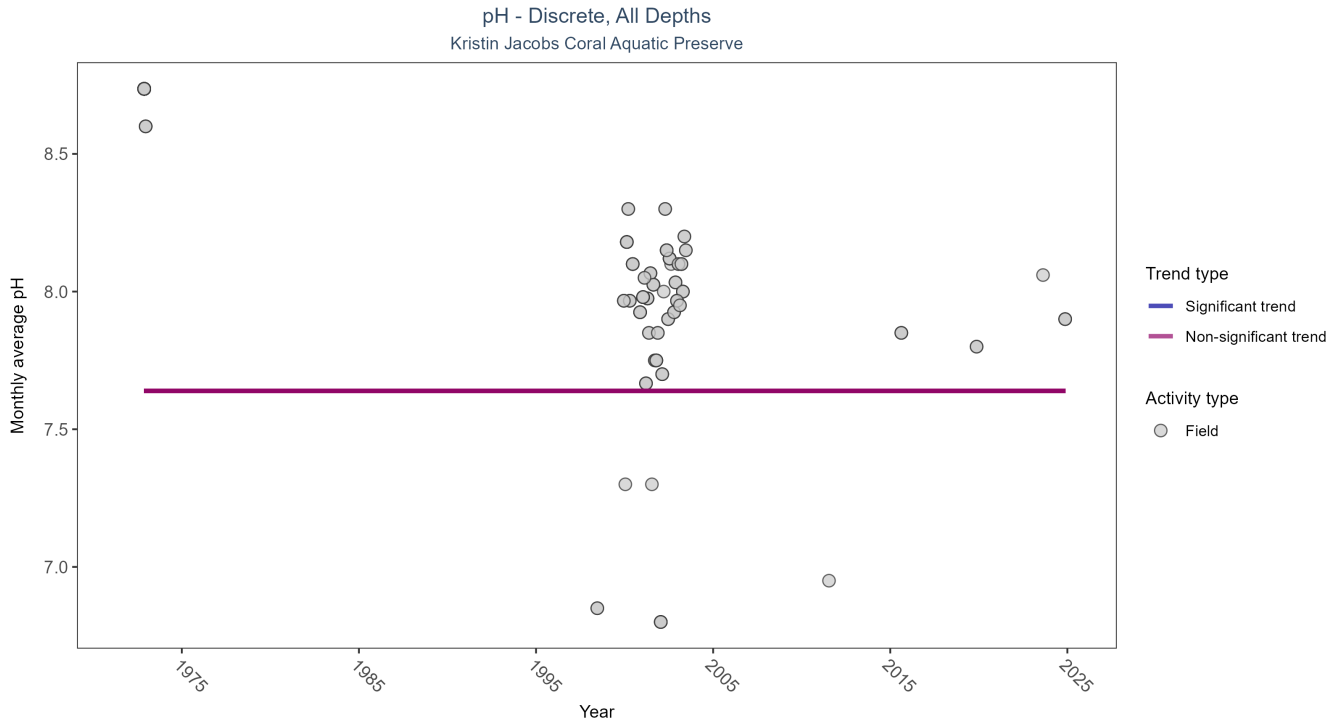

Figure 5: Scatter plot of monthly average pH over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only pH values measured in the field (circles) are included in the plot.

Table 10: 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	No significant trend	178	12	1972 - 2024	8.2	0.0603	7.6392	0	1

pH showed no detectable trend between 1972 and 2024.

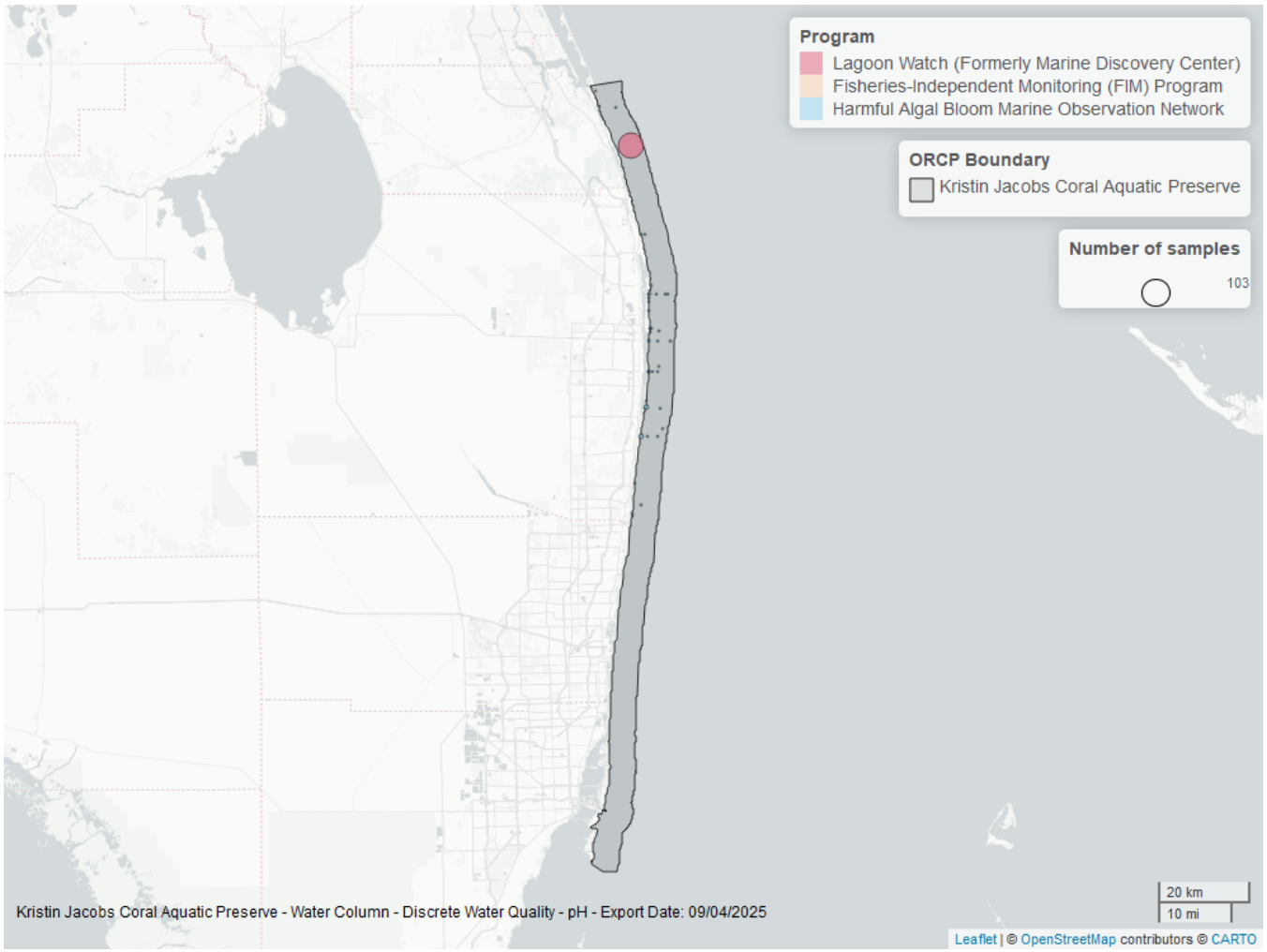

Figure 6: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 11: Programs contributing data for pH

ProgramID	*N_Data*	*YearMin*	*YearMax*
3001	103	1999	2003
95	65	1972	1972
69	7	1998	2024
103	3	2015	2015
5002	2	2011	2023

Program names:

69 - Fisheries-Independent Monitoring (FIM) Program[1]
95 - Harmful Algal Bloom Marine Observation Network[2]
103 - EPA STOrage and RETrieval Data Warehouse (STORET)/WQX[3]
3001 - Lagoon Watch (Formerly Marine Discovery Center)[5]
5002 - Florida STORET / WIN[6]

Salinity - Discrete

Seasonal Kendall-Tau Trend Analysis

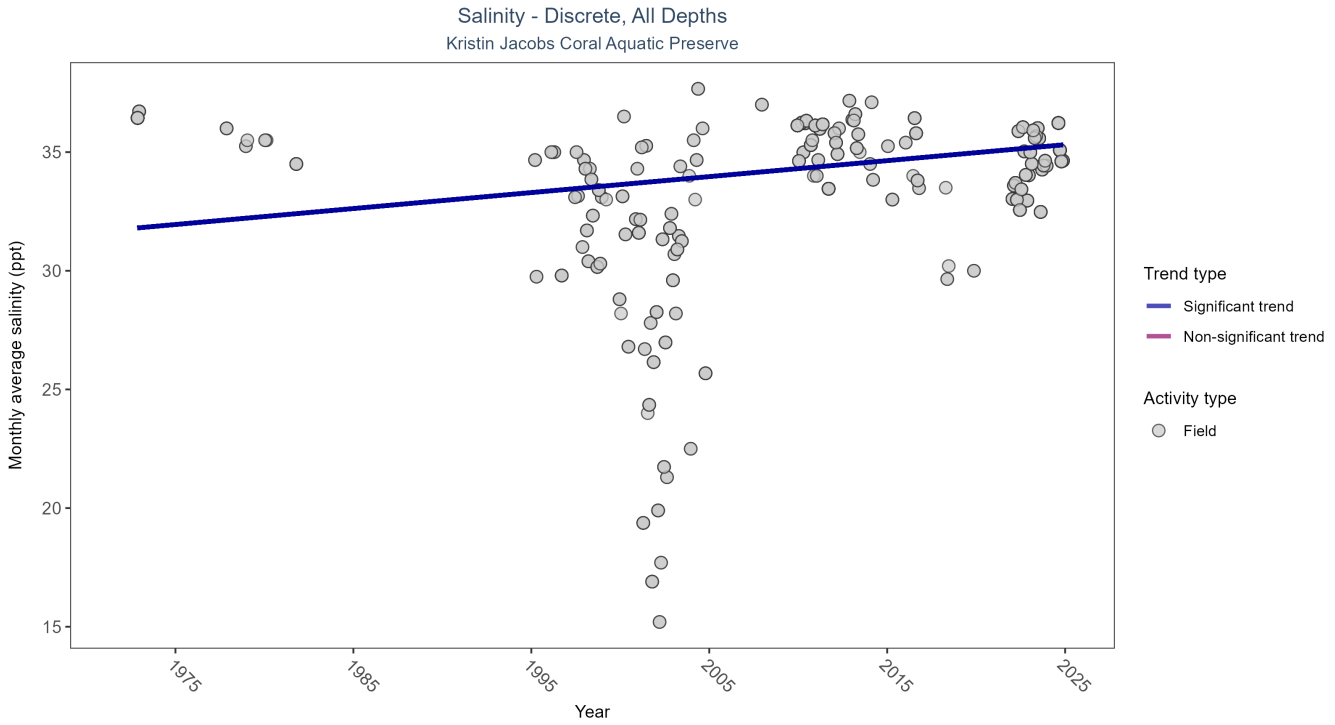

Figure 7: Scatter plot of monthly average salinity over time. If the time series included ten or more years of discrete observations, significant (blue) or non-significant (magenta) trend lines are also shown. Discrete salinity values derived from grab samples analyzed in the field (circles) or the laboratory (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	1545	31	1972 - 2024	35.78	0.1999	31.7474	0.0673	0.0044

Monthly average salinity increased by 0.07 ppt per year.

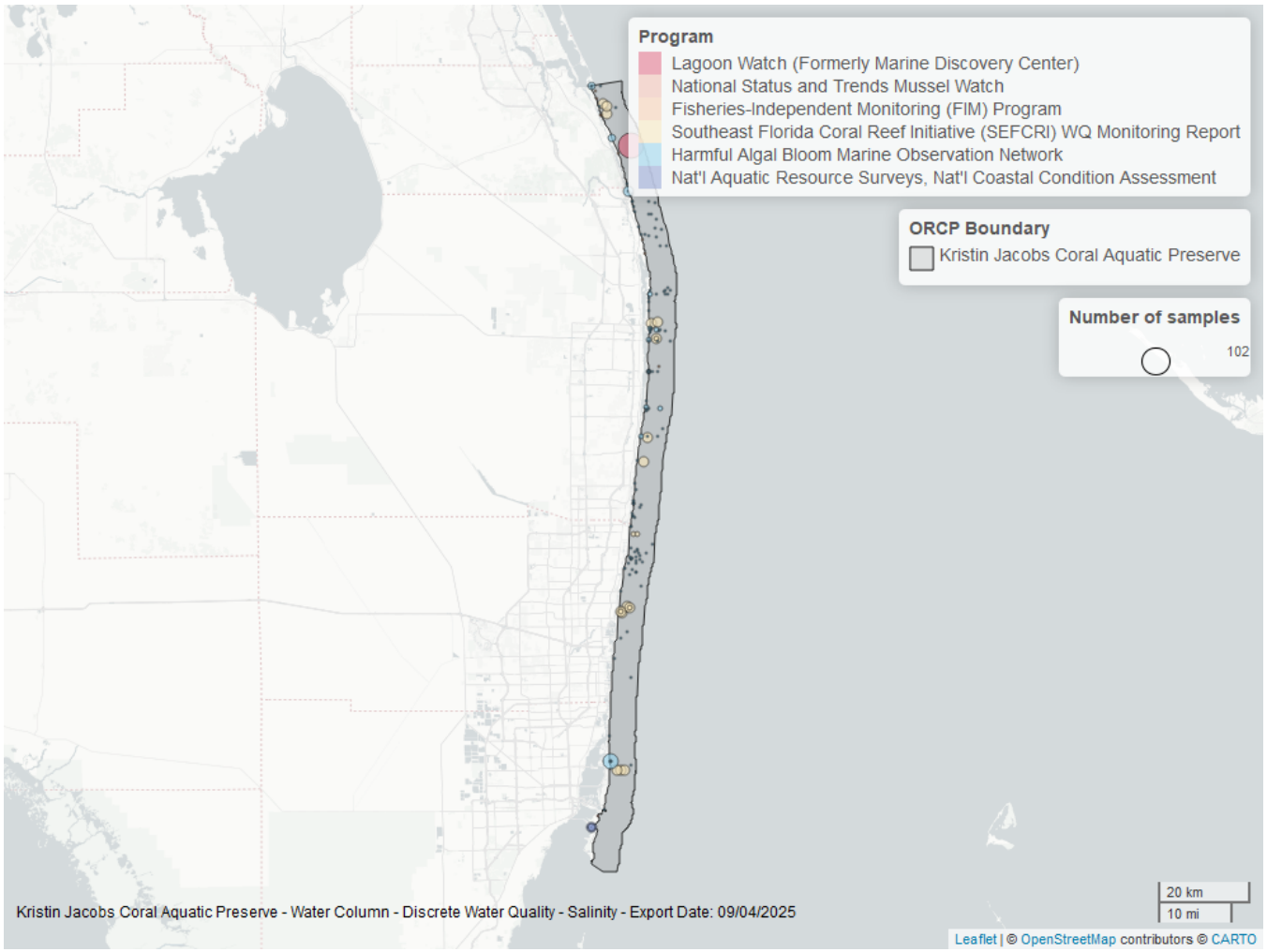

Figure 8: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 13: Programs contributing data for Salinity

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	922	1996	2023
5033	634	2024	2024
5058	266	2009	2011
95	230	1972	2018
3001	102	1999	2003
118	23	2015	2020
69	13	1997	2024
102	2	1995	1995

Program names:

69 - Fisheries-Independent Monitoring (FIM) Program[1]
95 - Harmful Algal Bloom Marine Observation Network[2]
102 - National Status and Trends Mussel Watch[8]
118 - National Aquatic Resource Surveys, National Coastal Condition Assessment[4]
3001 - Lagoon Watch (Formerly Marine Discovery Center)[5]

5002 - Florida STORET / WIN[6]
5033 - Southeast Florida Water Quality Assessment Survey[9]
5058 - Southeast Florida Coral Reef Initiative (SEFCRI) Water Quality Monitoring Report[7]

Secchi Depth - Discrete

Seasonal Kendall-Tau Trend Analysis

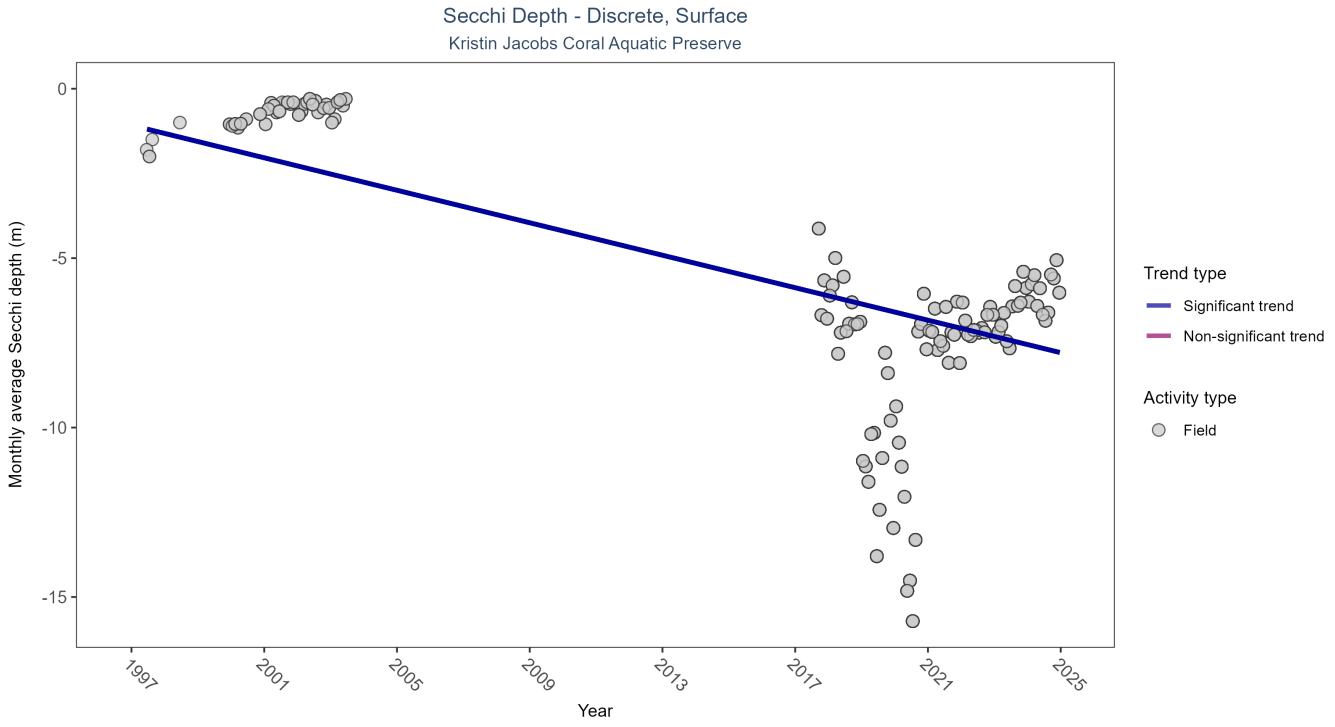

Figure 9: Scatter plot of monthly average Secchi depth over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Secchi depth is only measured in the field (circles).

Table 14: Seasonal Kendall-Tau 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	8572	16	1997 - 2024	-6.1	-0.259	-1.0799	-0.2396	0.0001

Monthly average Secchi depth became deeper by 0.24 m per year, indicating an increase in water clarity.

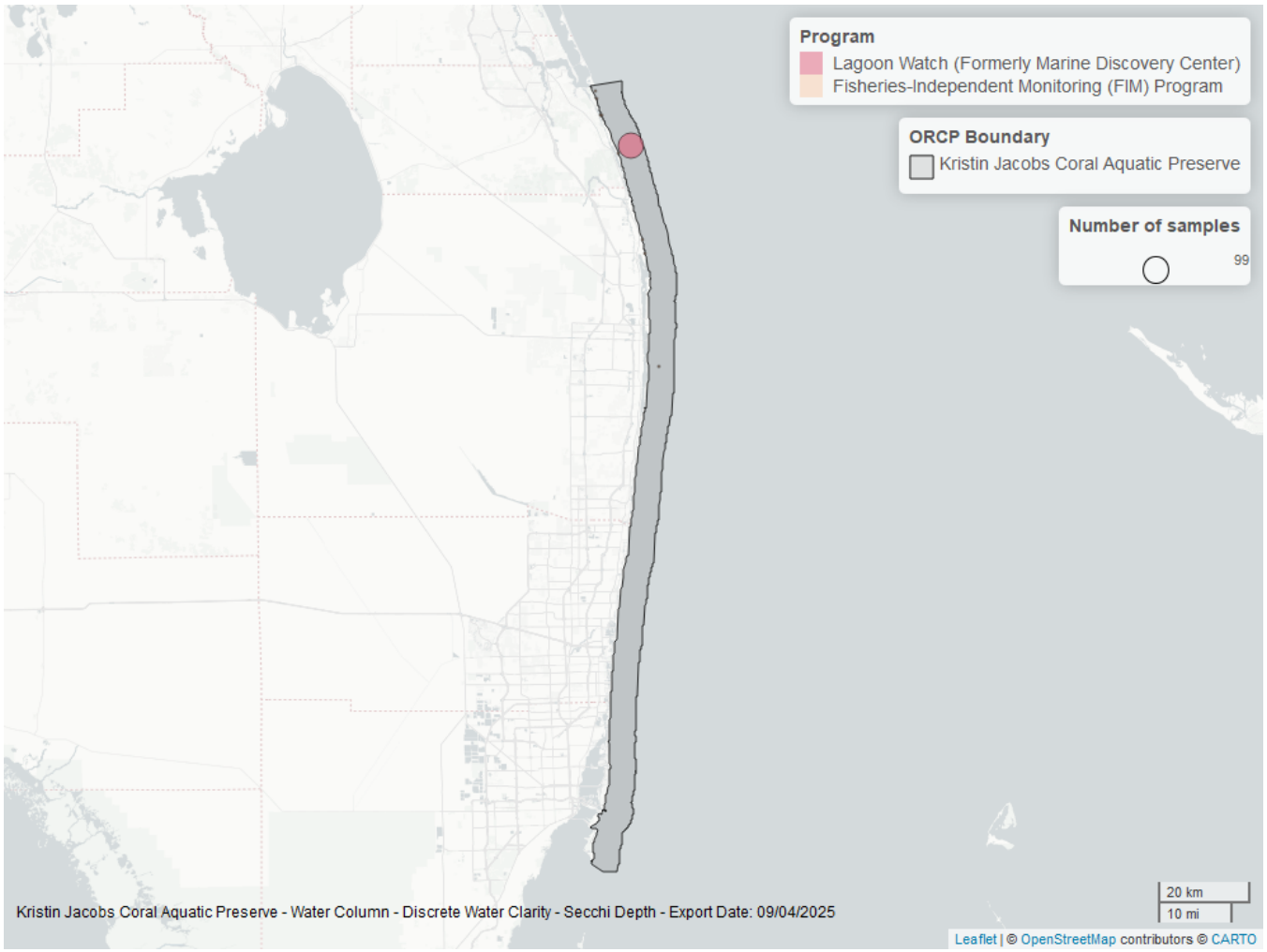

Figure 10: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 15: Programs contributing data for Secchi Depth

ProgramID	*N_Data*	*YearMin*	*YearMax*
5033	8470	2017	2024
3001	99	1999	2003
69	13	1997	2024
5002	1	2023	2023
103	1	2015	2015

Program names:

69 - Fisheries-Independent Monitoring (FIM) Program[1]
103 - EPA STOrage and RETrieval Data Warehouse (STORET)/WQX[3]
3001 - Lagoon Watch (Formerly Marine Discovery Center)[5]
5002 - Florida STORET / WIN[6]
5033 - Southeast Florida Water Quality Assessment Survey[9]

Total Phosphorus - Discrete

Seasonal Kendall-Tau Trend Analysis

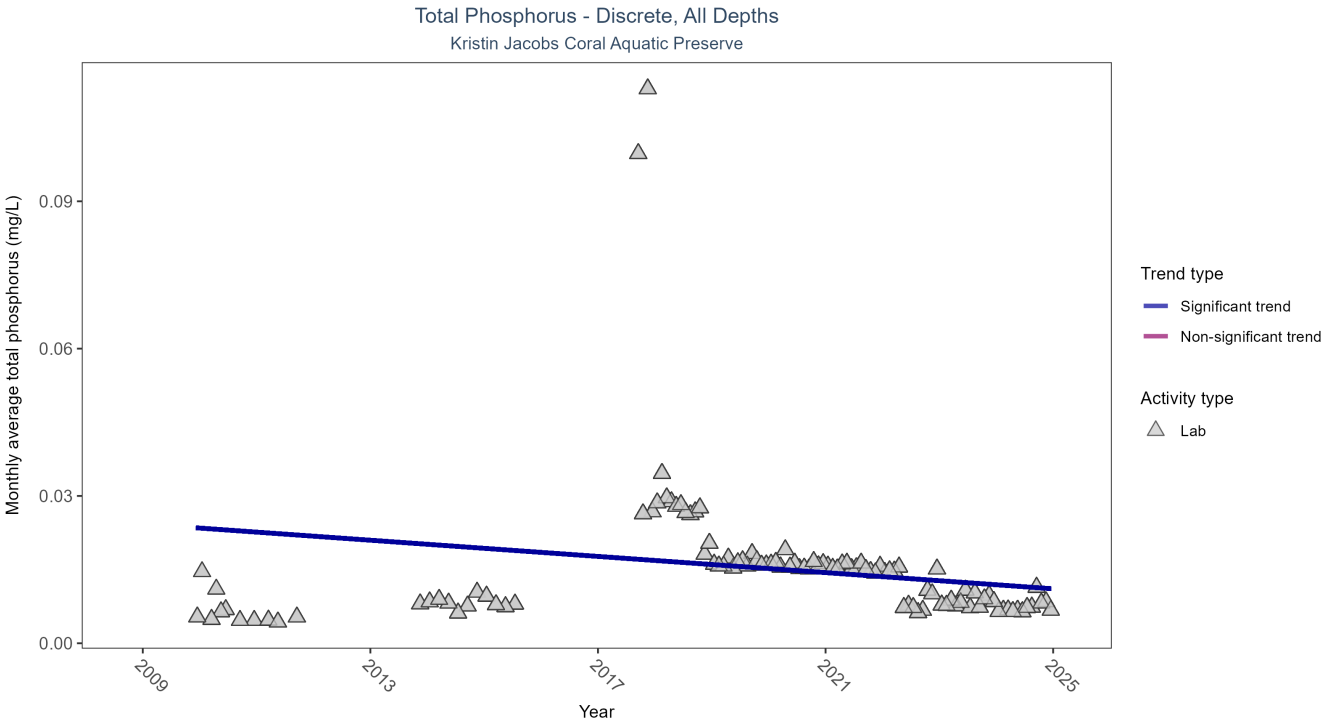

Figure 11: Scatter plot of monthly average total phosphorus over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only phosphorus values obtained from laboratory analyses (triangles) are included 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 decreasing trend	16698	14	2009 - 2024	0.0145	-0.3152	0.0243	-0.0008	0.0006

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

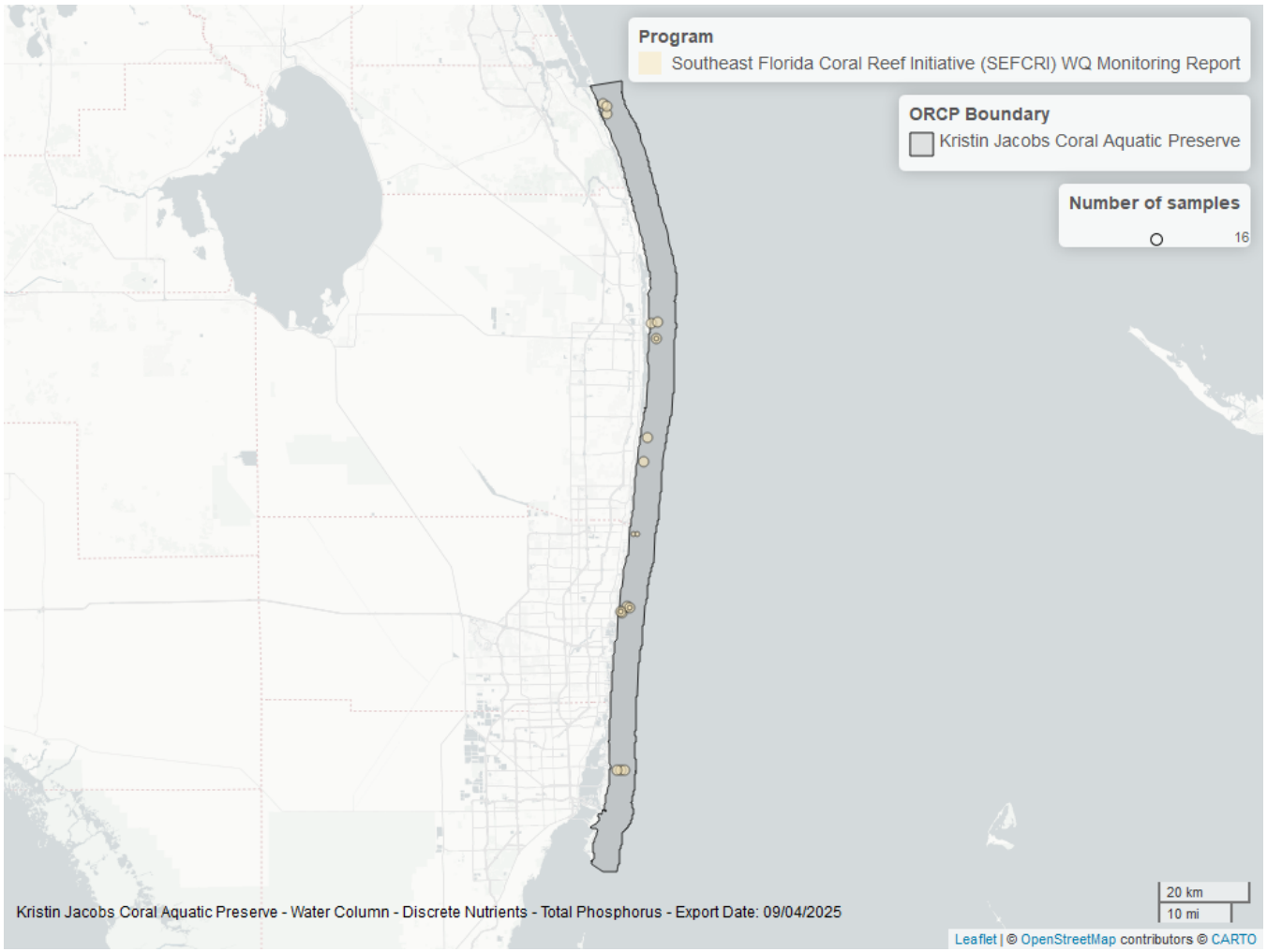

Figure 12: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 17: Programs contributing data for Total Phosphorus

ProgramID	*N_Data*	*YearMin*	*YearMax*
5033	16710	2017	2024
5002	665	2013	2023
5058	268	2009	2011

Program names:

5002 - Florida STORET / WIN[6]
5033 - Southeast Florida Water Quality Assessment Survey[9]
5058 - Southeast Florida Coral Reef Initiative (SEFCRI) Water Quality Monitoring Report[7]

Turbidity - Discrete

Seasonal Kendall-Tau Trend Analysis

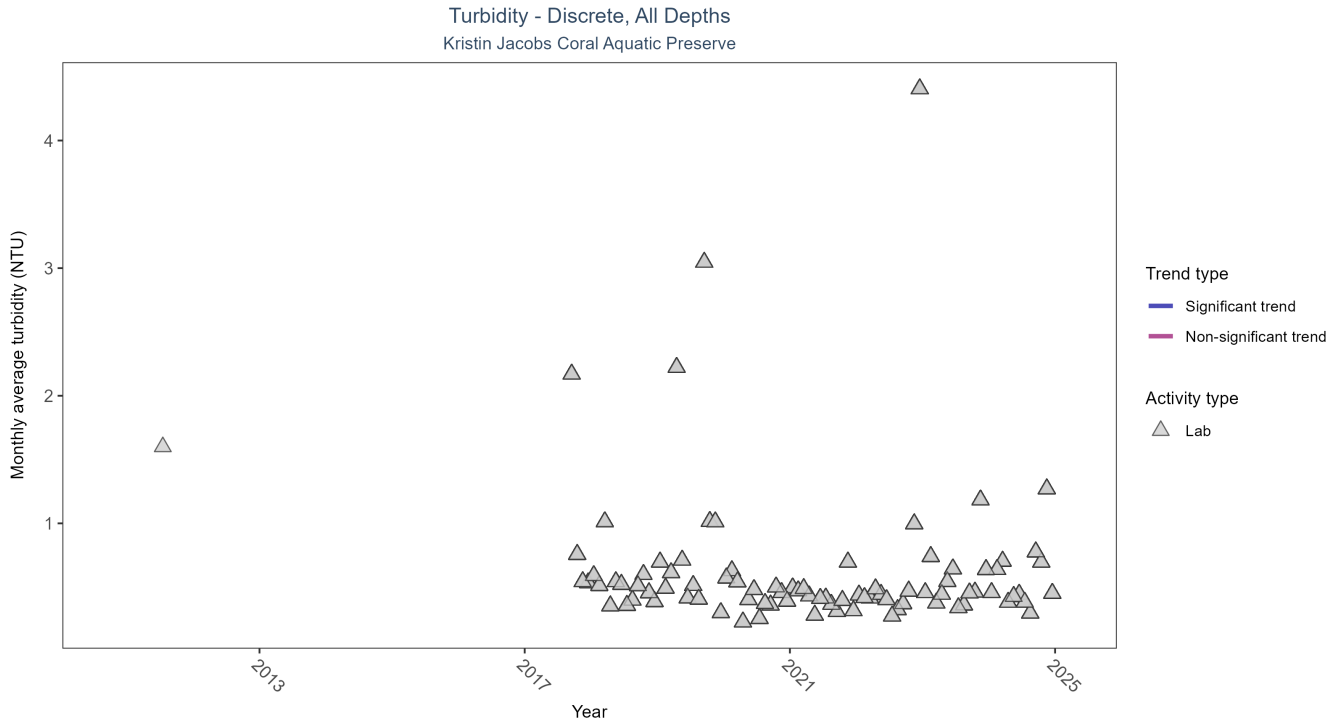

Figure 13: Scatter plot of monthly average turbidity over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only turbidity values measured in the laboratory (triangles) are included in the plot.

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	16804	9	2011 - 2024	0.3	-	-	-	-

There was insufficient data to fit a model for turbidity.

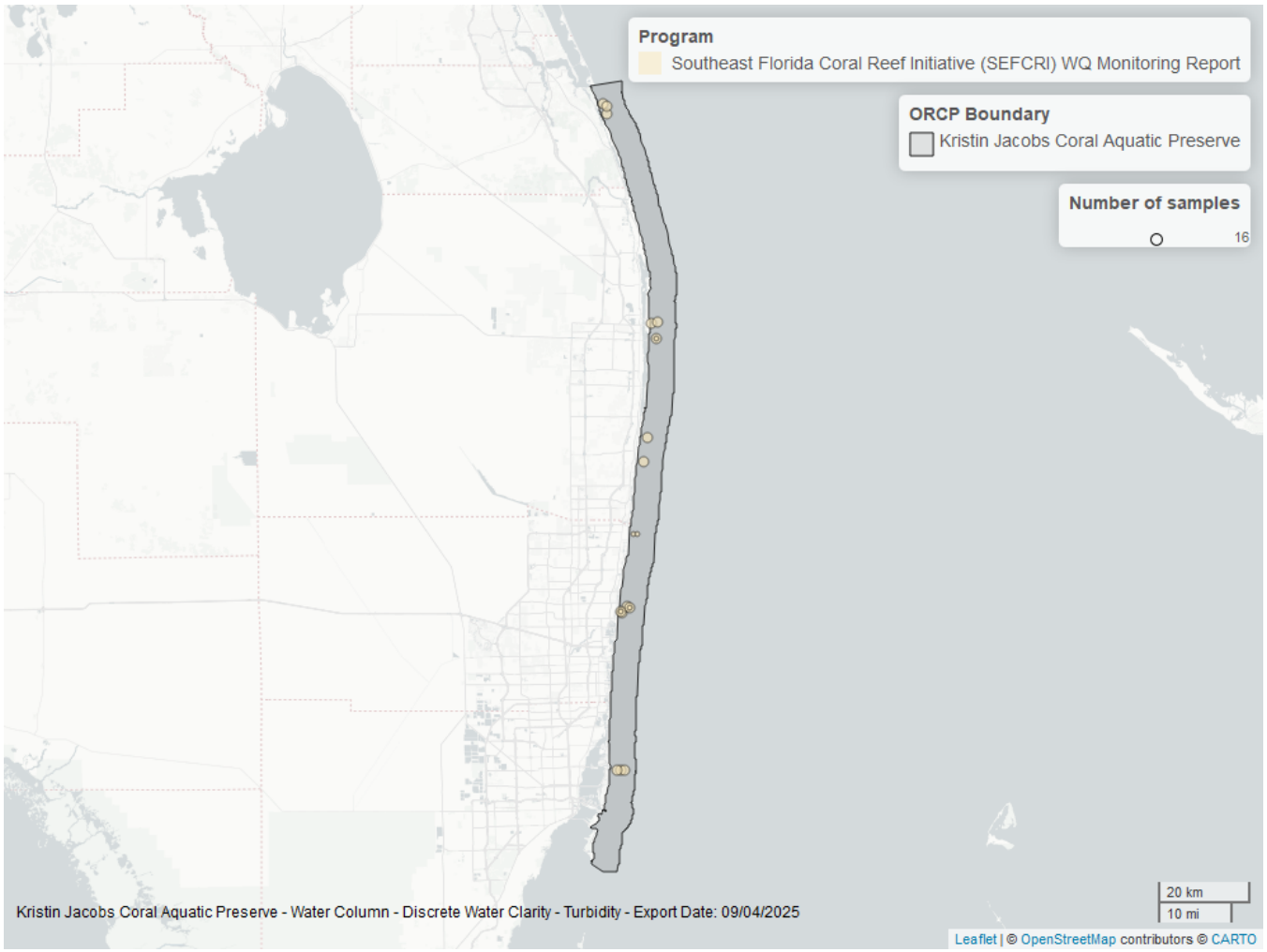

Figure 14: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 19: Programs contributing data for Turbidity

ProgramID	*N_Data*	*YearMin*	*YearMax*
5033	16827	2017	2024
5058	264	2009	2011
5002	210	2011	2023

Program names:

5002 - Florida STORET / WIN[6]
5033 - Southeast Florida Water Quality Assessment Survey[9]
5058 - Southeast Florida Coral Reef Initiative (SEFCRI) Water Quality Monitoring Report[7]

Water Temperature - Discrete

Seasonal Kendall-Tau Trend Analysis

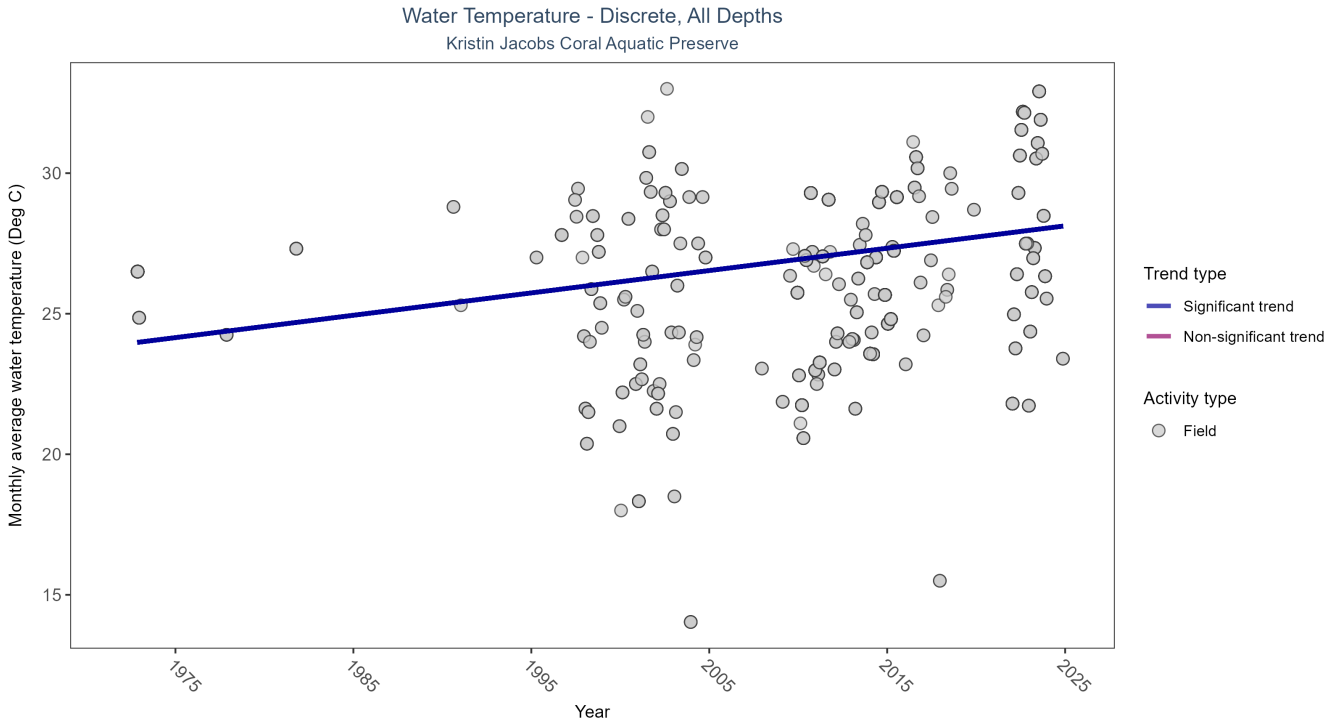

Figure 15: Scatter plot of monthly average water temperature over time. If the time series included ten or more years of discrete observations, a significant (blue) or non-significant (magenta) trend line is also shown. Only water temperature measurements taken in the field (circles) are included in 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	Significantly increasing trend	1566	30	1972 - 2024	26.5372	0.2748	23.9111	0.0795	0

Monthly average water temperature increased by 0.08°C per year.

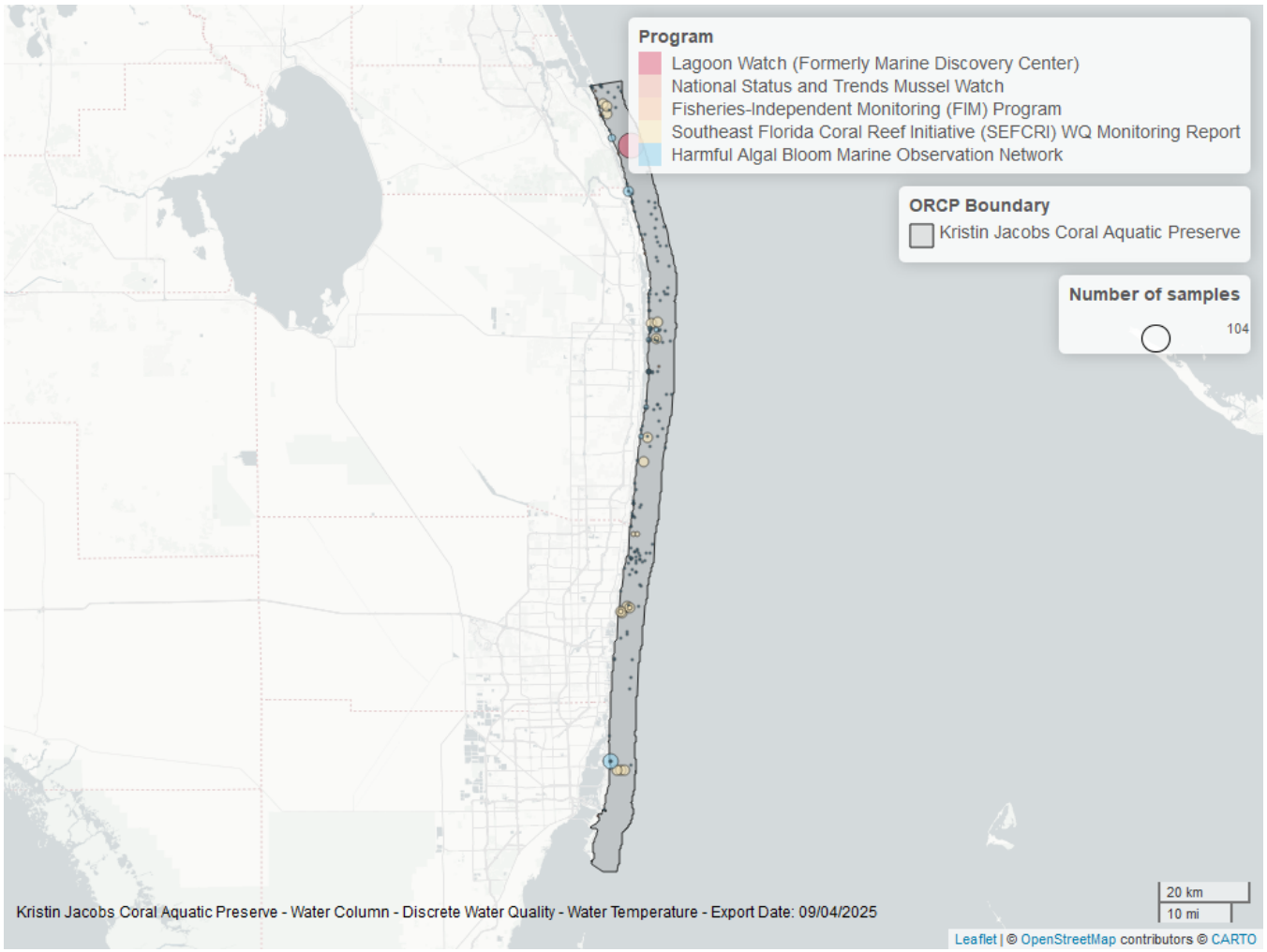

Figure 16: Map showing location of discrete water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Table 21: Programs contributing data for Water Temperature

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	926	1996	2023
5058	266	2009	2011
95	258	1972	2018
3001	104	1999	2003
69	13	1997	2024
102	2	1995	1995

Program names:

69 - Fisheries-Independent Monitoring (FIM) Program[1]
95 - Harmful Algal Bloom Marine Observation Network[2]
102 - National Status and Trends Mussel Watch[8]
3001 - Lagoon Watch (Formerly Marine Discovery Center)[5]
5002 - Florida STORET / WIN[6]
5058 - Southeast Florida Coral Reef Initiative (SEFCRI) Water Quality Monitoring Report[7]

Water Quality - Continuous

The following files were used in the continuous analysis:

- *Combined_WQ_WC_NUT_cont_Dissolved_Oxygen_SE-2025-Sep-19.txt*
- *Combined_WQ_WC_NUT_cont_Dissolved_Oxygen_Saturation_SE-2025-Sep-19.txt*
- *Combined_WQ_WC_NUT_cont_pH_SE-2025-Sep-19.txt*
- *Combined_WQ_WC_NUT_cont_Salinity_SE-2025-Sep-19.txt*
- *Combined_WQ_WC_NUT_cont_Turbidity_SE-2025-Sep-19.txt*
- *Combined_WQ_WC_NUT_cont_Water_Temperature_SE-2025-Sep-19.txt*

Continuous monitoring locations in Kristin Jacobs Coral Aquatic Preserve

Table 22: Station overview for Continuous parameters by Program

ProgramID	*ProgramLocationID*	*Years of Data*	*Use in Analysis*	*Parameters*
5	LKWF1	42	TRUE	TempW
986	1	11	TRUE	TempW
986	2	11	TRUE	TempW
986	3	11	TRUE	TempW
986	4	11	TRUE	TempW
986	5	11	TRUE	TempW
986	6	11	TRUE	TempW
986	84	17	TRUE	TempW
986	85	17	TRUE	TempW
986	86	17	TRUE	TempW
986	87	17	TRUE	TempW
986	88	17	TRUE	TempW
986	89	17	TRUE	TempW
986	90	17	TRUE	TempW
986	91	17	TRUE	TempW
986	92	17	TRUE	TempW
986	93	17	TRUE	TempW
986	94	17	TRUE	TempW
986	95	17	TRUE	TempW
986	96	6	TRUE	TempW
986	97	14	TRUE	TempW
986	98	14	TRUE	TempW

Program names:

5 - National Data Buoy Center[10]
986 - Water Temperature on Coral Reefs in the Florida Keys[11]

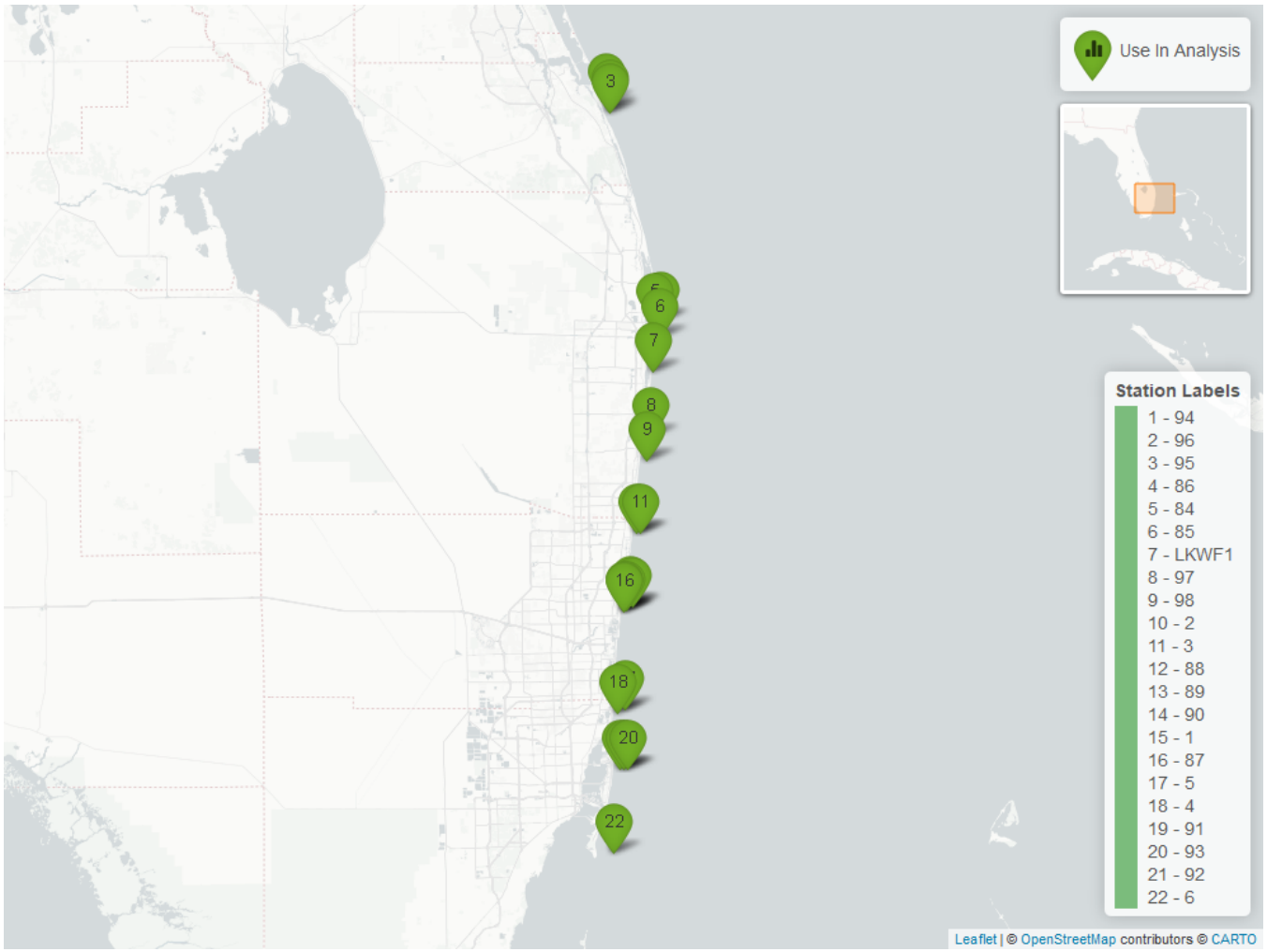

Figure 17: Map showing continuous water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. Sites marked as *Use In Analysis* (green) are featured in this report.

Water Temperature - Continuous - Program 5

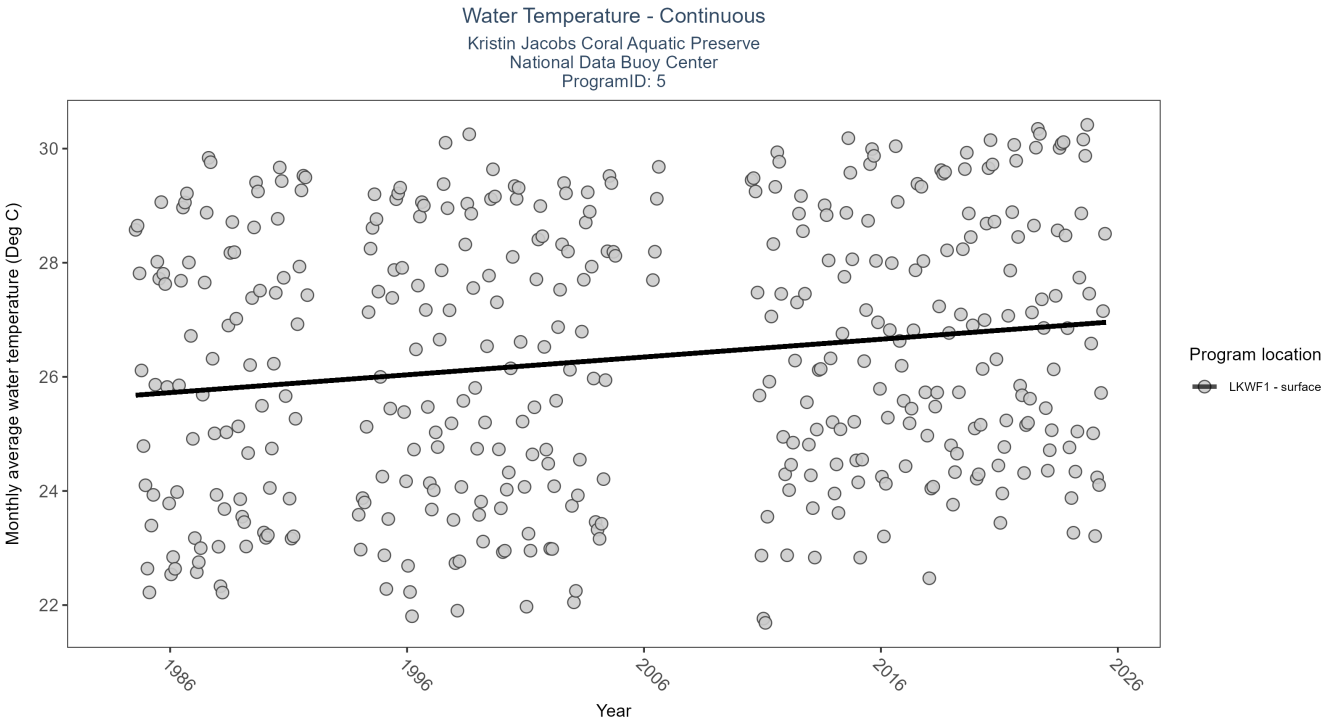

Figure 18: Scatter plot of monthly average water temperature over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 23: Seasonal Kendall-Tau Results for Water Temperature - Program 5

Station	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
LKWF1	Significantly increasing trend	1336312	37	1984 - 2025	26.4	0.42	25.66	0.03	0

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

Water Temperature - Continuous - Program 986

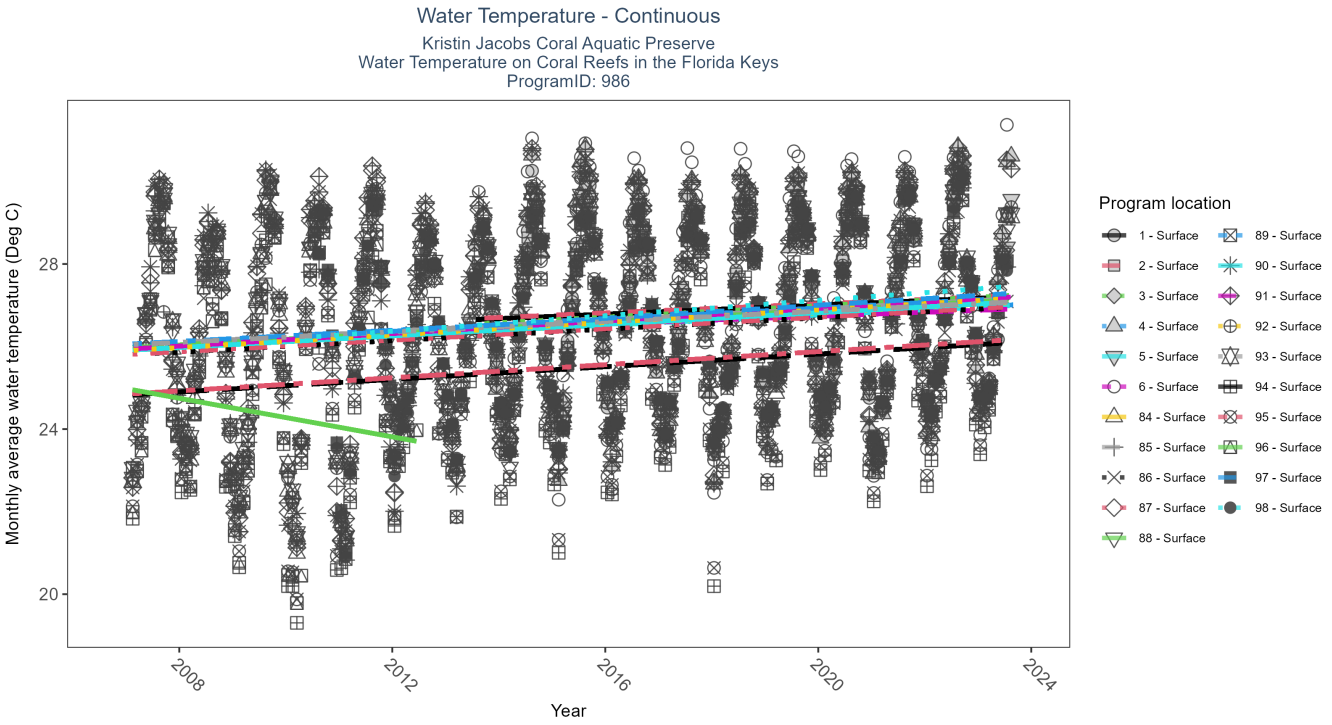

Figure 19: Scatter plot of monthly average water temperature over time at continuously monitored program locations. Each location is analyzed separately, with significant (blue) or non-significant (magenta) trend lines shown for time series that included five or more years of observations.

Table 24: Seasonal Kendall-Tau Results for Water Temperature - Program 986

Station	Statistical Trend	Sample Count	Years with Data	Period of Record	Median	tau	Sen Intercept	Sen Slope	p
85	Significantly increasing trend	118414	17	2007 - 2023	26.29	0.38	26.03	0.07	0.00
86	Significantly increasing trend	113127	17	2007 - 2023	26.20	0.39	25.80	0.07	0.00
6	Significantly increasing trend	69753	11	2013 - 2023	26.84	0.19	26.41	0.05	0.01
91	Significantly increasing trend	111048	17	2007 - 2023	26.60	0.38	25.93	0.08	0.00
88	Significantly increasing trend	123687	17	2007 - 2023	26.42	0.38	25.97	0.07	0.00
1	Significantly increasing trend	73700	11	2013 - 2023	26.50	0.23	26.62	0.06	0.00
89	Significantly increasing trend	120476	17	2007 - 2023	26.32	0.38	26.06	0.07	0.00
90	Significantly increasing trend	103477	17	2007 - 2023	26.48	0.39	25.91	0.07	0.00
94	Significantly increasing trend	98419	17	2007 - 2023	25.62	0.34	24.82	0.08	0.00
3	Significantly increasing trend	69054	11	2013 - 2023	26.69	0.32	26.51	0.07	0.00
93	Significantly increasing trend	115688	17	2007 - 2023	26.56	0.38	26.04	0.06	0.00
92	Significantly increasing trend	120189	17	2007 - 2023	26.50	0.40	25.90	0.08	0.00
84	Significantly increasing trend	117729	17	2007 - 2023	26.37	0.40	25.91	0.07	0.00
96	No significant trend	25550	6	2007 - 2012	24.87	-0.25	24.98	-0.23	0.08
97	Significantly increasing trend	105832	14	2010 - 2023	26.50	0.42	26.21	0.08	0.00
87	Significantly increasing trend	117324	17	2007 - 2023	26.50	0.37	25.81	0.07	0.00
4	Significantly increasing trend	77960	11	2013 - 2023	26.69	0.28	26.36	0.06	0.00
2	Significantly increasing trend	68589	11	2013 - 2023	26.74	0.32	26.65	0.06	0.00
5	Significantly increasing trend	60729	11	2013 - 2023	26.69	0.28	26.33	0.06	0.00
98	Significantly increasing trend	94894	14	2010 - 2023	26.45	0.42	26.18	0.09	0.00
95	Significantly increasing trend	109401	17	2007 - 2023	25.62	0.36	24.85	0.08	0.00

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

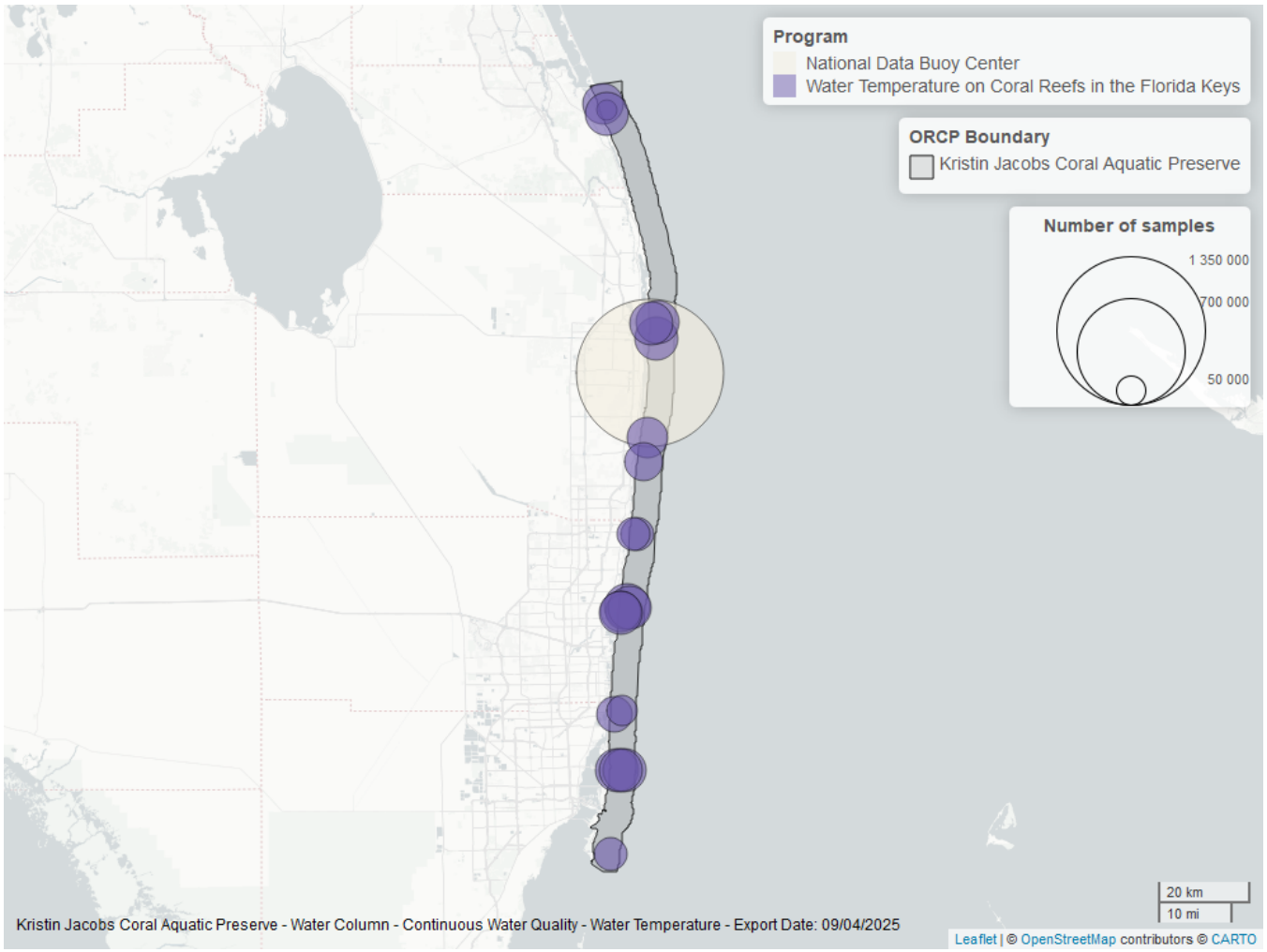

Figure 20: Map showing location of water temperature continuous water quality sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Coral Reef

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

Percent Cover

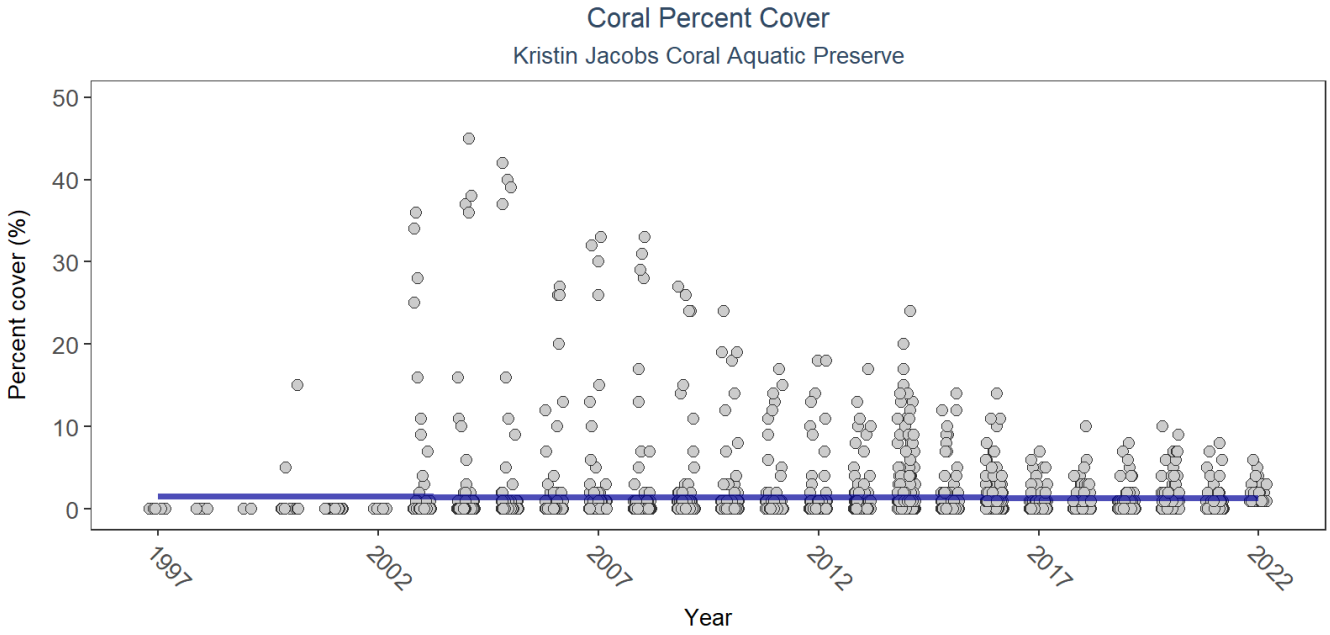

Figure 21: Scatter plot of live coral coverage over time as a percent of reef surface. Species groups include octocorals, milleporans, and scleractinians. If the time series included five or more years of observations, a significant (blue) or non-significant (magenta) trend line is also shown. Data points are jittered horizontally to reduce overlap.

Table 25: Coral Percent Cover

Statistical Trend	Period of Record	LME Intercept	LME Slope	p
Significantly decreasing trend	1997 - 2022	18.27128	-0.00837	0

Annual average percent cover decreased by -0.01% between 1997 and 2022.

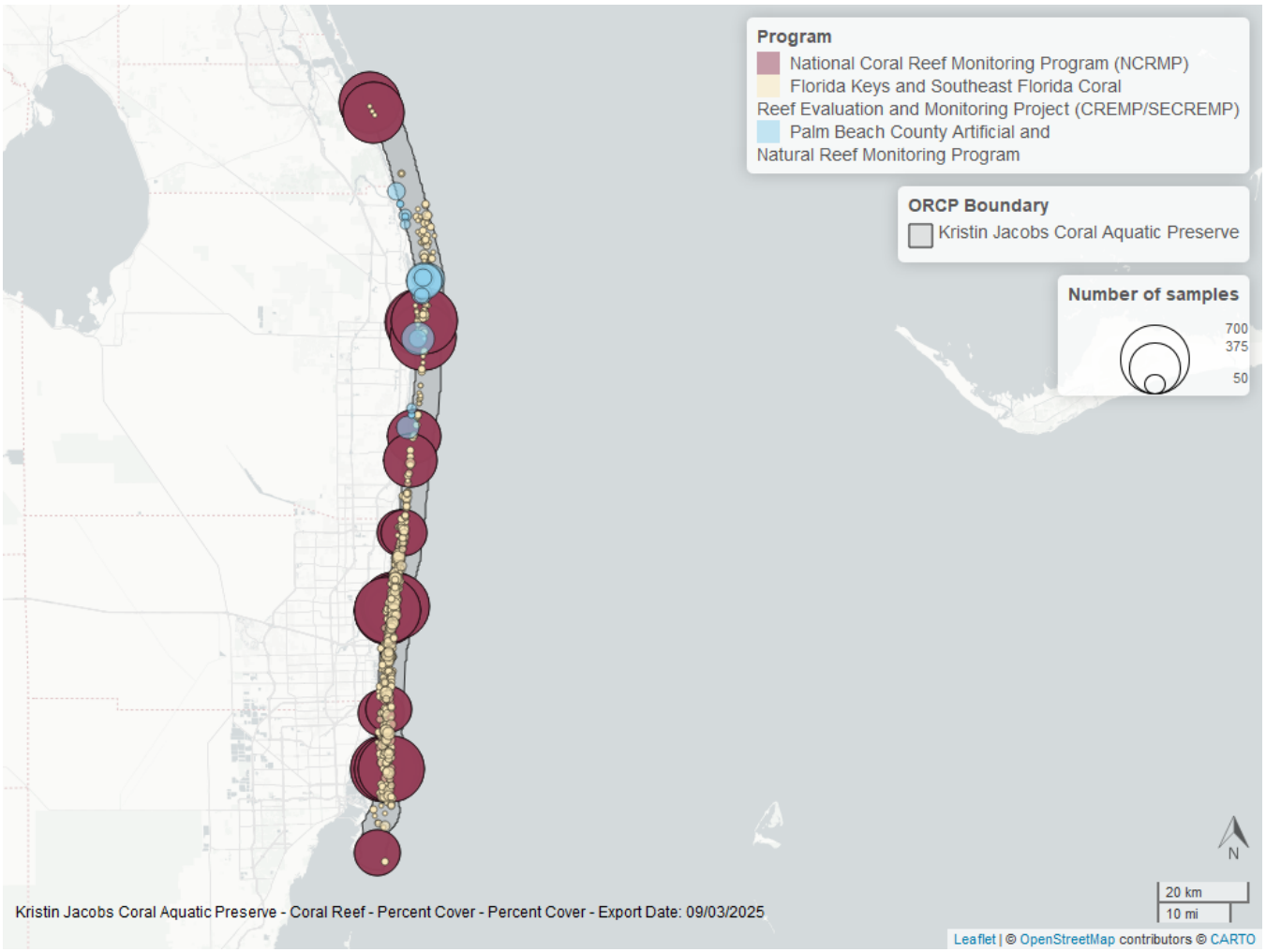

Figure 22: Map showing location of coral percent cover sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Species Richness

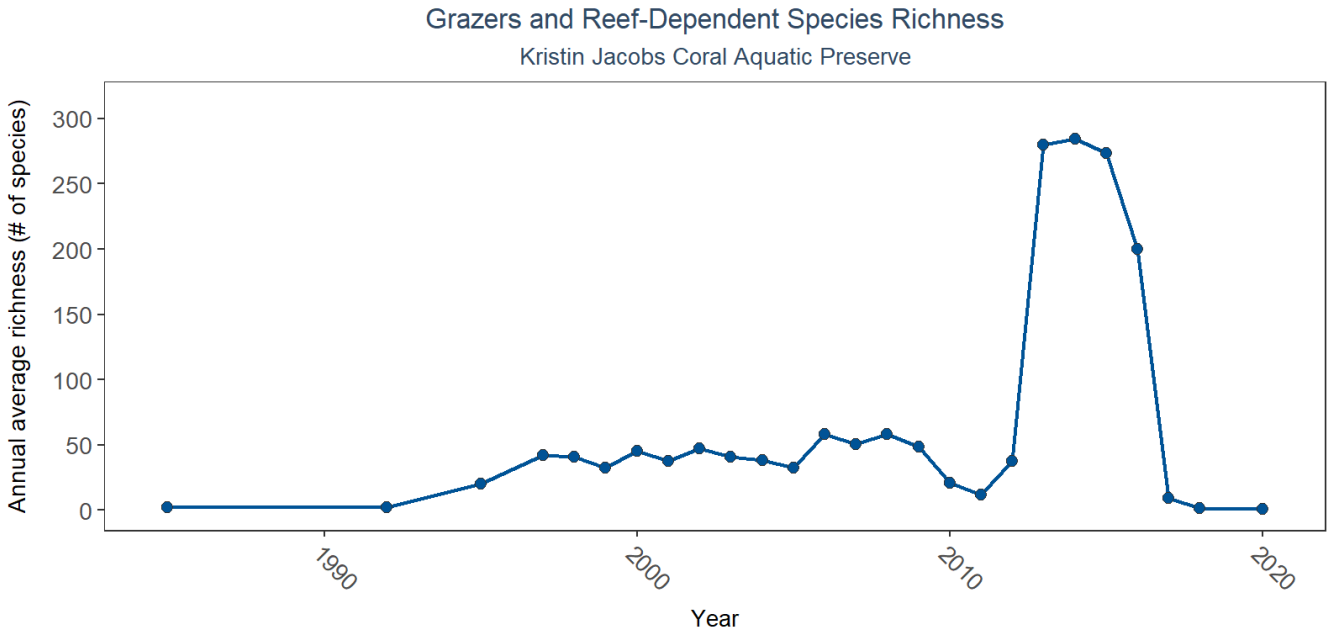

Figure 23: Line graph of annual average species richness of grazers and reef-dependent species over time. If the time series included more than one year of observations, a line connects the data points for visualization.

Table 26: Coral Species Richness

Sample Count	*Number of Years*	*Period of Record*	*Median N of Taxa*	*Mean N of Taxa*
3686	26	1985 - 2020	294	193.8752

The median annual number of taxa was 294 based on 3,686 observations collected between 1985 and 2020.

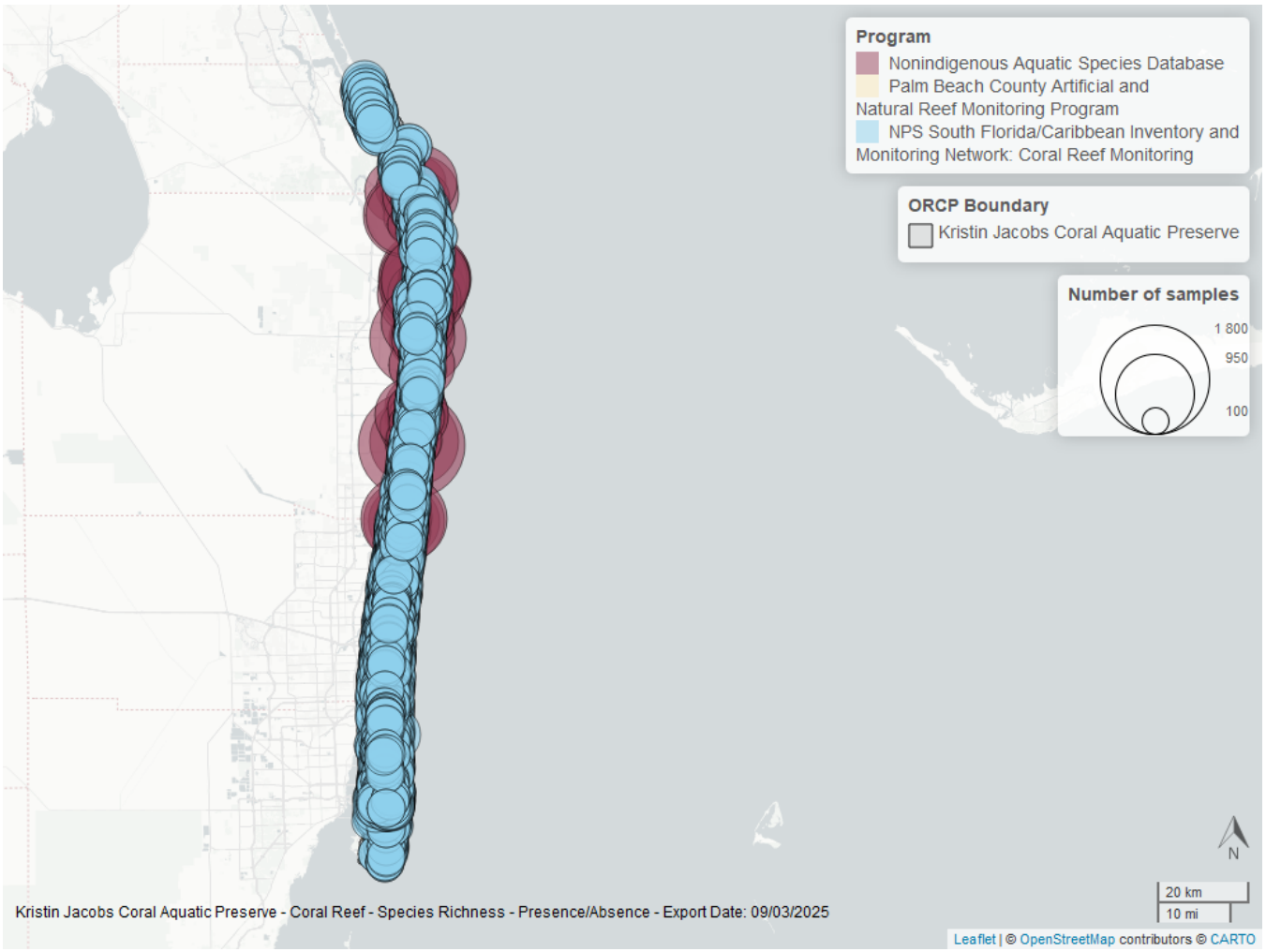

Figure 24: Map showing location of coral species richness sampling locations within the boundaries of *Kristin Jacobs Coral Aquatic Preserve*. The bubble size on the maps above reflect the amount of data available at each sampling site.

Species list

Abudefduf saxatilis[1]
Abudefduf taurus[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]
Acanthurus tractus[1]
Acropora cervicornis[2]
Aetobatus narinari
Agaricia agaricites[2]
Agaricia fragilis[2]
Agaricia grahamae
Agaricia humilis
Agaricia lamarcki[2]
Agaricia sp.[2]
Agaricia spp.
Agelas clathrodes
Agelas conifera
Aglaophenia latecarinata
Ahlia egmontis
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
Anchoa lyolepis
Ancylopsetta dilecta
Anisotremus surinamensis[1]
Anisotremus virginicus[1]
Antennarius multiocellatus
Anthozoa
Antillogorgia sp.[2]
Aplysina cauliformis
Aplysina fistularis
Apogon aurolineatus[1]
Apogon binotatus[1]
Apogon lachneri[1]
Apogon maculatus[1]
Apogon phenax[1]
Apogon planifrons[1]
Apogon pseudomaculatus[1]
Apogon quadrisquamatus[1]
Epinephelus itajara[1]
Epinephelus morio[1]
Epinephelus striatus[1]
Eques lanceolatus[1]
Equetus punctatus[1]
Erythropodium caribaeorum[2]
Eucidaris tribuloides
Eucinostomus argenteus
Eucinostomus gula
Eucinostomus jonesii
Eucinostomus melanopterus
Eudistoma obscuratum
Eudistoma sp.
Eunicidae
Eusmilia fastigiata[2]
Euthynnus alletteratus
Favia fragum[2]
Fistularia tabacaria[1]
Fowlerichthys ocellatus[1]
Galeocerdo cuvier[1]
Gerreidae
Gerres cinereus
Ginglymostoma cirratum
Gnatholepis cauerensis[1]
Gnatholepis thompsoni[1]
Gobiidae[1]
Gobioclinus bucciferus[1]
Gobioclinus filamentosus[1]
Gobioclinus gobio[1]
Gobioclinus kalisherae[1]
Gobiosoma sp.[1]
Gorgonia[2]
Gramma loreto[1]
Gramma melacara
Green frondose algae
Gymnangium allmani
Gymnangium speciosum
Gymnothorax funebris[1]
Gymnothorax miliaris[1]
Gymnothorax moringa[1]
Gymnothorax nigromarginatus[1]
Gymnothorax saxicola[1]
Gymnothorax vicinus[1]
Haemulidae[1]
Haemulon album[1]
Haemulon aurolineatum[1]
Haemulon carbonarium[1]
Haemulon flavolineatum[1]
Haemulon macrostomum[1]
Haemulon melanurum[1]
Haemulon parra[1]
Haemulon plumierii[1]
Haemulon sciurus[1]
Haemulon sp.[1]
Opsanus tau[1]
Orbicella annularis[2]
Orbicella faveolata[2]
Orbicella franksi[2]
Orbicella sp.
Orthopristis chrysoptera[1]
Other calcareous macroalgae
Other fleshy macroalgae
Other red algae
Oxyurichthys stigmalophius[1]
Padina
Pagrus pagrus[1]
Palythoa spp.
Parablennius marmoreus[1]
Paraclinus marmoratus[1]
Paraclinus nigripinnis[1]
Paralichthys albigutta[1]
Paranthias furcifer[1]
Pareques acuminatus[1]
Pareques umbrosus[1]
Paroncheilus affinis[1]
Pempheris poeyi[1]
Pempheris schomburgkii[1]
Peyssonnelia
Phaeoptyx pigmentaria[1]
Phaeoptyx xenus[1]
Phallusia nigra
Phorbas amaranthus
Phragmatopoma caudata
Plakortis angulospiculatus
Platax orbicularis
Platybelone argalus
Plectrypops retrospinis[1]
Polycarpa spongiabilis
Pomacanthidae[1]
Pomacanthus arcuatus[1]
Pomacanthus paru[1]
Pomacentridae[1]
Pomatomus saltatrix
Porifera
Porifera spp.
Porites astreoides[2]
Porites cf. branneri
Porites divaricata[2]
Porites furcata
Porites porites[2]
Porites sp.
Porites spp.[2]
Porolithon pachydermum
Priacanthus arenatus[1]
Priolepis hipoliti[1]
Prionotus ophryas[1]
Prionotus rubio[1]
Prionotus tribulus[1]

Apogon robinsi[1]
Apogon townsendi[1]
Archosargus probatocephalus[1]
Archosargus rhomboidalis[1]
Ascidiacea
Asteroidea
Astrapogon puncticulatus[1]
Astrapogon sp.[1]
Astrapogon stellatus[1]
Astroscopus guttatus
Astroscopus ygraecum
Atherinomorus stipes
Aulostomus maculatus[1]
Azurina cyanea[1]
Balistes capriscus[1]
Balistes sp.[1]
Balistes vetula[1]
Balistidae[1]
Bare substrate
Bathytoshia centroura
Blenniidae[1]
Blenniidae sp.[1]
Bodianus pulchellus[1]
Bodianus rufus[1]
Bollmannia boqueronensis[1]
Bothus lunatus[1]
Bothus ocellatus[1]
Brachygenys chrysargyreum[1]
Brockius nigricinctus[1]
Brotula barbata
Bryozoa
Calamus bajonado[1]
Calamus calamus[1]
Calamus leucosteus[1]
Calamus nodosus[1]
Calamus penna[1]
Calamus proridens[1]
Callionymus bairdi[1]
Callyspongia (Cladochalina) aculeata
Callyspongia (Cladochalina) plicifera
Cantherhines macrocerus[1]
Cantherhines pullus[1]
Canthidermis sufflamen[1]
Canthigaster rostrata[1]
Carangidae[1]
Caranx bartholomaei[1]
Caranx crysos[1]
Caranx hippos[1]
Caranx latus[1]
Caranx lugubris[1]
Caranx ruber[1]
Caranx sp.[1]
Carcharhinus falciformis
Carcharhinus leucas
Carcharhinus limbatus
Carcharhinus obscurus
Carcharhinus perezii
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]
Halimeda
Halimeda goreaui
Halimeda opuntia
Halimeda spp.
Halisarca sp.
Halopteris carinata
Harengula humeralis
Harengula jaguana
Helioseris cucullata
Hemiemblemaria simula[1]
Hemiramphus balao
Hemiramphus brasiliensis
Hermodice carunculata
Heteroconger longissimus
Heteroconger luteolus
Heteropriacanthus cruentatus[1]
Hippocampus erectus[1]
Hippocampus reidi[1]
Hippopodina feegeensis
Holacanthus bermudensis[1]
Holacanthus ciliaris[1]
Holacanthus spp.[1]
Holacanthus tricolor[1]
Holocentrus adscensionis[1]
Holocentrus rufus[1]
Hypanus americanus
Hypleurochilus bermudensis[1]
Hypoatherina harringtonensis
Hypoplectrus chlorurus[1]
Hypoplectrus gemma[1]
Hypoplectrus gummigutta[1]
Hypoplectrus guttavarius[1]
Hypoplectrus hybrid[1]
Hypoplectrus indigo[1]
Hypoplectrus nigricans[1]
Hypoplectrus puella[1]
Hypoplectrus randallorum[1]
Hypoplectrus sp.[1]
Hypoplectrus tann[1]
Hypoplectrus unicolor[1]
Hyporthodus flavolimbatus[1]
Hyporthodus niveatus[1]
Iciligorgia schrammi[2]
Iotrochota birotulata
Ircinia strobilina
Isophyllia rigida
Isophyllia sinuosa[2]
Pristipomoides aquilonaris[1]
Pristis pectinata
Prognathodes aculeatus[1]
Prognathodes aya[1]
Pseudobatos lentiginosus
Pseudodiploria clivosa[2]
Pseudodiploria sp.
Pseudodiploria strigosa[2]
Pseudoplexaura[2]
Pseudupeneus maculatus[1]
Ptereleotris calliura
Ptereleotris helenae
Pterogorgia[2]
Pterois miles[1]
Pterois sp.[1]
Pterois volitans[1]
Rachycentron canadum
Raja eglanteria
Ramicrusta spp.
Razorfish sp.[1]
Remora remora
Rhinoptera bonasus
Rhomboplites aurorubens[1]
Rubble
Rypticus bistrispinus[1]
Rypticus maculatus[1]
Rypticus saponaceus[1]
Rypticus subbifrenatus[1]
Sabellidae
Sand-sand
Sand on hard-bottom
Sardinella aurita
Sargassum sp.
Sargocentron bullisi[1]
Sargocentron coruscum[1]
Sargocentron vexillarium[1]
Scaridae[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]
Schizoporella
Schultzea beta[1]
Sciaenidae[1]
Scianid sp.[1]
Scleractinia[2]
Scolymia cubensis
Scolymia sp.[2]
Scolymia spp.[2]
Scomberomorus cavalla
Scomberomorus maculatus
Scomberomorus regalis
Scopalina ruetzleri

Carcharhinus plumbeus
Carijoa riisei[2]
Caulerpa
Caulerpa racemosa
Centropomus undecimalis
Centropristis ocyurus[1]
Centropristis philadelphica[1]
Centropristis striata[1]
Centropyge argi[1]
Cephalopholis cruentata[1]
Cephalopholis fulva[1]
Ceramium sp.
Chaenopsis limbaughi[1]
Chaetodipterus faber
Chaetodon capistratus[1]
Chaetodon ocellatus[1]
Chaetodon sedentarius[1]
Chaetodon striatus[1]
Chaetodontidae[1]
Chilomycterus antennatus[1]
Chilomycterus antillarum
Chilomycterus reticulatus[1]
Chilomycterus schoepfii[1]
Chloroscombrus chrysurus[1]
Chriodorus atherinoides
Chromis enchrysurus[1]
Chromis insolata[1]
Chromis multilineata[1]
Chromis scotti[1]
Cirripedia
Cladocora[2]
Clathria (Thalysias) venosa
Clathria sp.
Clavelina picta
Clavelina sp.
Clepticus parrae[1]
Cliona caribbaea
Cliona sp.
Cliona spp.
Cliona varians
Clupeidae
Cnidaria
Codium isthmocladum
Codium sp.
Colpophyllia natans[2]
Conger oceanicus
Conger triporiceps
Corvula sanctaeluciae[1]
Coryphopterus dicrus[1]
Coryphopterus eidolon[1]
Coryphopterus glaucofraenum[1]
Coryphopterus lipernes[1]
Coryphopterus personatus[1]
Coryphopterus punctipectophorus[1]
Coryphopterus sp.[1]
Cosmocampus albirostris[1]
Crustacea
Isophyllia sp.
Istiophorus platypterus
Jenkinsia sp.
Kyphosus sectatrix[1]
Kyphosus vaigiensis[1]
Labridae[1]
Labrisomidae sp.[1]
Labrisomus nuchipinnis[1]
Labrisomus spp.[1]
Lachnolaimus maximus[1]
Lactophrys bicaudalis[1]
Lactophrys trigonus[1]
Lactophrys triqueter[1]
Lagodon rhomboides[1]
Leiostomus xanthurus[1]
Leptogorgia hebes[2]
Liopropoma eukrines[1]
Liopropoma mowbrayi[1]
Liopropoma rubre[1]
Lobophora spp.
Lutjanidae[1]
Lutjanus analis[1]
Lutjanus apodus[1]
Lutjanus buccanella[1]
Lutjanus campechanus[1]
Lutjanus cyanopterus[1]
Lutjanus griseus[1]
Lutjanus jocu[1]
Lutjanus mahogoni[1]
Lutjanus synagris[1]
Macroalgae
Macrorhynchia clarkei
Madracis auretenra[2]
Madracis decactis[2]
Madracis formosa
Madracis senaria
Madracis sp.[2]
Madracis spp.[2]
Malacanthus plumieri
Malacoctenus aurolineatus[1]
Malacoctenus gilli[1]
Malacoctenus macropus[1]
Malacoctenus triangulatus[1]
Malacoctenus versicolor[1]
Manicina areolata
Meandrina danae
Meandrina jacksoni
Meandrina meandrites[2]
Meandrina sp.
Megalops atlanticus
Melichthys niger[1]
Menidia sp.
Microgmathus crinitus[1]
Microgobius carri[1]
Microgobius microlepis[1]
Microspathodon chrysurus[1]
Millepora alcicornis[2]
Scorpaena brasiliensis
Scorpaena plumieri[1]
Scorpaenodes caribbaeus[1]
Selachii
Selar crumenophthalmus[1]
Selene vomer[1]
Seriola dumerili[1]
Seriola rivoliana[1]
Seriola sp.[1]
Seriola zonata[1]
Serranid sp.[1]
Serranidae[1]
Serranus annularis[1]
Serranus baldwini[1]
Serranus chionaraia[1]
Serranus phoebe[1]
Serranus subligarius[1]
Serranus tabacarius[1]
Serranus tigrinus[1]
Serranus tortugarum[1]
Sertularella diaphana
Siderastrea radians[2]
Siderastrea siderea[2]
Siderastrea sp.
Snapper sp.[1]
Solenastrea bournoni[2]
Solenastrea hyades
Sparidae[1]
Sparidae sp.[1]
Sparisoma atomarium[1]
Sparisoma aurofrenatum[1]
Sparisoma chrysopterum[1]
Sparisoma radians[1]
Sparisoma rubripinne[1]
Sparisoma sp.[1]
Sparisoma viride[1]
Sphoeroides[1]
Sphoeroides nephelus[1]
Sphoeroides spengleri[1]
Sphoeroides testudineus[1]
Sphyraena barracuda[1]
Sphyraena guachancho
Sphyraena picudilla
Sphyrna lewini
Sphyrna mokarran
Sphyrna tiburo
Sphyrna zygaena
Spirastrella coccinea
Spondylus americanus
Squirrelfish sp.[1]
Stegastes adustus[1]
Stegastes diencaeus[1]
Stegastes leucostictus[1]
Stegastes partitus[1]
Stegastes planifrons[1]
Stegastes sp.[1]
Stegastes variabilis[1]

Crustose coralline algae
Cryptotomus roseus[1]
Ctenogobius saepepallens[1]
Cyanobacteria
Cyanophyta spp.
Cynoscion nebulosus[1]
Dactylopterus volitans
Decapterus macarellus[1]
Decapterus punctatus[1]
Decapterus sp.[1]
Dendrogyra cylindrus[2]
Dentitheca dendritica
Dermatolepis inermis[1]
Desmapsamma anchorata
Diadema antillarum
Dichocoenia stokesii[2]
Dictyota
Dictyota spp.
Didemnidae
Diodogorgia nodulifera[2]
Diodon holocanthus[1]
Diodon hystrix[1]
Diodon sp.[1]
Diplastrella megastellata
Diplectrum bivittatum[1]
Diplectrum formosum[1]
Diplodus argenteus[1]
Diplodus holbrookii[1]
Diploria labyrinthiformis[2]
Doratonotus megalepis[1]
Echeneis naucrates
Echeneis neucratoides
Echidna catenata[1]
Echinoidea
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 carychroa[1]
Enchelycore nigricans[1]
Encrusting gorgonian[2]
Enneanectes altivelis
Enneanectes boehlkei
Enneanectes jordani
Epinephelus adscensionis[1]
Epinephelus drummondhayi[1]
Epinephelus guttatus[1]
Millepora complanata[2]
Millepora sp.[2]
Millepora spp.[2]
Mobula birostris
Mollusca
Monacanthidae[1]
Monacanthus ciliatus[1]
Monacanthus tuckeri[1]
Monanchora arbuscula
Montastraea cavernosa[2]
Mugil cephalus
Mullidae[1]
Mulloidichthys martinicus[1]
Muraena retifera[1]
Muricea[2]
Mussa angulosa[2]
Mycetophyllia aliciae[2]
Mycetophyllia ferox
Mycetophyllia lamarckiana
Mycetophyllia sp.
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]
Nes longus[1]
Nicholsina usta[1]
Niphates digitalis
Niphates erecta
Octocorallia[2]
Oculina diffusa[2]
Oculina sp.[2]
Ocyurus chrysurus[1]
Odontoscion dentex[1]
Ogcocephalus nasutus[1]
Ogcocephalus sp.
Oligoplites saurus[1]
Ophichthus ophis
Ophioblennius macclurei[1]
Opisthonema oglinum
Opistognathus aurifrons
Opistognathus macrognathus
Opistognathus maxillosus[1]
Opistognathus sp.
Opistognathus whitehursti
Stephanocoenia intersepta[2]
Stephanolepis hispida[1]
Stephanolepis setifer[1]
Strongylacidon sp.
Strongylura marina
Strongylura notata[1]
Strongylura timucu
Stygnobrotula latebricola
Substrate
Swiftia exserta[2]
Syacium micrurum[1]
Symplegma viride
Syngnathus louisianae[1]
Syngnathus scovelli[1]
Syngnathus sp.[1]
Synodus foetens[1]
Synodus intermedius[1]
Synodus saurus[1]
Synodus synodus[1]
Telesto fruticulosa[2]
Tetraodontidae[1]
Thalassoma bifasciatum[1]
Thick turf
Thyroscyphus marginatus
Thyroscyphus ramosus
Tigrigobius macrodon[1]
Tigrigobius saucrus[1]
Trachinotus falcatus[1]
Trachinotus goodei[1]
Trachurus lathami[1]
Tridemnum solidum
Turf algae free of sediment
Turf algae with sediment
Tylosurus crocodilus
Ulaema lefroyi
Umbrina coroides[1]
Umimayanthus parasiticus
Undaria sp.
Unidentified fish
Unidentified species
Unknown encrusting sponge
Unknown rope sponge
Unknown substrate
Unknown tube sponge
Upeneus parvus[1]
Urobatis jamaicensis
Valonia macrophysa
Valonia ventricosa
Xyrichtys martinicensis[1]
Xyrichtys novacula[1]
Xyrichtys splendens[1]
Zebrasoma velifer[1]
Zoanthidae
Abudefduf saxatilis[1]
Abudefduf taurus[1]

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

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