Yellow River Marsh Aquatic Preserve

SEACAR Habitat Analyses

Last compiled on 08 April, 2024

Contents

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*	*Sensor Type*
Dissolved Oxygen	mg/L	0	50	YSI EXOs
Dissolved Oxygen	mg/L	0	50	Analysis Only - 2022-04-04
Dissolved Oxygen	mg/L	0	50	6600 Series
Salinity	ppt	0	70	6600 Series
Salinity	ppt	0	70	YSI EXOs
Salinity	ppt	0	70	Analysis Only - 2022-04-04
Water Temperature	Degrees C	-5	45	YSI EXOs
Water Temperature	Degrees C	-5	45	Analysis Only - 2022-04-04
Water Temperature	Degrees C	-5	45	6600 Series
pH	pH	2	14	Analysis Only - 2022-04-04
pH	pH	2	14	6600 Series
pH	pH	2	14	YSI EXOs
Dissolved Oxygen Saturation	%	0	500	YSI EXOs
Dissolved Oxygen Saturation	%	0	500	6600 Series
Dissolved Oxygen Saturation	%	0	500	Analysis Only - 2022-04-04
Specific Conductivity	mS/cm	0	100	6600 Series
Specific Conductivity	mS/cm	0	200	YSI EXOs
Turbidity	NTU	0	4000	YSI EXOs
Turbidity	NTU	0	1000	6600 Series
Turbidity	NTU	0	4000	Analysis Only - 2022-04-04

Table 2: Discrete Water Quality threshold values

Parameter Name	*Units*	*Low Threshold*	*High Threshold*
Dissolved Oxygen	mg/L	0.000001	22
Salinity	ppt	0	70
Water Temperature	Degrees C	3	40
pH		2	13
Dissolved Oxygen Saturation	%	0.000001	310
Specific Conductivity	mS/cm	0.005000001	100
Turbidity	NTU	0	-
Total Suspended Solids (TSS)	mg/L	0	-
Chlorophyll a uncorrected for pheophytin	ug/L	0	-
Chlorophyll a corrected for pheophytin	ug/L	0	-
Secchi Depth	m	0.000001	50
Light Extinction Coefficient	m^1	0	-
Colored dissolved organic matter, CDOM	PCU	0	-
Fluorescent dissolved organic matter, FDOM	QSE	0	-
Total Nitrogen	mg/L	0	-
Total Kjeldahl Nitrogen TKN	mg/L	0	-
NO2+3 Filtered	mg/L	0	-
NH4 Filtered	mg/L	0	-
Total Phosphorus	mg/L	0	-

Parameter Name	*Units*	*Low Threshold*	*High Threshold*
PO4 Filtered	mg/L	0	-
Ammonia- Un-ionized (NH3)	mg/L	0	-
Nitrate (N)	mg/L	0	-
Nitrite (N)	mg/L	0	-
Nitrogen, organic	mg/L	0	-

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

SEACAR QAQC Description	*Include*	*SEACAR QAQCFlagCode*
Exceeds Maximum threshold. Not verified in raw data	No	2Q
Exceeds Maximum threshold. Verified in raw data	No	3Q
Below Minimum threshold. Not verified in raw data	No	4Q
Below Minimum threshold. Verified in raw data	No	5Q
Within threshold tolerance	Yes	6Q
No defined thresholds for this parameter	Yes	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	No	0	Value based on field kit determination; results may not be accurate
STORET-WIN	J	No	0	Estimated value
STORET-WIN	V	No	0	Analyte was detected at or above method detection limit
STORET-WIN	Y	No	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	Yes	Optional parameter not collected
SWMP	-2	No	Missing data
SWMP	-3	No	Data rejected due to QA/QC
SWMP	-4	No	Outside low sensor range
SWMP	-5	No	Outside high sensor range
SWMP	0	Yes	Passed initial QA/QC checks
SWMP	1	No	Suspect data
SWMP	2	Yes	Reserved for future use
SWMP	3	Yes	Calculated data: non-vented depth/level sensor correction for changes in barometric pressure
SWMP	4	Yes	Historical: Pre-auto QA/QC
SWMP	5	Yes	Corrected data

Water Column

The water column habitat extends from the surface of all water bodies to the bottom sediments and encompasses the different features found in the water at different depths (National Oceanographic Center, 2016). The water column habitat must be viewed in relation to its interconnectedness with other habitats. A healthy water column is an integral component in ensuring a healthy marine and coastal ecosystem. Having a flourishing marine and coastal ecosystem in Florida is necessary to support a strong economy. The health of the water column is dependent upon factors as diverse as land use (e.g., agriculture, mining, forestry practices); human population growth; emissions, (e.g., power plants, automobiles, wastewater); climate (e.g., rainfall, temperature, winds and currents); and decadal trends (e.g., El Niño/La Niña, Atlantic Multidecadal Oscillation, climate change).

The water column is composed of various physical, chemical and biological features, and only a small number of them are adequately monitored. Features of the water column that are monitored are used as indicators of the water column health and help assess the status of other habitats. These indicators include nutrient concentrations (nitrogen and phosphorus); water quality (dissolved oxygen, temperature, salinity and pH); water clarity (Secchi depth, turbidity, chlorophyll-a and colored dissolved organic matter); and nekton (fish, macroinvertebrates and megafauna).

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**.

Water Quality - Discrete

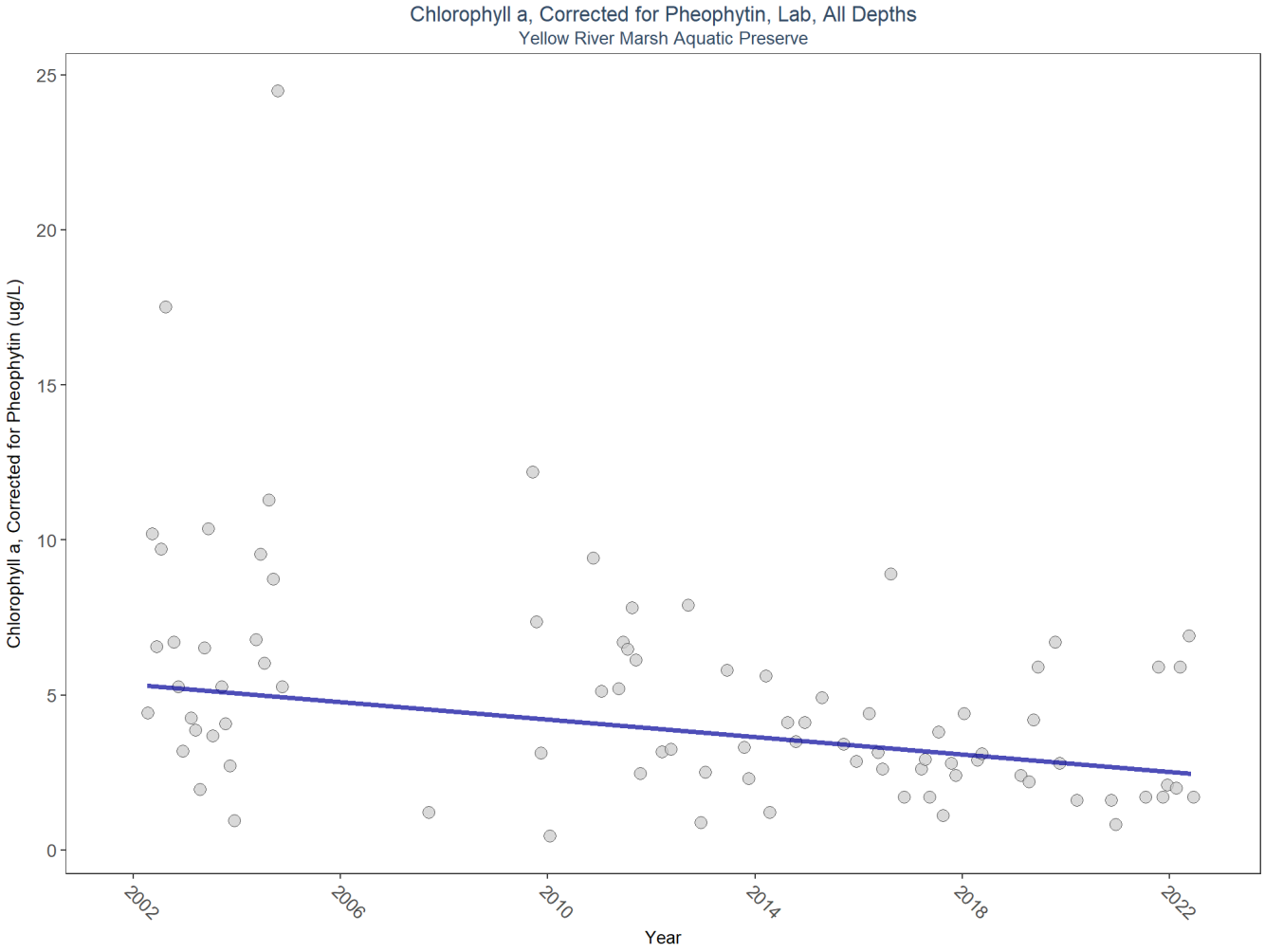
The following files were used in the discrete analysis:

- *Combined_WQ_WC_NUT_Chlorophyll_a_corrected_for_pheophytin-2024-Mar-27.txt*
- *Combined_WQ_WC_NUT_Chlorophyll_a_uncorrected_for_pheophytin-2024-Mar-27.txt*
- *Combined_WQ_WC_NUT_Colored_dissolved_organic_matter_CDOM-2024-Mar-27.txt*
- *Combined_WQ_WC_NUT_Dissolved_Oxygen-2024-Mar-27.txt*
- *Combined_WQ_WC_NUT_Dissolved_Oxygen_Saturation-2024-Mar-27.txt*
- *Combined_WQ_WC_NUT_pH-2024-Mar-27.txt*
- *Combined_WQ_WC_NUT_Salinity-2024-Mar-27.txt*
- *Combined_WQ_WC_NUT_Secchi_Depth-2024-Mar-27.txt*
- *Combined_WQ_WC_NUT_Total_Nitrogen-2024-Mar-27.txt*
- *Combined_WQ_WC_NUT_Total_Phosphorus-2024-Mar-27.txt*
- *Combined_WQ_WC_NUT_Total_Suspended_Solids_TSS-2024-Mar-27.txt*
- *Combined_WQ_WC_NUT_Turbidity-2024-Mar-27.txt*
- *Combined_WQ_WC_NUT_Water_Temperature-2024-Mar-27.txt*

Chlorophyll a, Corrected for Pheophytin - Discrete Water Quality

Chlorophyll-a is monitored as a measure of microalgae growing in the water. Algae are a natural part of coastal and aquatic ecosystems but in excess can cause poor water quality and clarity, and decreased levels of dissolved oxygen.

Seasonal Kendall-Tau Trend Analysis

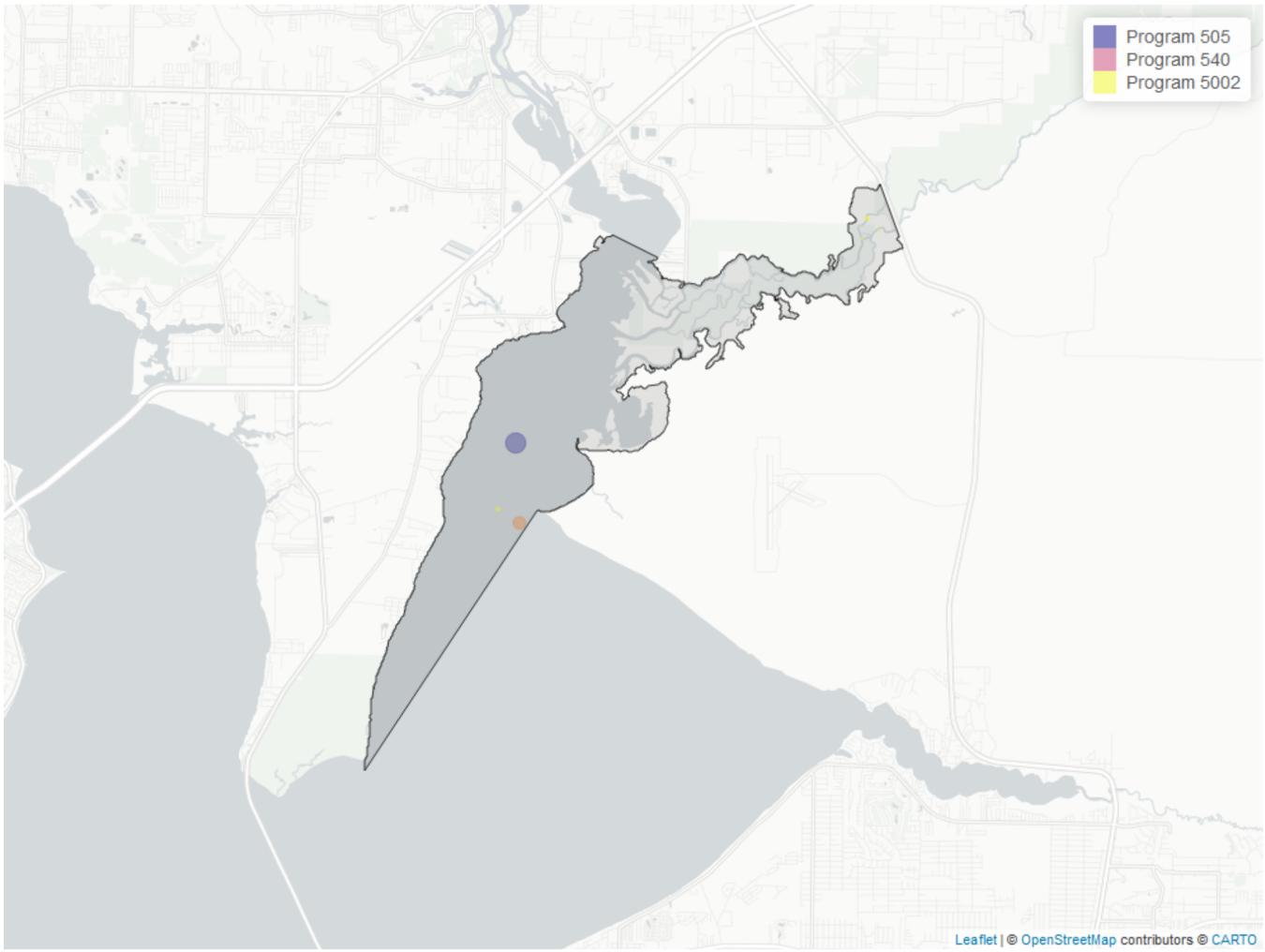


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	123	18	4.15	TRUE	-0.3293	0.0003	-0.1414086	5.343056	9.0518	0.6171	-1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Map showing location of Discrete sampling sites for Chlorophyll a, Corrected for Pheophytin



The bubble size on the above plots reflects the amount of data available at each sampling site

Table 6: Programs contributing data for Chlorophyll a, Corrected for Pheophytin

ProgramID	*N_Data*	*YearMin*	*YearMax*
505	67	2002	2012
5002	35	2007	2020
540	22	2016	2022

Program names:

505 - Pensacola Bay Water Quality Monitoring Program
5002 - Florida STORET / WIN
540 - Shellfish Harvest Area Classification Program

Value Qualifiers

- *N_Total* is total amount of data for a given year
- *N_* is the total amount of values flagged with the respective value qualifier in a given year
- *perc_* is the percent of data flagged with the respective value qualifier as a proportion of *N_Total*

Table 7: Value Qualifiers for Chlorophyll a, Corrected for Pheophytin

Year	*N_Total*	*N_I*	*perc_I*	*N_U*	*perc_U*
2007	1	1	100.0		
2012	6	1	16.7		
2014	5	1	20.0		
2016	7	1	14.3		
2017	11	2	18.2		
2019	6	1	16.7		
2020	4	1	25.0	2	50
2021	4	3	75.0		
2022	4	2	50.0		

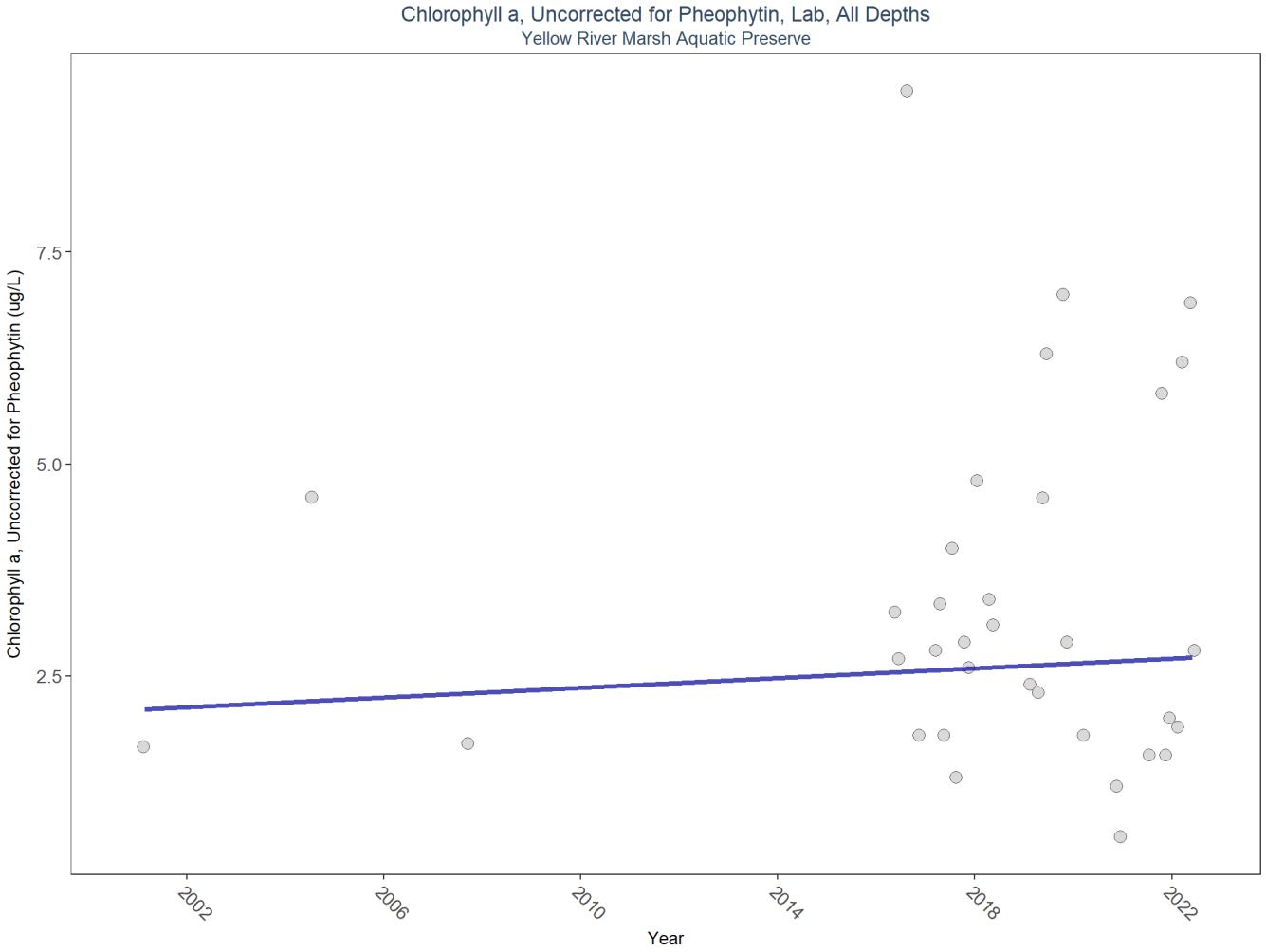
Note: [1]**I** - Reported value is greater than or equal to lab method detection limit, but less than quantitation limit [2]**U** - Compound was analyzed for but not detected

Programs containing Value Qualified data:

540 - Shellfish Harvest Area Classification Program
5002 - Florida STORET / WIN

Chlorophyll a, Uncorrected for Pheophytin - Discrete Water Quality

Seasonal Kendall-Tau Trend Analysis

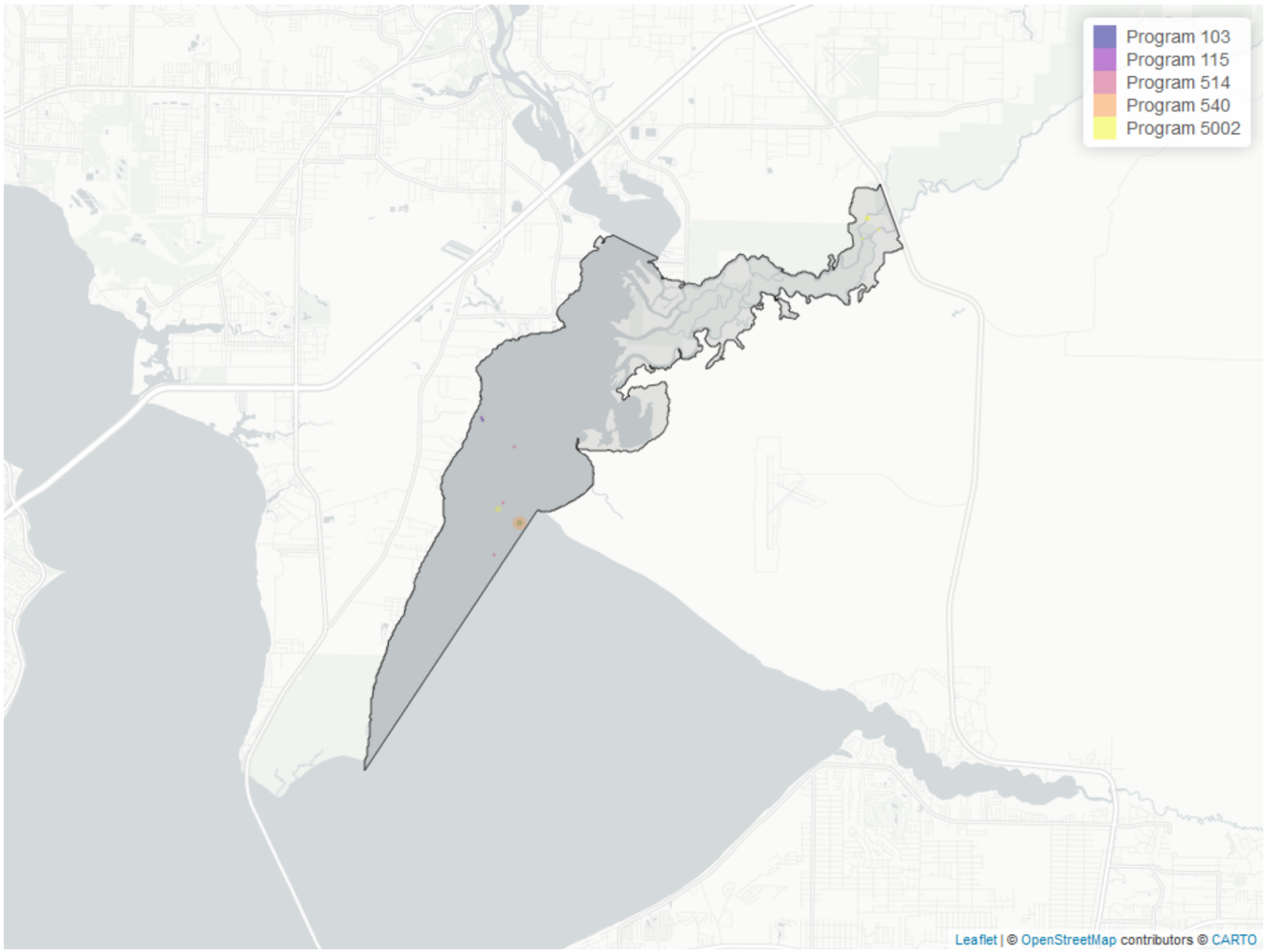


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	48	10	2.7	TRUE	0.0625	0.6920	0.0287037	2.1	8.1222	0.5219	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Map showing location of Discrete sampling sites for Chlorophyll a, Uncorrected for Pheophytin



The bubble size on the above plots reflects the amount of data available at each sampling site

Table 8: Programs contributing data for Chlorophyll a, Uncorrected for Pheophytin

ProgramID	*N_Data*	*YearMin*	*YearMax*
540	22	2016	2022
5002	16	2007	2020
103	7	2004	2021
514	3	2001	2001
115	1	2004	2004

Program names:

540 - Shellfish Harvest Area Classification Program
5002 - Florida STORET / WIN
103 - EPA STOrage and RETrieval Data Warehouse (STORET)

514 - Florida LAKEWATCH Program
115 - Environmental Monitoring Assessment Program

Value Qualifiers

- *N_Total* is total amount of data for a given year
- *N_* is the total amount of values flagged with the respective value qualifier in a given year
- *perc_* is the percent of data flagged with the respective value qualifier as a proportion of *N_Total*

Table 9: Value Qualifiers for Chlorophyll a, Uncorrected for Pheophytin

Year	*N_Total*	*N_I*	*perc_I*	*N_U*	*perc_U*
2020	4	1	25	2	50
2021	10	2	20		
2022	4	2	50		

Note: [1]**I** - Reported value is greater than or equal to lab method detection limit, but less than quantitation limit [2]**U** - Compound was analyzed for but not detected

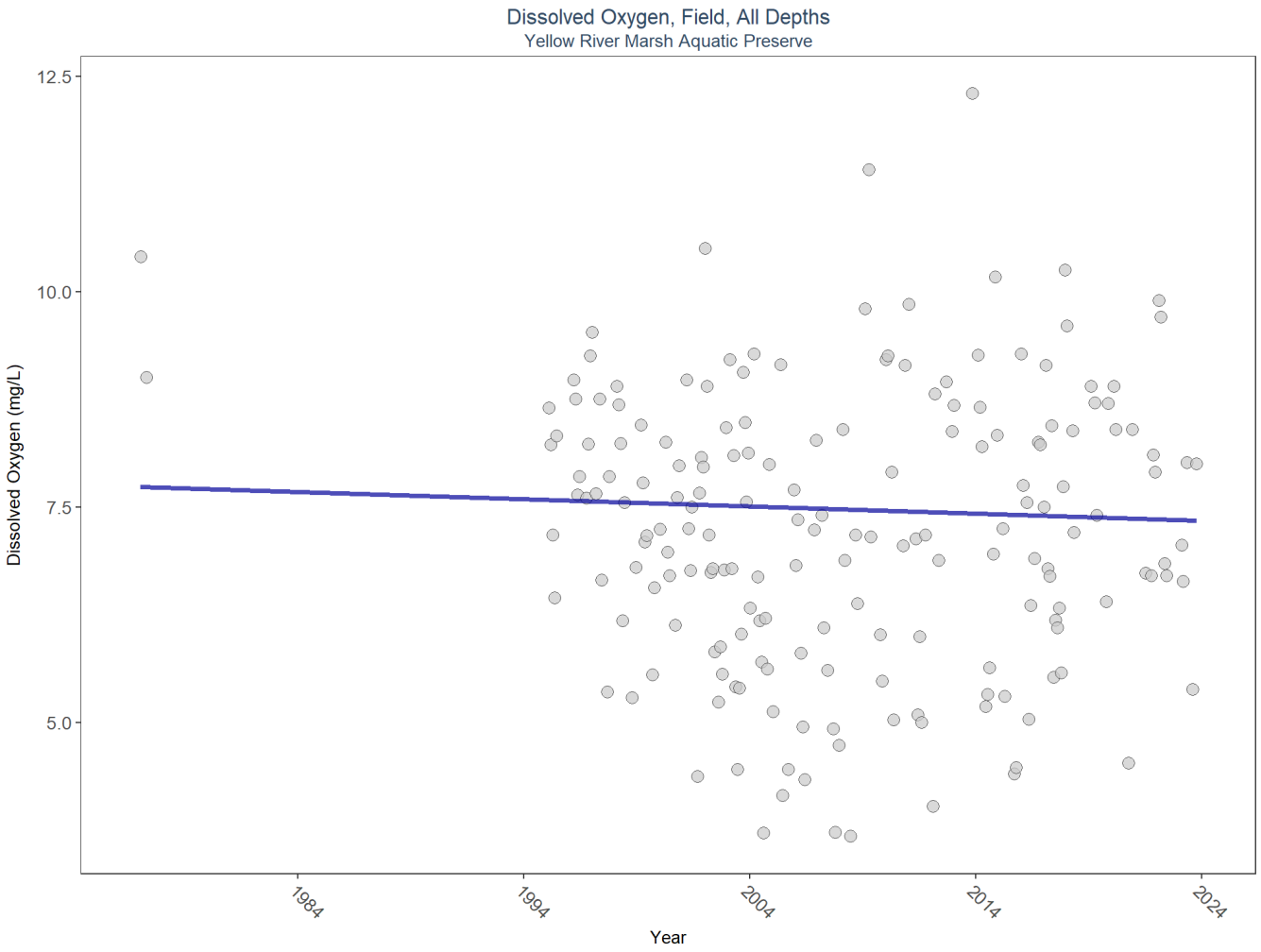
Programs containing Value Qualified data:

5002 - Florida STORET / WIN
540 - Shellfish Harvest Area Classification Program

Dissolved Oxygen - Discrete Water Quality

Dissolved Oxygen (*DO*) is a key indicator of water quality. Oxygen enters surface waters by air-sea gas exchange, by wind action, or as a byproduct of aquatic plant photosynthesis. The actual quantity of DO in aquatic environments is dependent on the above processes as well as water temperature and salinity.

Seasonal Kendall-Tau Trend Analysis

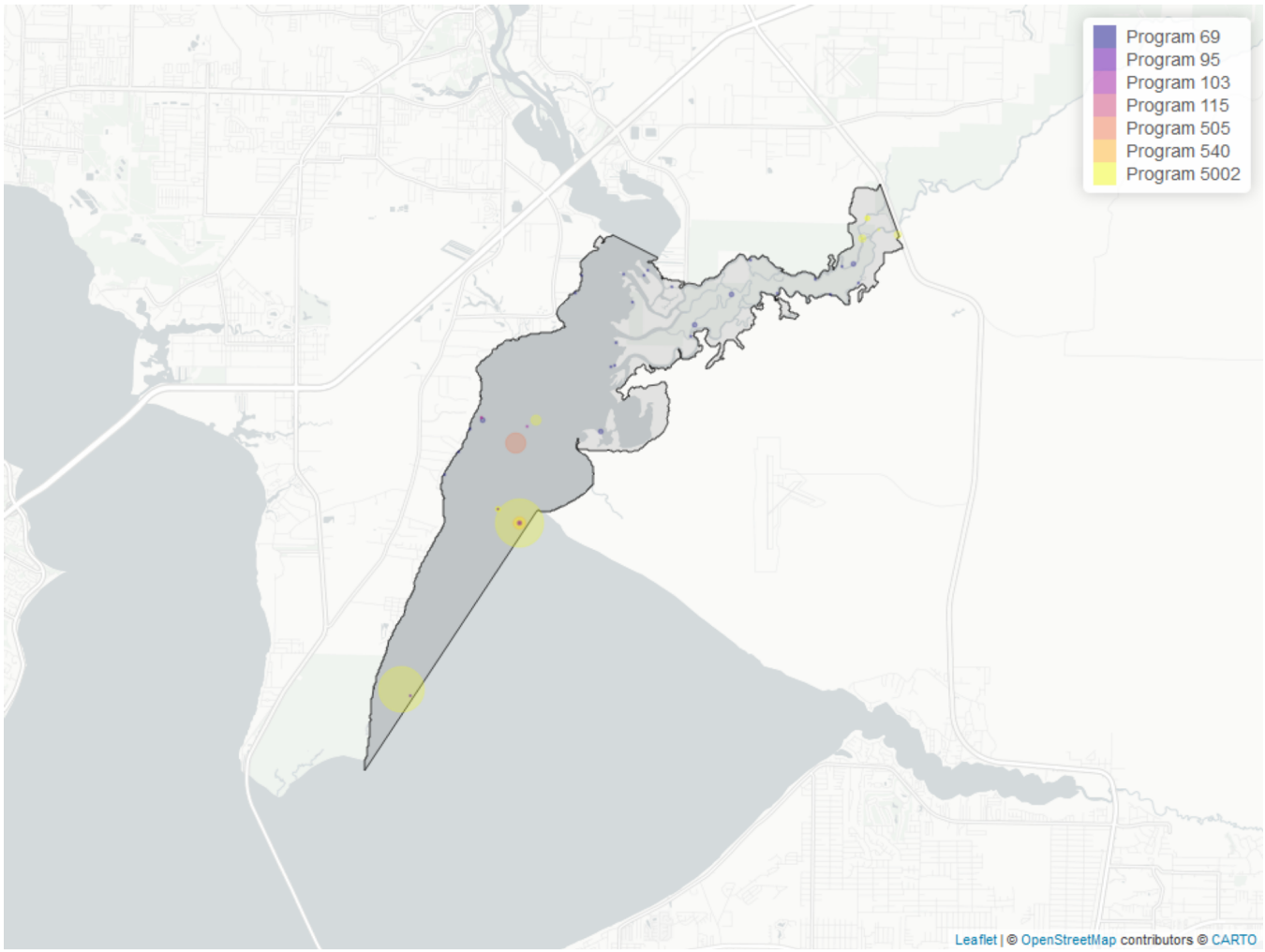


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	892	30	7.4	TRUE	-0.0035	0.5074	-0.008333333	7.736143	14.4044	0.2114	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Map showing location of Discrete sampling sites for Dissolved Oxygen



The bubble size on the above plots reflects the amount of data available at each sampling site

Table 10: Programs contributing data for Dissolved Oxygen

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	745	1995	2023
505	66	2002	2012
69	55	2003	2017
540	21	2016	2022
103	6	1977	2021
95	4	2000	2017
115	2	2004	2004

Program names:

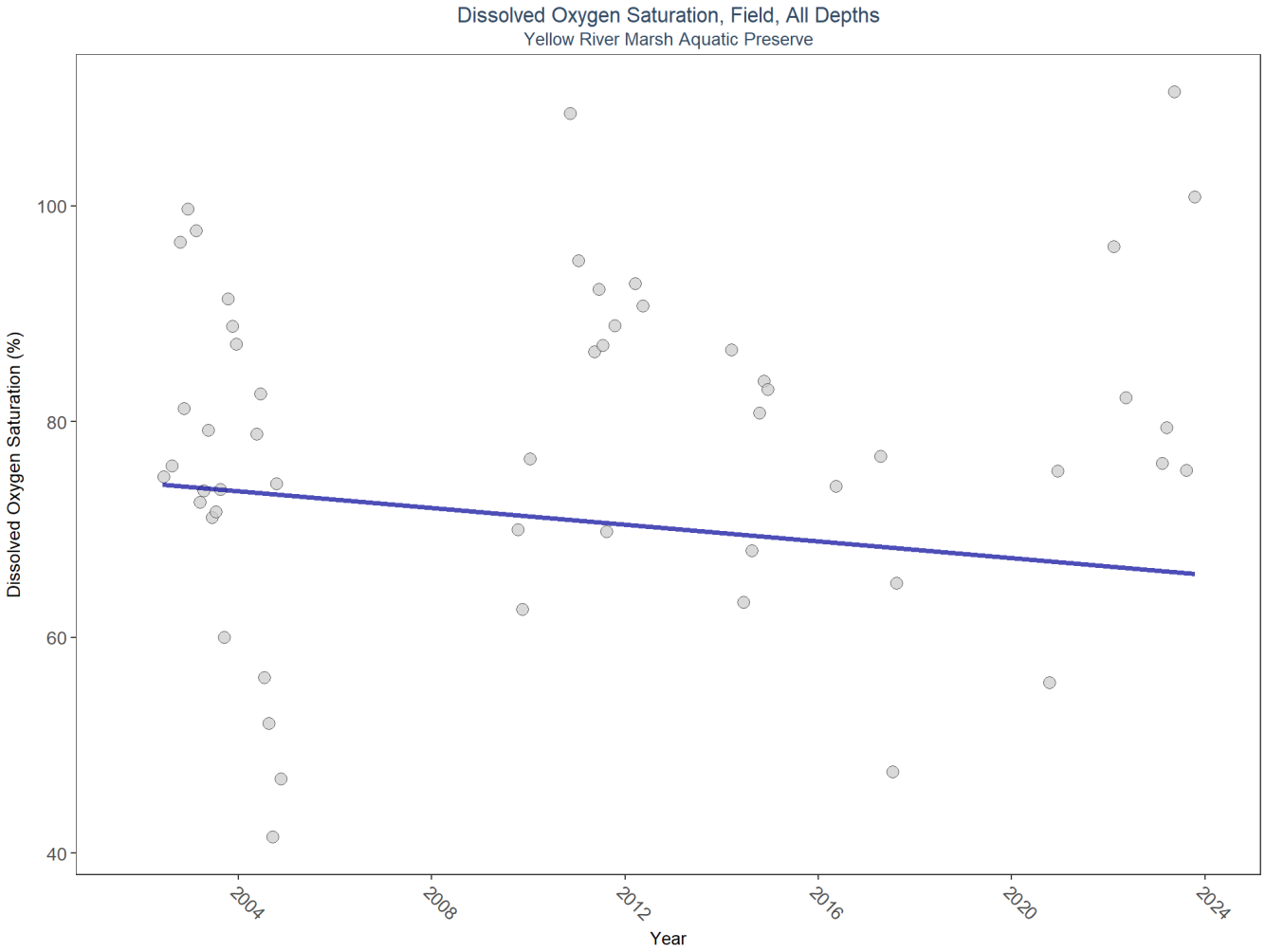
5002 - Florida STORET / WIN
505 - Pensacola Bay Water Quality Monitoring Program

69 - Fisheries-Independent Monitoring (FIM) Program
540 - Shellfish Harvest Area Classification Program
103 - EPA STOrage and RETrieval Data Warehouse (STORET)
95 - Harmful Algal Bloom Marine Observation Network
115 - Environmental Monitoring Assessment Program

There are no qualifying Value Qualifiers for Dissolved Oxygen in Yellow River Marsh Aquatic Preserve

Dissolved Oxygen Saturation - Discrete Water Quality

Seasonal Kendall-Tau Trend Analysis

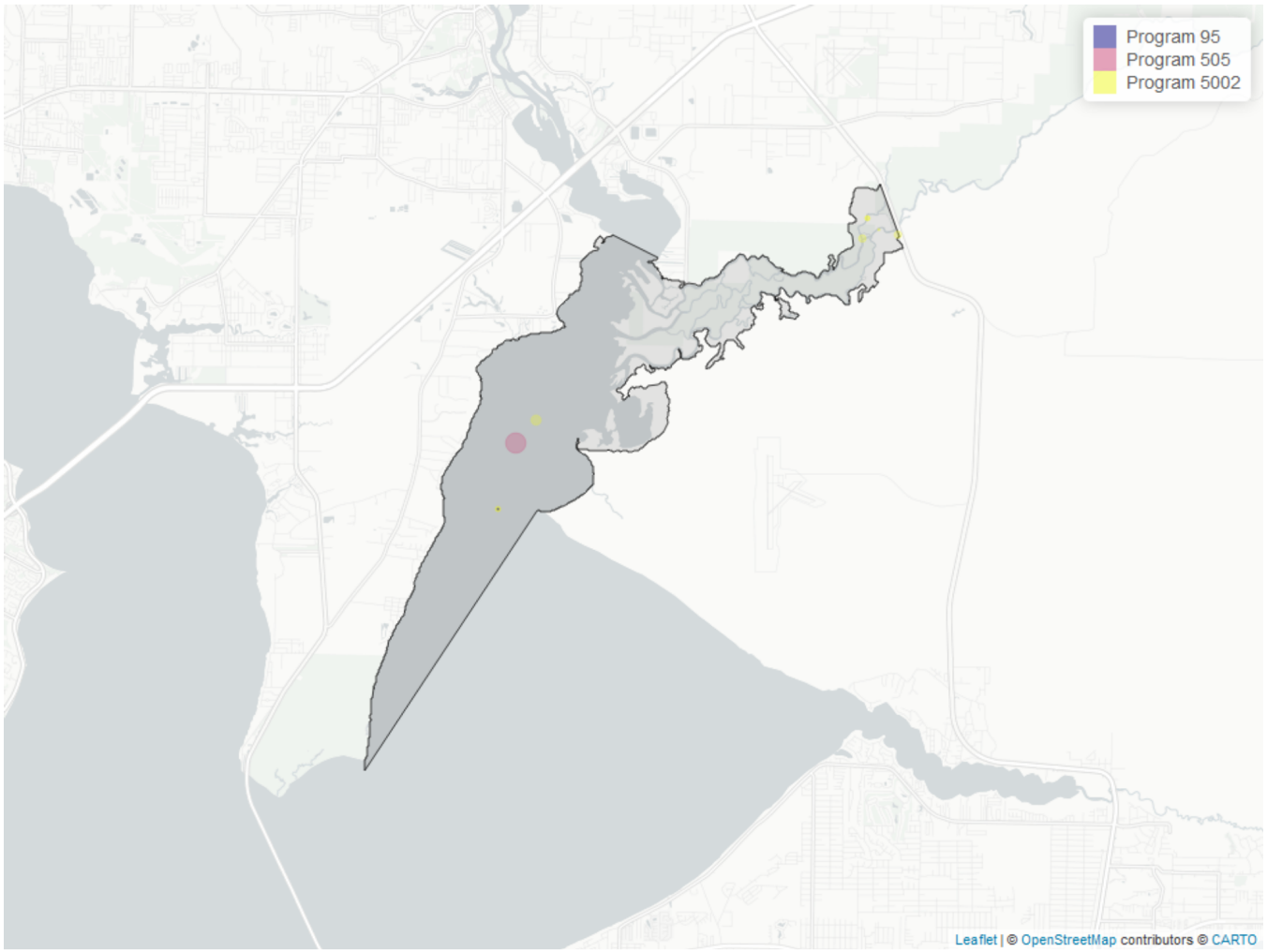


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	114	13	78.12	TRUE	-0.1145	0.5112	-0.3872727	74.31369	11.7743	0.3808	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Map showing location of Discrete sampling sites for Dissolved Oxygen Saturation



The bubble size on the above plots reflects the amount of data available at each sampling site

Table 11: Programs contributing data for Dissolved Oxygen Saturation

ProgramID	*N_Data*	*YearMin*	*YearMax*
505	62	2002	2012
5002	53	2014	2023
95	1	2017	2017

Program names:

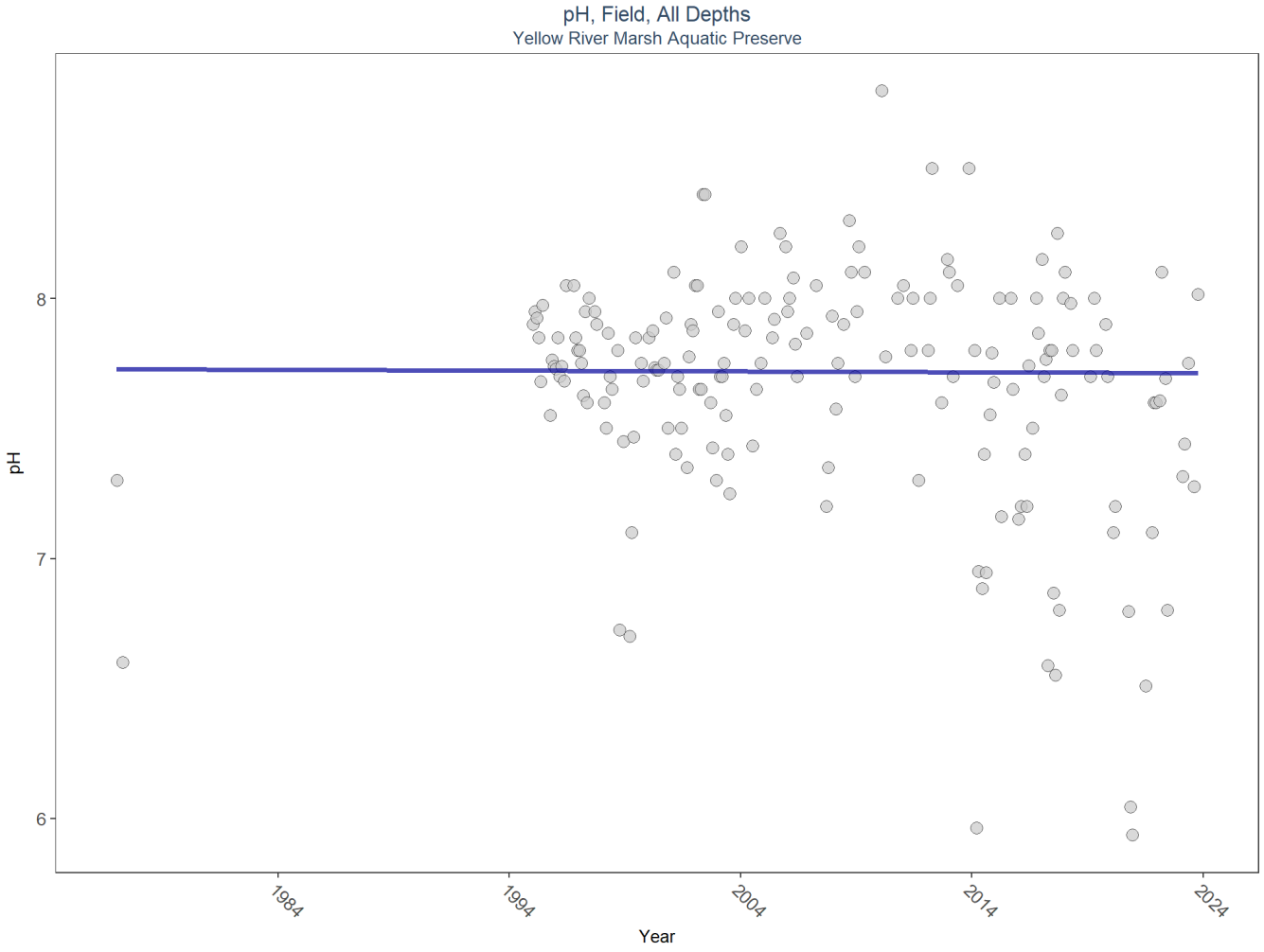
505 - Pensacola Bay Water Quality Monitoring Program
5002 - Florida STORET / WIN
95 - Harmful Algal Bloom Marine Observation Network

There are no qualifying Value Qualifiers for Dissolved Oxygen Saturation in Yellow River Marsh Aquatic Preserve

pH - Discrete Water Quality

The **pH** of water is the measure of how acidic or basic the water body is on a scale of 0-14, with lower readings indicating acidic and higher readings indicating basic, and a pH of 7 being neutral. Florida's natural waters fall between 6.5 and 8.5 on this scale. A water body's pH can change due to precipitation, geology, vegetation, water pollution and air pollution.

Seasonal Kendall-Tau Trend Analysis

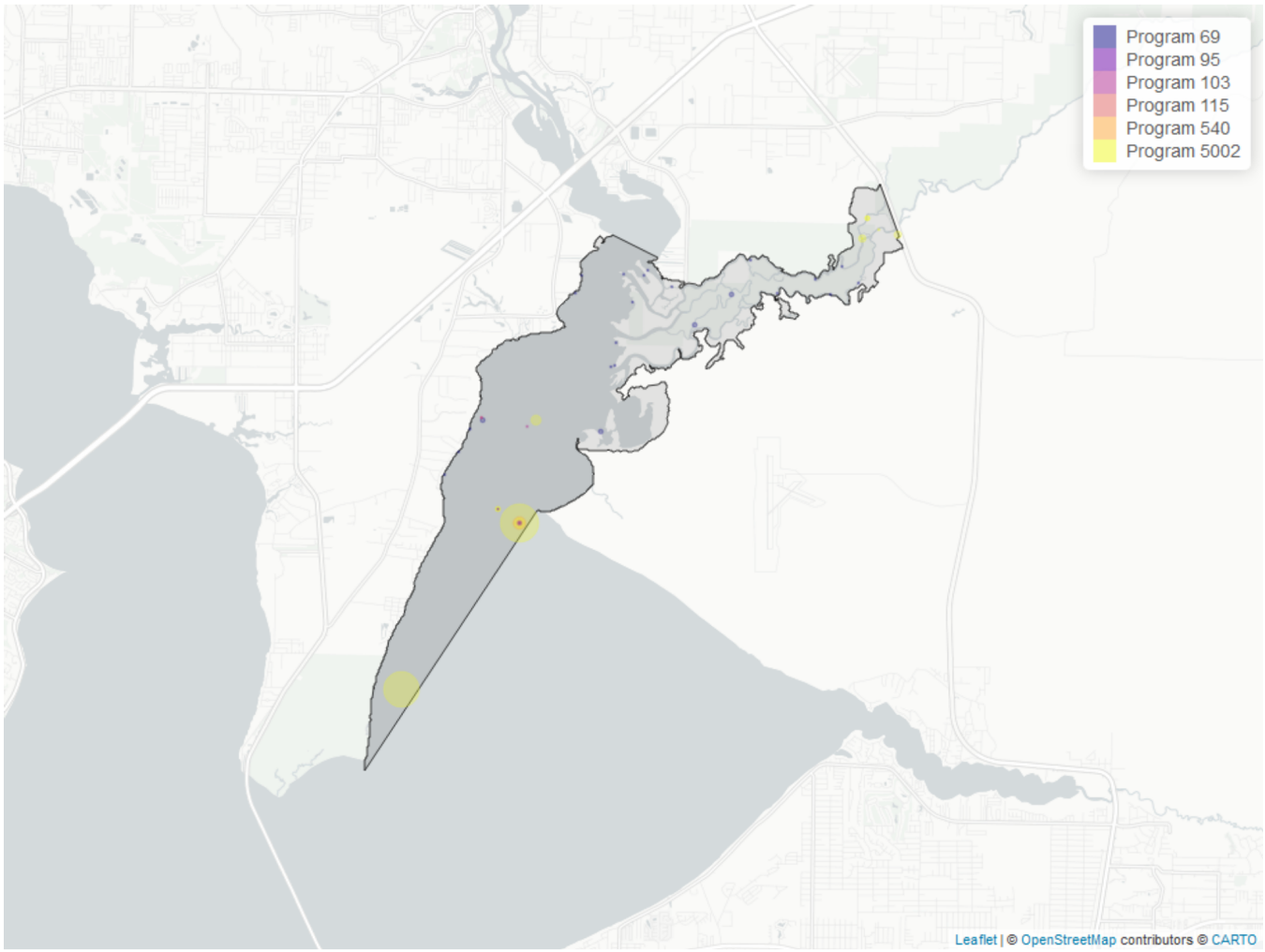


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	567	30	7.7	TRUE	-0.037	0.7221	-0.0002777778	7.728002	18.3625	0.0735	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Map showing location of Discrete sampling sites for pH



The bubble size on the above plots reflects the amount of data available at each sampling site

Table 12: Programs contributing data for pH

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	494	1995	2023
69	50	2003	2017
540	21	2016	2022
103	6	1977	2021
95	3	2014	2017
115	2	2004	2004

Program names:

5002 - Florida STORET / WIN
69 - Fisheries-Independent Monitoring (FIM) Program
540 - Shellfish Harvest Area Classification Program

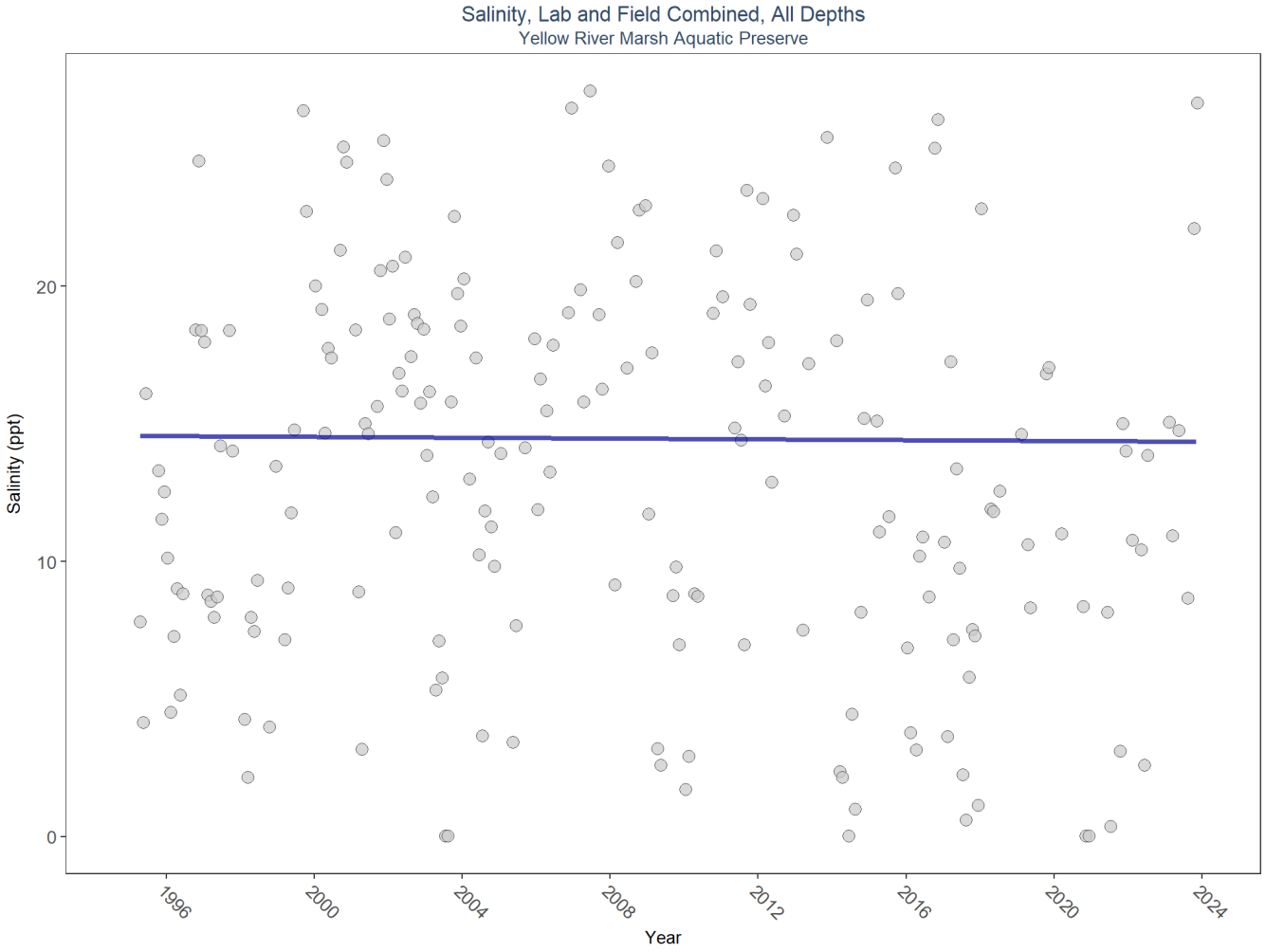
103 - EPA STOrage and RETrieval Data Warehouse (STORET)
95 - Harmful Algal Bloom Marine Observation Network
115 - Environmental Monitoring Assessment Program

There are no qualifying Value Qualifiers for pH in Yellow River Marsh Aquatic Preserve

Salinity - Discrete Water Quality

Salinity is a measure of the amount of salt in the water. In estuarine ecosystems, salinity is influenced by precipitation, evaporation, surface-water inputs, and exchange with coastal waters.

Seasonal Kendall-Tau Trend Analysis

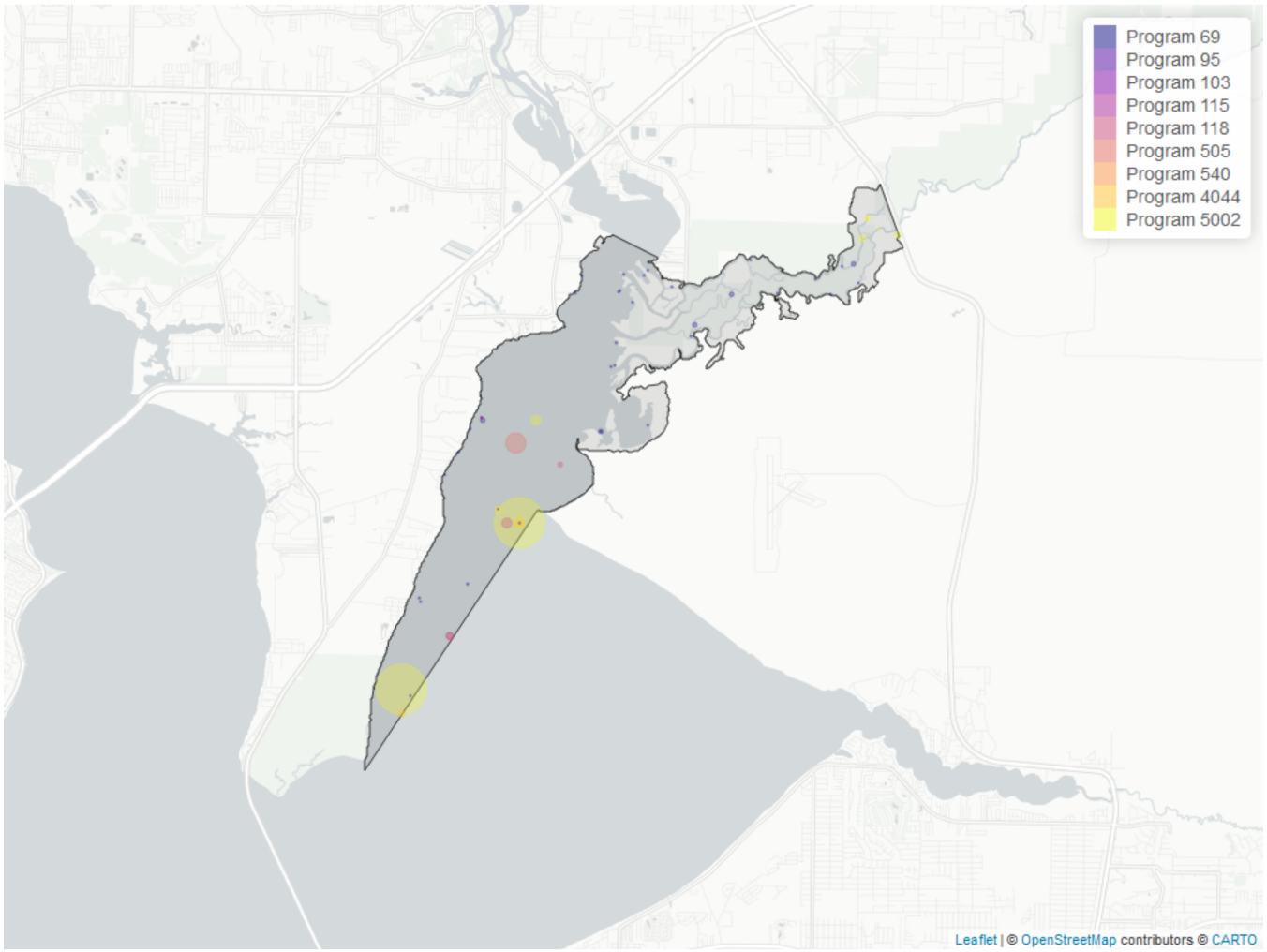


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	1069	29	12.2	TRUE	-0.0102	0.9029	-0.007142857	14.56652	6.598	0.8306	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Map showing location of Discrete sampling sites for Salinity



The bubble size on the above plots reflects the amount of data available at each sampling site

Table 13: Programs contributing data for Salinity

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	864	1995	2023
69	68	2003	2017
505	67	2002	2012
118	40	2015	2021
540	19	2016	2022
4044	10	2017	2023
95	4	2000	2017
115	2	2004	2004
103	1	2004	2004

Program names:

5002 - Florida STORET / WIN
69 - Fisheries-Independent Monitoring (FIM) Program
505 - Pensacola Bay Water Quality Monitoring Program
118 - National Aquatic Resource Surveys, National Coastal Condition Assessment
540 - Shellfish Harvest Area Classification Program
4044 - NRDA Oyster Cultch Recovery Project
95 - Harmful Algal Bloom Marine Observation Network
115 - Environmental Monitoring Assessment Program
103 - EPA STOrage and RETrieval Data Warehouse (STORET)

There are no qualifying Value Qualifiers for Salinity in Yellow River Marsh Aquatic Preserve

Total Nitrogen - Discrete Water Quality

Nitrogen and **Phosphorous** are key nutrients that provide nourishment essential for the growth and maintenance of aquatic plants and animals; however, excess nutrients can cause harmful algal blooms and other water quality concerns. Nutrients enter water bodies several ways, including runoff from rain events and atmospheric deposition from natural and industrial sources.

Total Nitrogen Calculation:

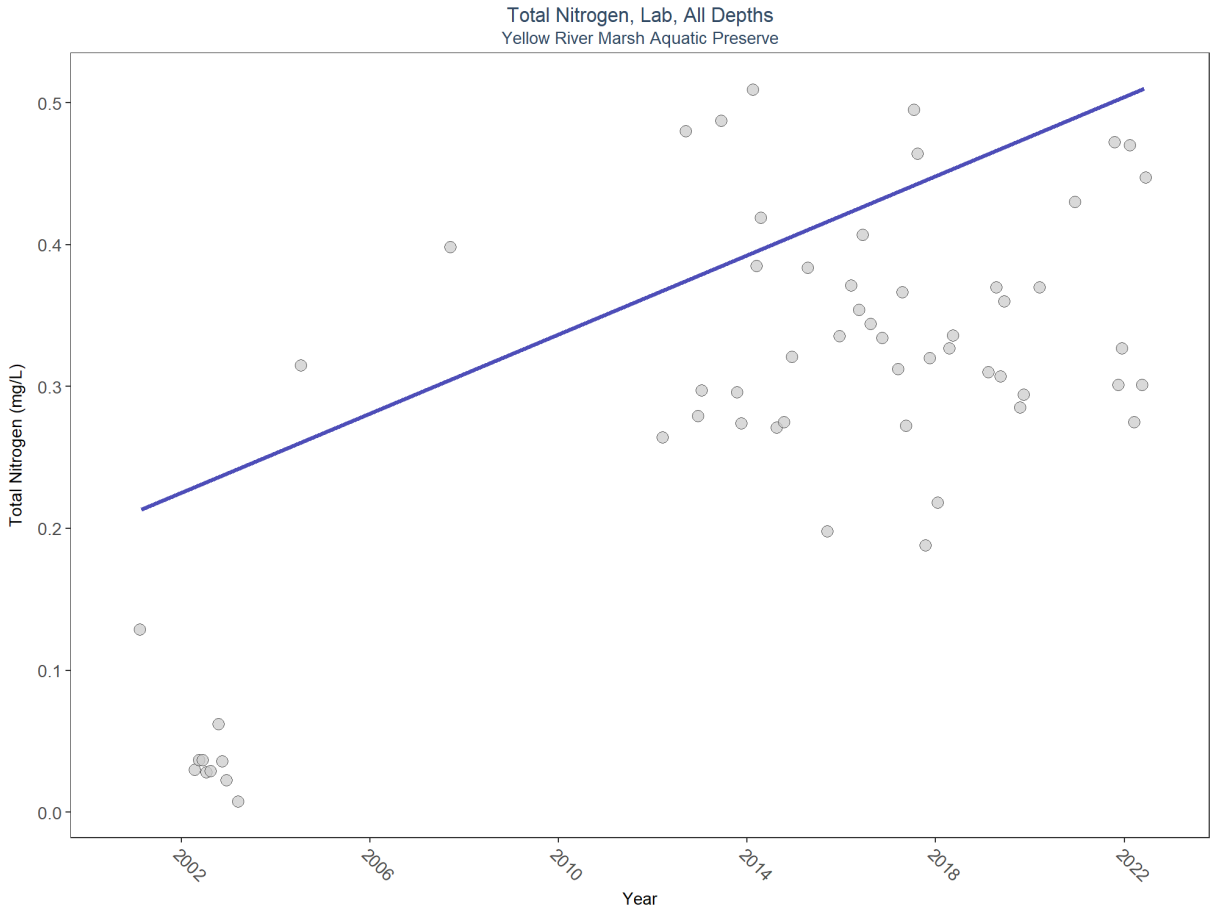
The logic for calculated Total Nitrogen was provided by Kevin O'Donnell and colleagues at FDEP (with the help of Jay Silvanima, Watershed Monitoring Section). The following logic is used, in this order, based on the availability of specific nitrogen components.

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:
  - FDEP report that if both "Total" and "Dissolved" are reported, only "Total" is used. If the total is not reported, they do use dissolved as a best available replacement.
  - An analysis of all SEACAR data shows that 90% of all possible TN calculations can be done using nitrogen components with the same sample fraction, rather than use nitrogen components with mixed total/dissolved sample fractions. In other words, TN can be calculated when TKN and NO3O2 are both total sample fraction, or when both are dissolved sample fraction. This is important, because then the calculated TN value is not 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

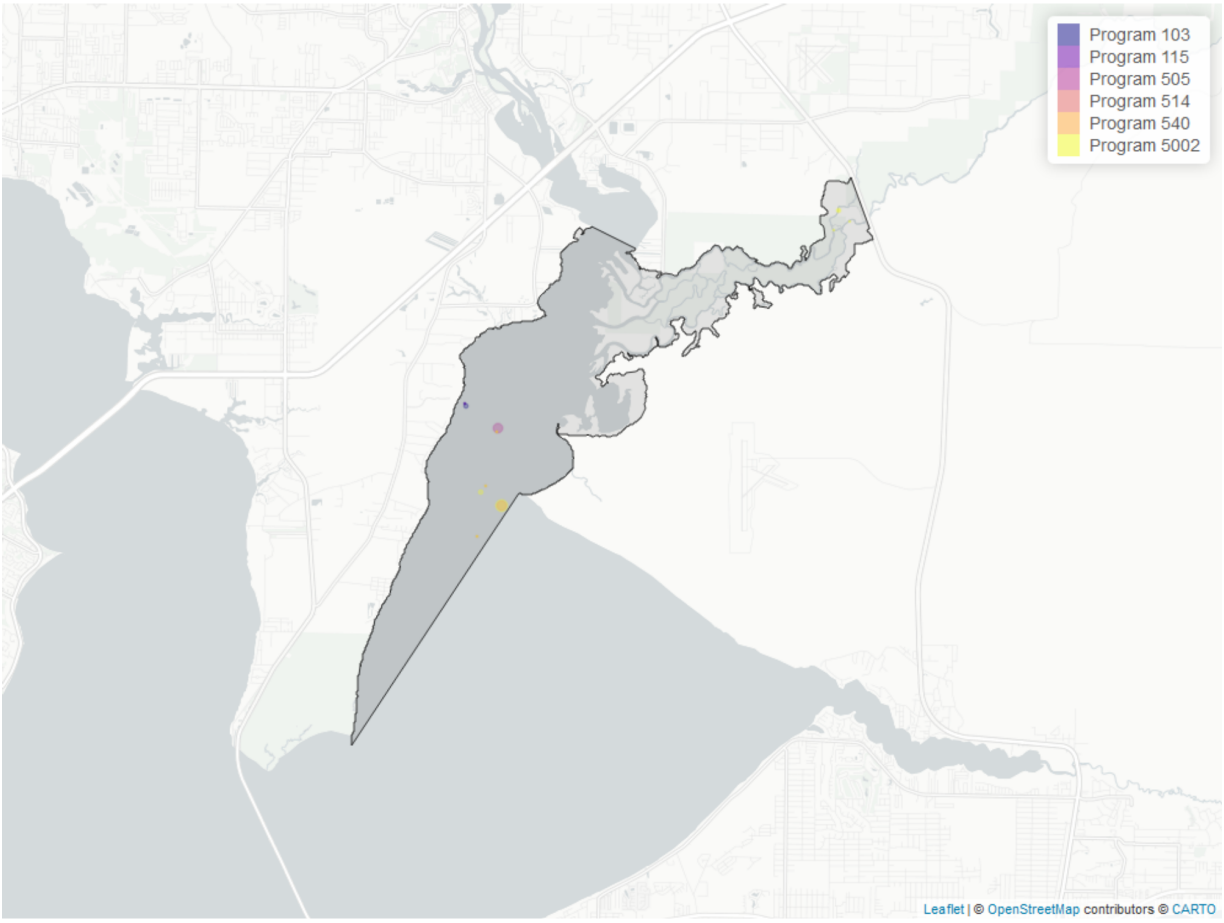


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	89	16	0.297	TRUE	0.2851	0.0172	0.01395263	0.2113338	10.3741	0.4971	1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Map showing location of Discrete sampling sites for Total Nitrogen



The bubble size on the above plots reflects the amount of data available at each sampling site

Table 14: Programs contributing data for Total Nitrogen

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	39	2001	2020
540	20	2016	2022
505	20	2002	2003
103	6	2004	2004
514	3	2001	2001
115	1	2004	2004

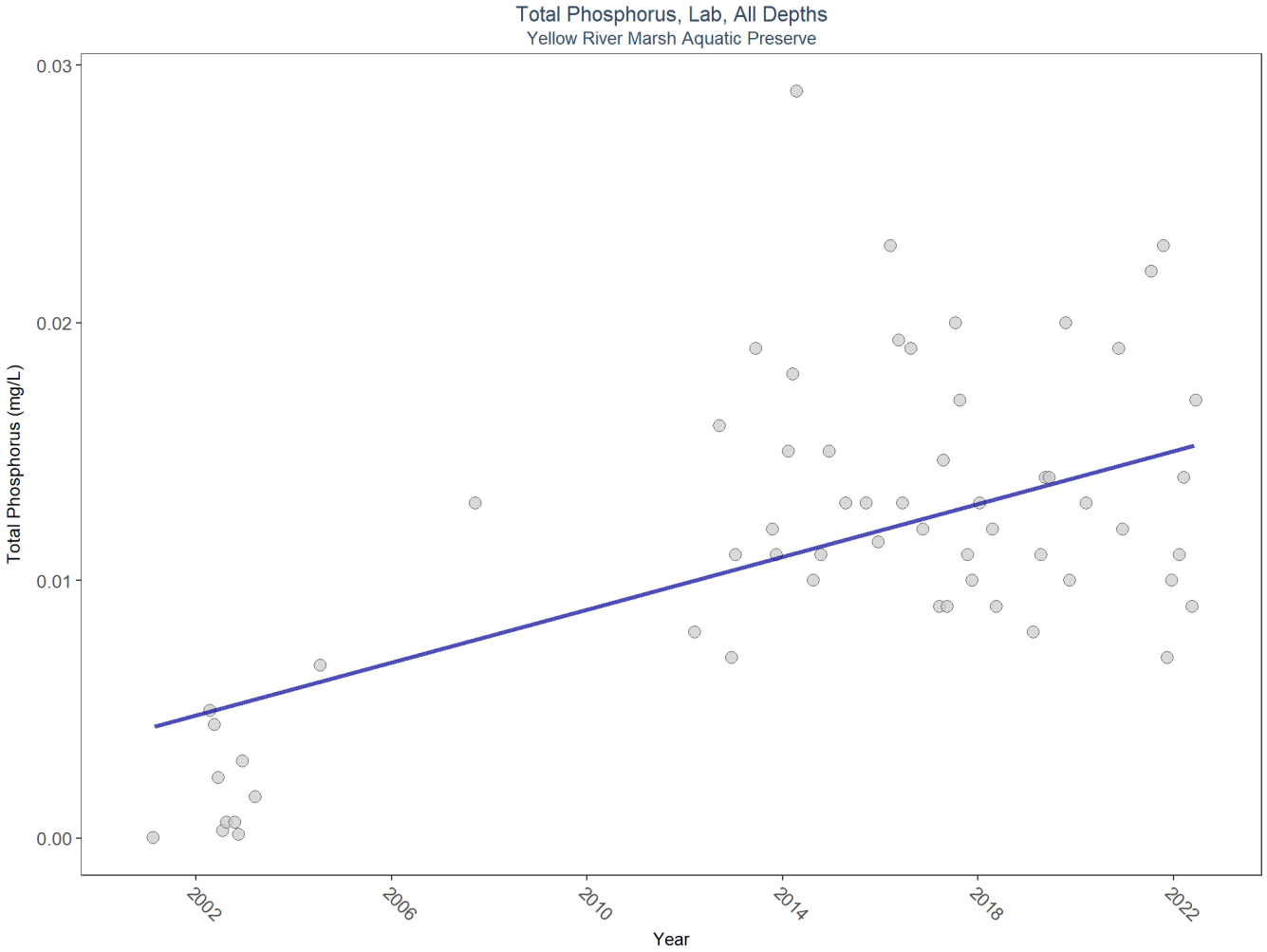
Program names:

5002 - Florida STORET / WIN
540 - Shellfish Harvest Area Classification Program
505 - Pensacola Bay Water Quality Monitoring Program
103 - EPA STOrage and RETrieval Data Warehouse (STORET)
514 - Florida LAKEWATCH Program
115 - Environmental Monitoring Assessment Program

There are no qualifying Value Qualifiers for Total Nitrogen in Yellow River Marsh Aquatic Preserve

Total Phosphorus - Discrete Water Quality

Seasonal Kendall-Tau Trend Analysis

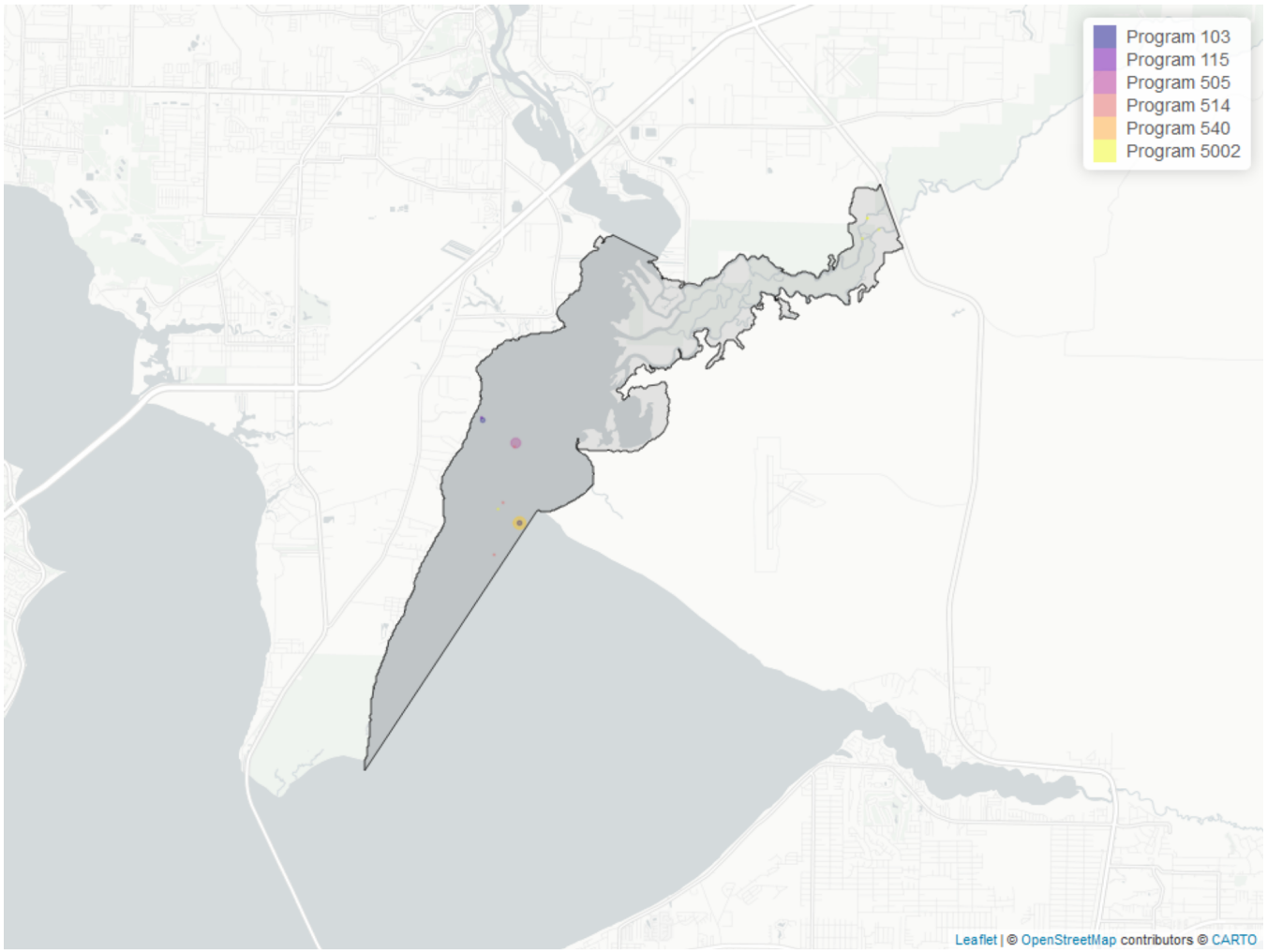


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	82	16	0.011	TRUE	0.3544	0.0085	0.0005117778	0.00426348	6.3437	0.8495	1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Map showing location of Discrete sampling sites for Total Phosphorus



The bubble size on the above plots reflects the amount of data available at each sampling site

Table 15: Programs contributing data for Total Phosphorus

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	34	2007	2020
540	22	2016	2022
505	18	2002	2003
103	6	2004	2021
514	3	2001	2001
115	1	2004	2004

Program names:

5002 - Florida STORET / WIN
540 - Shellfish Harvest Area Classification Program
505 - Pensacola Bay Water Quality Monitoring Program

103 - EPA STOrage and RETrieval Data Warehouse (STORET)
514 - Florida LAKEWATCH Program
115 - Environmental Monitoring Assessment Program

Value Qualifiers

- *N_Total* is total amount of data for a given year
- *N_* is the total amount of values flagged with the respective value qualifier in a given year
- *perc_* is the percent of data flagged with the respective value qualifier as a proportion of *N_Total*

Table 16: Value Qualifiers for Total Phosphorus

Year	*N_Total*	*N_I*	*perc_I*	*N_U*	*perc_U*
2012	3	1	33.3	1	33.3
2014	6	1	16.7		
2017	9	2	22.2		
2018	3	1	33.3		
2019	6	1	16.7		
2021	7	2	28.6		
2022	4	1	25.0		

Note: [1]**I** - Reported value is greater than or equal to lab method detection limit, but less than quantitation limit [2]**U** - Compound was analyzed for but not detected

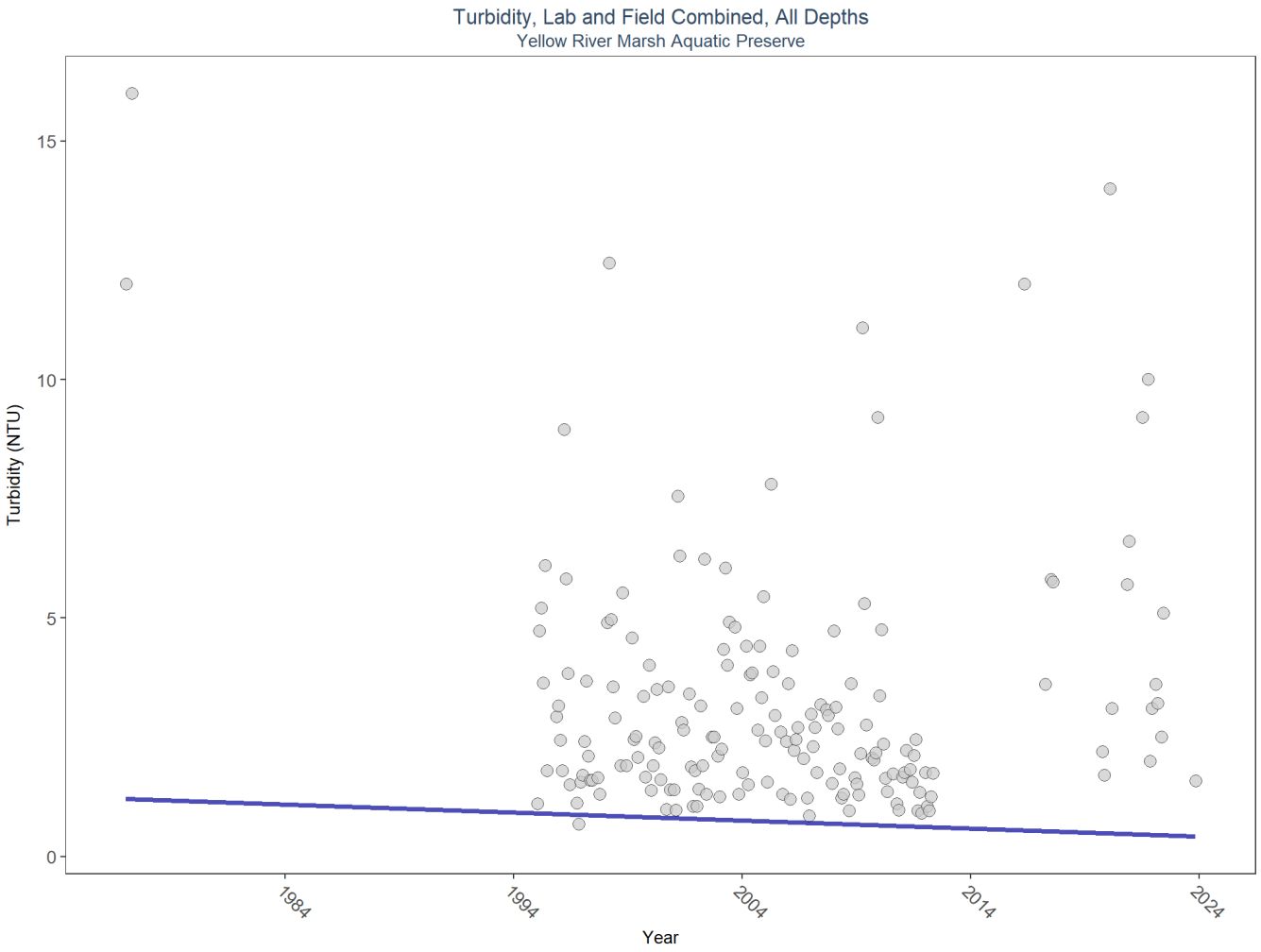
Programs containing Value Qualified data:

5002 - Florida STORET / WIN
540 - Shellfish Harvest Area Classification Program

Turbidity - Discrete Water Quality

Turbidity results from suspended solids in the water, including silts, clays, tannins, industrial wastes, sewage and plankton, which are all factors that contribute to how clouded or murky a water column is. Turbidity is caused by soil erosion, excess nutrients, pollutants, and physical forces such as winds, currents and bottom feeders.

Seasonal Kendall-Tau Trend Analysis

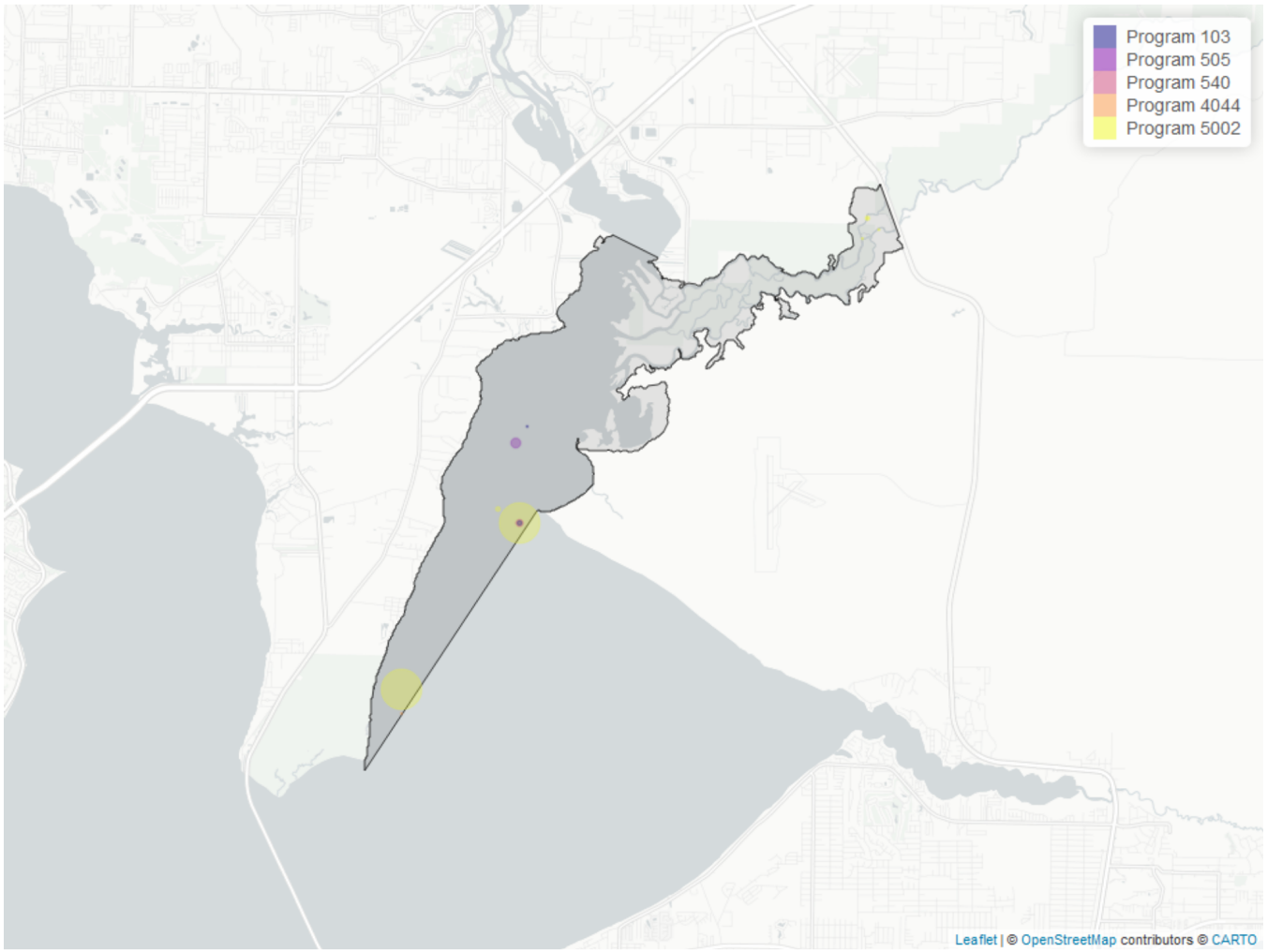


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	576	26	2.4	TRUE	-0.0061	0.3630	-0.01690476	1.207279	23.1814	0.0167	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Map showing location of Discrete sampling sites for Turbidity



The bubble size on the above plots reflects the amount of data available at each sampling site

Table 17: Programs contributing data for Turbidity

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	544	1995	2020
505	13	2009	2012
540	12	2019	2022
103	5	1977	2021
4044	2	2023	2023

Program names:

5002 - Florida STORET / WIN
505 - Pensacola Bay Water Quality Monitoring Program
540 - Shellfish Harvest Area Classification Program
103 - EPA STOrage and RETrieval Data Warehouse (STORET)

4044 - NRDA Oyster Cultch Recovery Project

Value Qualifiers

- *N_Total* is total amount of data for a given year
- *N_* is the total amount of values flagged with the respective value qualifier in a given year
- *perc_* is the percent of data flagged with the respective value qualifier as a proportion of *N_Total*

Table 18: Value Qualifiers for Turbidity

Year	*N_Total*	*N_Q*	*perc_Q*
2020	4	1	25

Note: [1]**Q** - Sample held beyond the accepted holding time

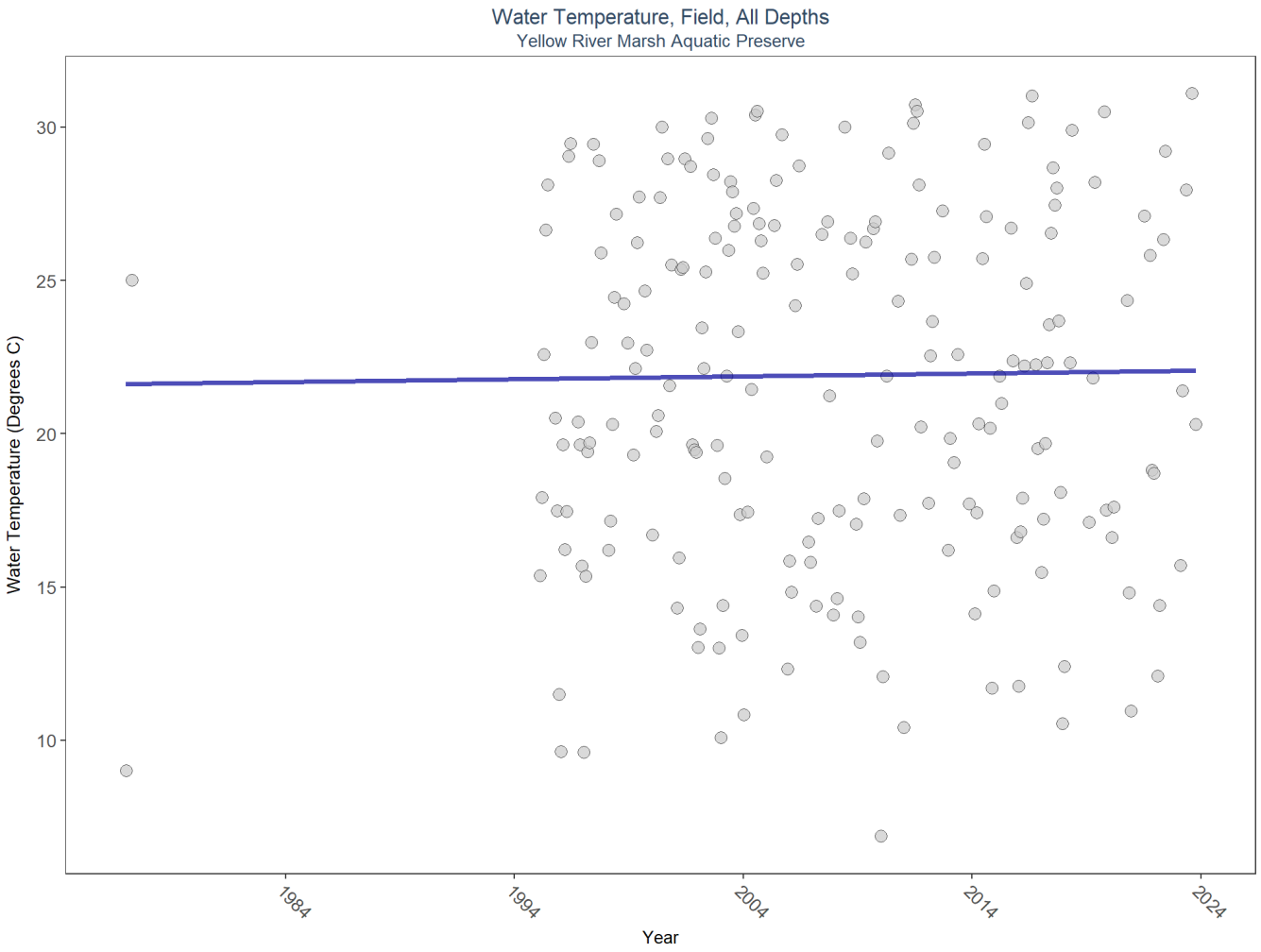
Programs containing Value Qualified data:

540 - Shellfish Harvest Area Classification Program

Water Temperature - Discrete Water Quality

Temperature determines the capacity of water to hold oxygen. Cooler water can hold more dissolved oxygen because water molecules are more tightly packed, making it harder for oxygen to escape. Additionally, as water temperature increases, fish and other aquatic organisms become more active and consume oxygen at a faster rate.

Seasonal Kendall-Tau Trend Analysis

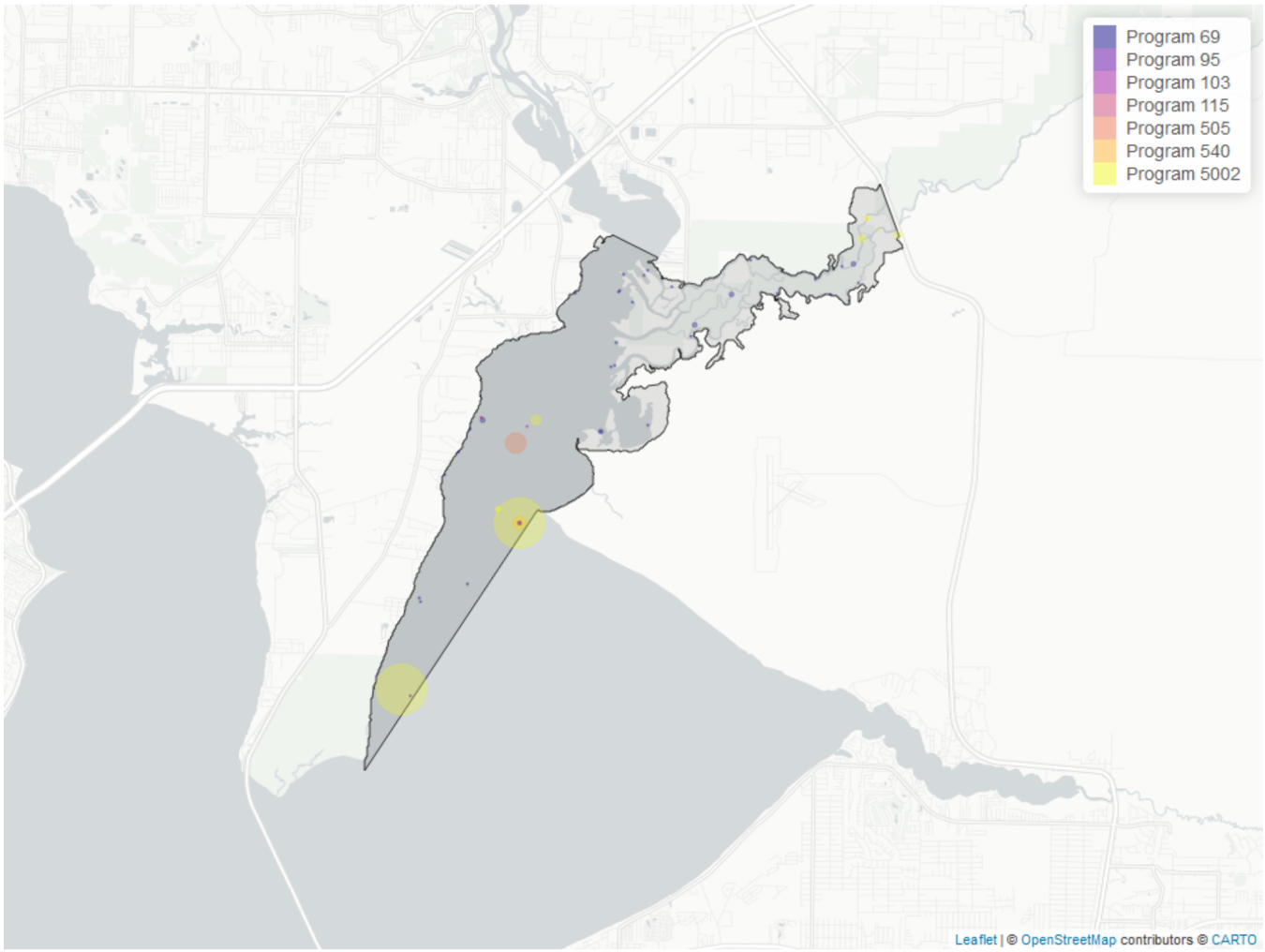


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	1063	30	22	TRUE	0.0175	0.6385	0.009069549	21.62783	9.016	0.6204	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Map showing location of Discrete sampling sites for Water Temperature



The bubble size on the above plots reflects the amount of data available at each sampling site

Table 19: Programs contributing data for Water Temperature

ProgramID	*N_Data*	*YearMin*	*YearMax*
5002	896	1995	2023
69	68	2003	2017
505	67	2002	2012
540	21	2016	2022
103	6	1977	2021
95	3	2000	2015
115	2	2004	2004

Program names:

5002 - Florida STORET / WIN
69 - Fisheries-Independent Monitoring (FIM) Program

505 - Pensacola Bay Water Quality Monitoring Program
540 - Shellfish Harvest Area Classification Program
103 - EPA STOrage and RETrieval Data Warehouse (STORET)
95 - Harmful Algal Bloom Marine Observation Network
115 - Environmental Monitoring Assessment Program

There are no qualifying Value Qualifiers for Water Temperature in Yellow River Marsh Aquatic Preserve

Water Quality - Continuous

The following files were used in the continuous analysis:

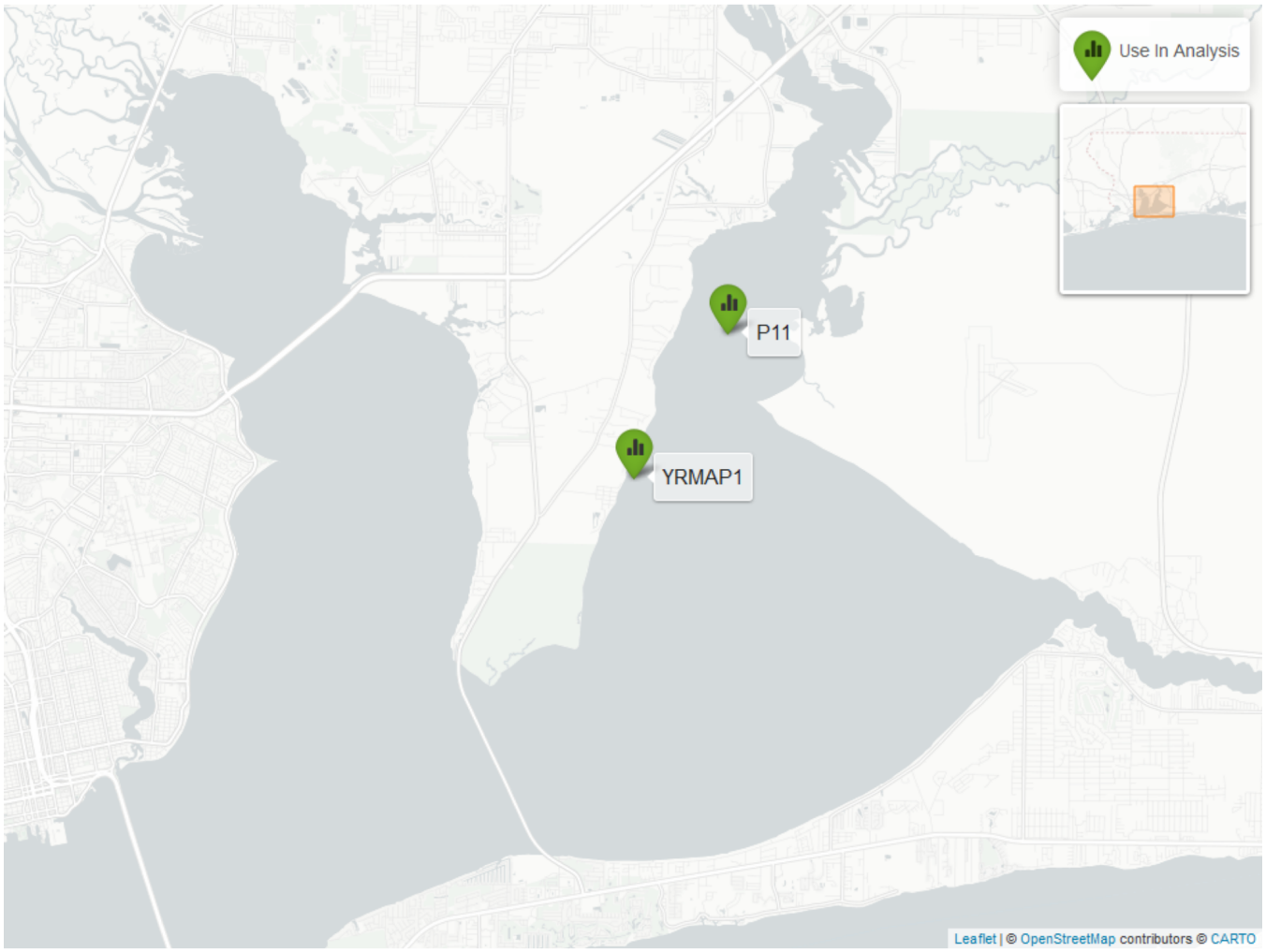
- *Combined_WQ_WC_NUT_cont_Dissolved_Oxygen_NW-2024-Mar-23.txt*
- *Combined_WQ_WC_NUT_cont_Dissolved_Oxygen_Saturation_NW-2024-Mar-23.txt*
- *Combined_WQ_WC_NUT_cont_pH_NW-2024-Mar-23.txt*
- *Combined_WQ_WC_NUT_cont_Salinity_NW-2024-Mar-23.txt*
- *Combined_WQ_WC_NUT_cont_Turbidity_NW-2024-Mar-23.txt*
- *Combined_WQ_WC_NUT_cont_Water_Temperature_NW-2024-Mar-23.txt*

Table 20: Pensacola Bay Water Quality Monitoring Program (505)

ProgramLocationID	*Years of Data*	*Use in Analysis*	*Parameters*
P11	4	FALSE	Turb
P11	11	TRUE	DO , DOS , Sal , TempW

Table 21: Yellow River Marsh Aquatic Preserve Continuous Water Quality Monitoring (467)

ProgramLocationID	*Years of Data*	*Use in Analysis*	*Parameters*
YRMAP1	9	TRUE	DO , DOS , pH , Sal , Turb , TempW

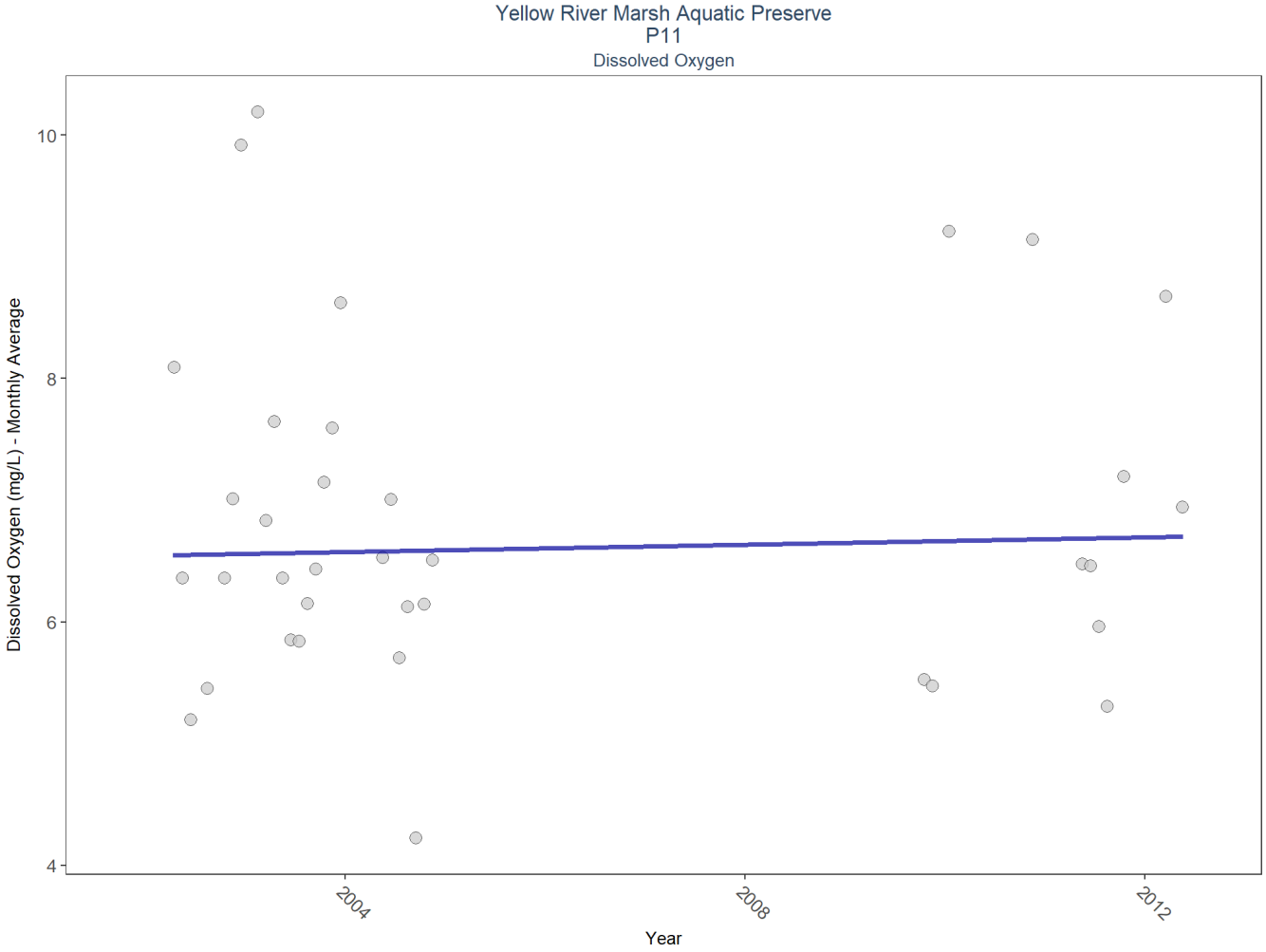


Map showing Continuous Water Quality Monitoring sampling locations within the boundaries of Yellow River Marsh Aquatic Preserve. Sites marked as *Use In Analysis* are featured in this report.

Dissolved Oxygen - Continuous Water Quality

P11

Pensacola Bay Water Quality Monitoring Program (505)



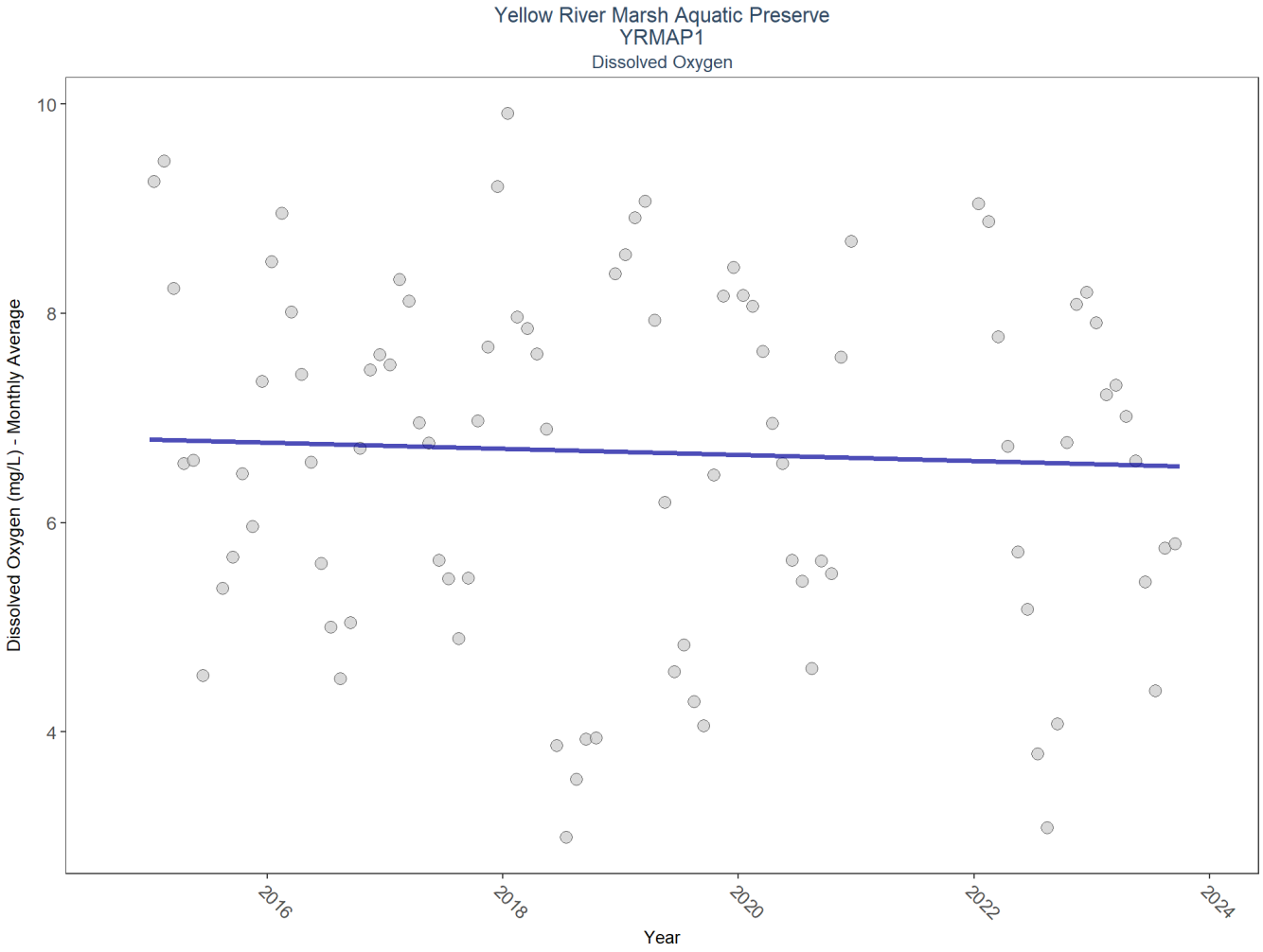
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
Surface	131	7	6.37284	TRUE	0.0392	0.4884	0.01519009	6.543358	8.6954	0.4659	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

YRMAP1

Yellow River Marsh Aquatic Preserve Continuous Water Quality Monitoring (467)



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	221521	8	6.9	TRUE	-0.0886	0.2359	-0.02958824	6.795439	13.5921	0.2564	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

All Stations Combined

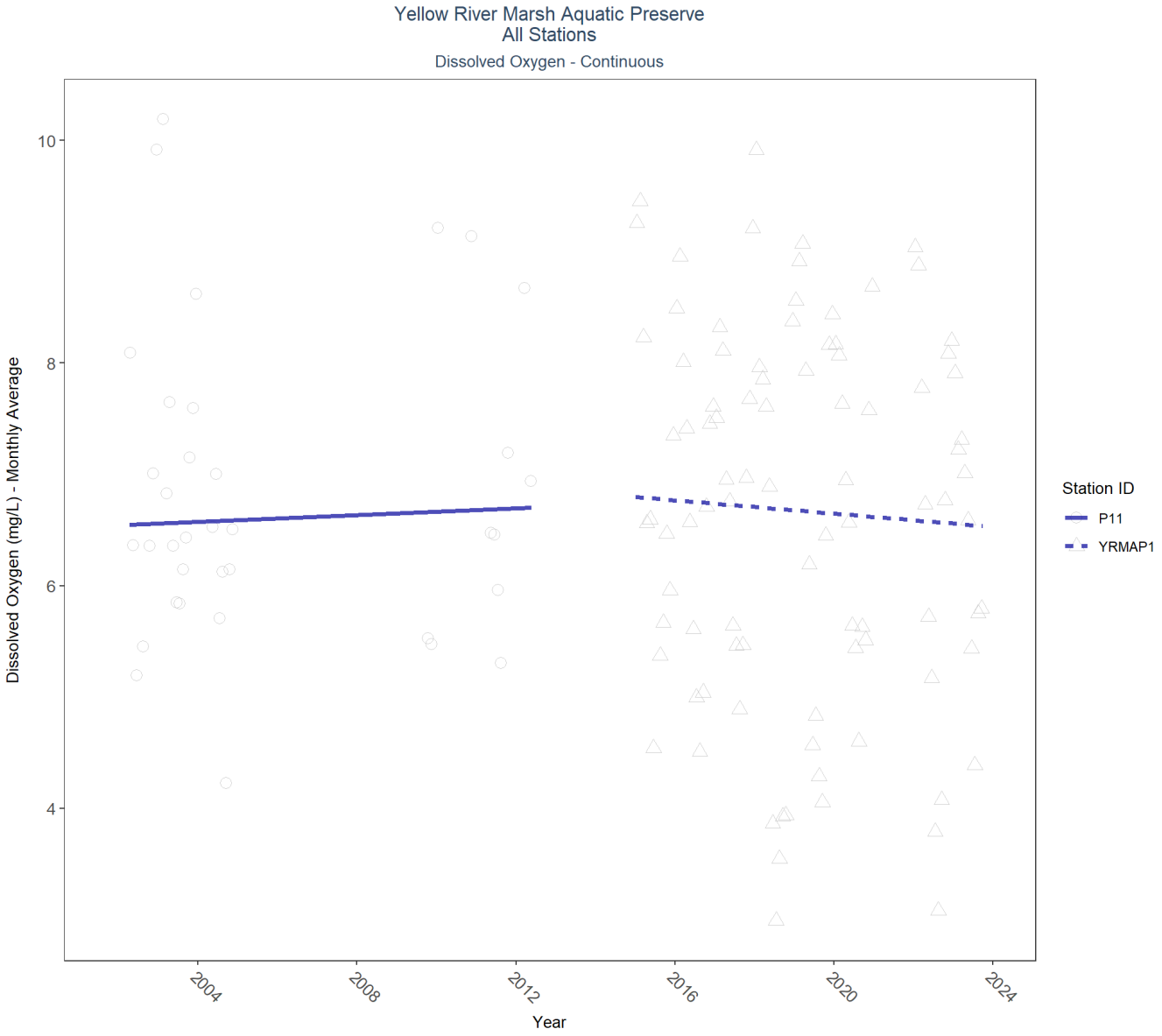


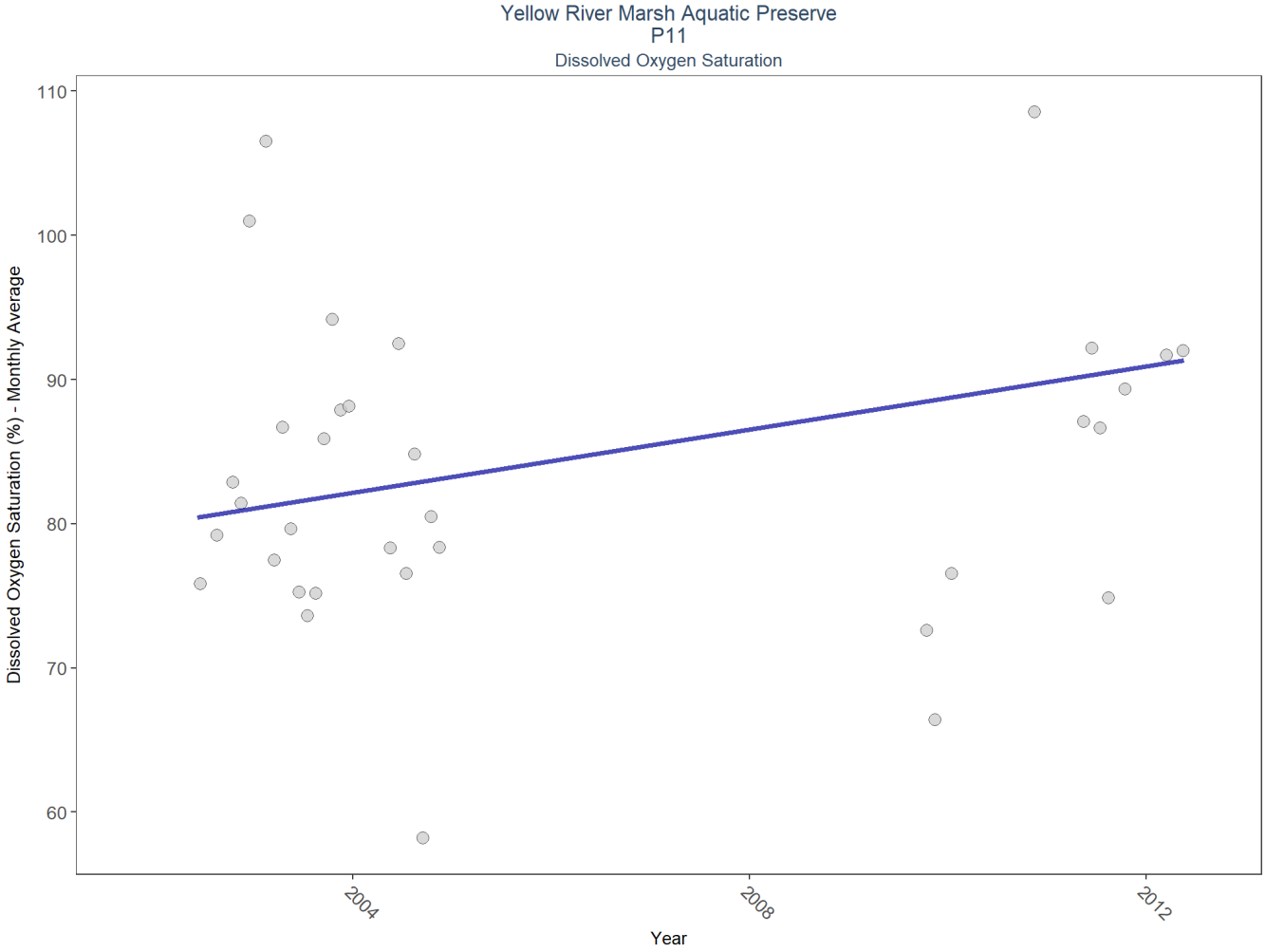
Table 22: Seasonal Kendall-Tau Results for All Stations - Dissolved Oxygen

Station	N_Data	N_Years	Period of Record	Median	tau	SennIntercept	SennSlope	p
P11	131	7	2002 - 2012	6.37	0.04	6.54	0.02	0.4884
YRMAP1	221521	8	2015 - 2023	6.90	-0.09	6.80	-0.03	0.2359

Dissolved Oxygen Saturation - Continuous Water Quality

P11

Pensacola Bay Water Quality Monitoring Program (505)



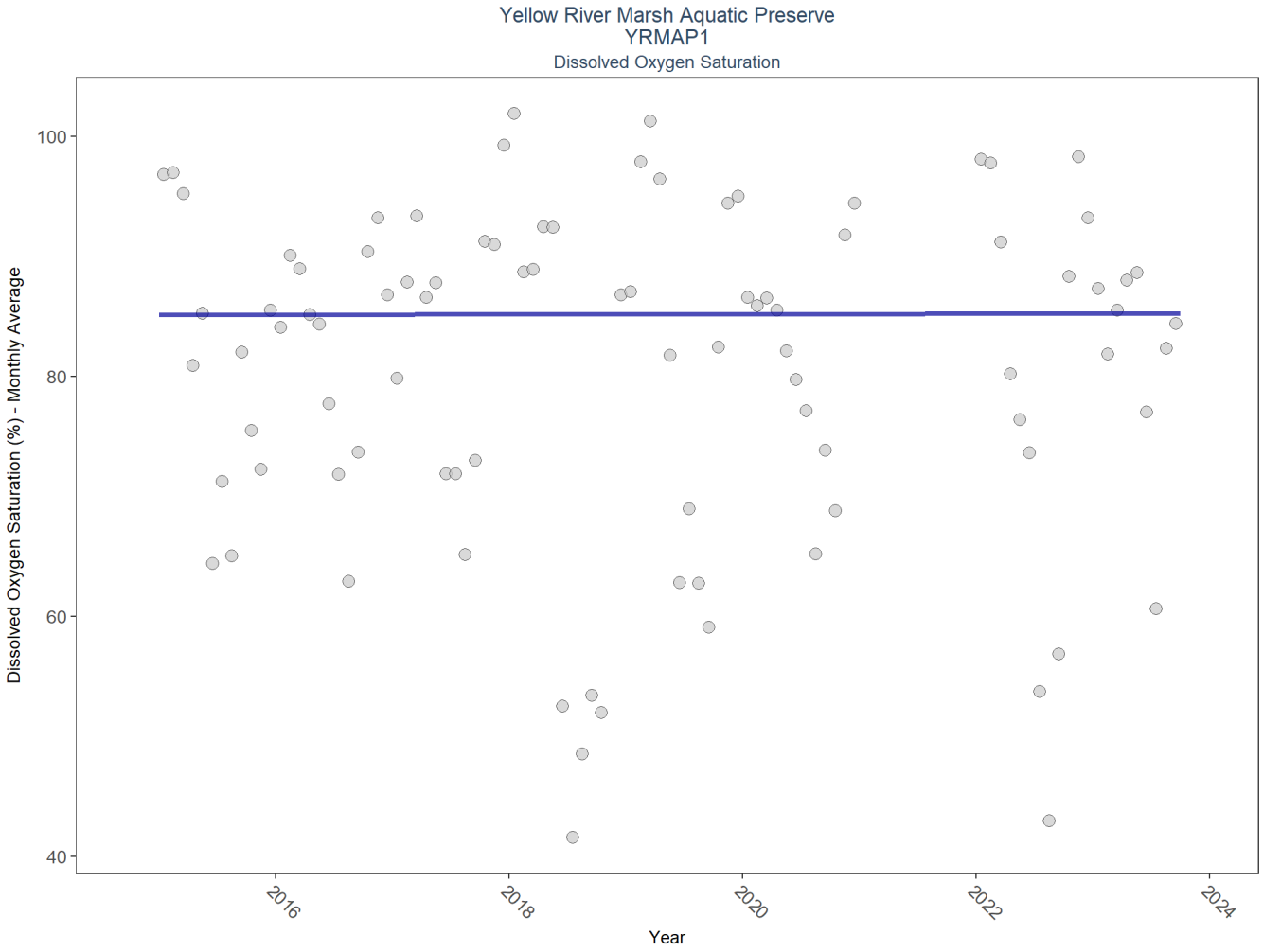
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
Surface	126	7	79.92936	TRUE	0.086	0.7119	1.093763	79.96773	8.2348	0.4109	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

YRMAP1

Yellow River Marsh Aquatic Preserve Continuous Water Quality Monitoring (467)



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	227789	8	86.8	TRUE	0.0164	1.0000	0.01239919	85.13237	8.5339	0.6648	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

All Stations Combined

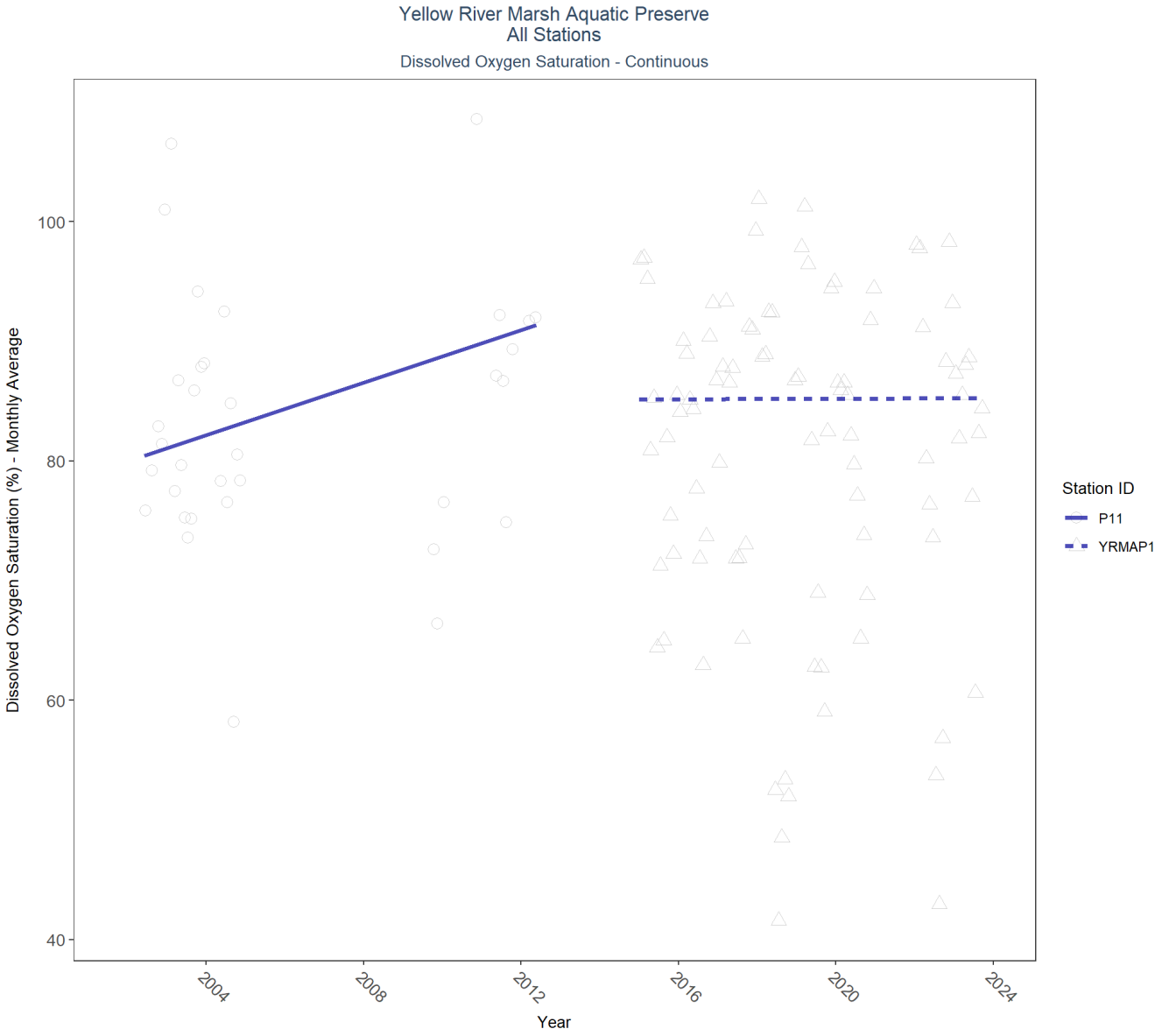


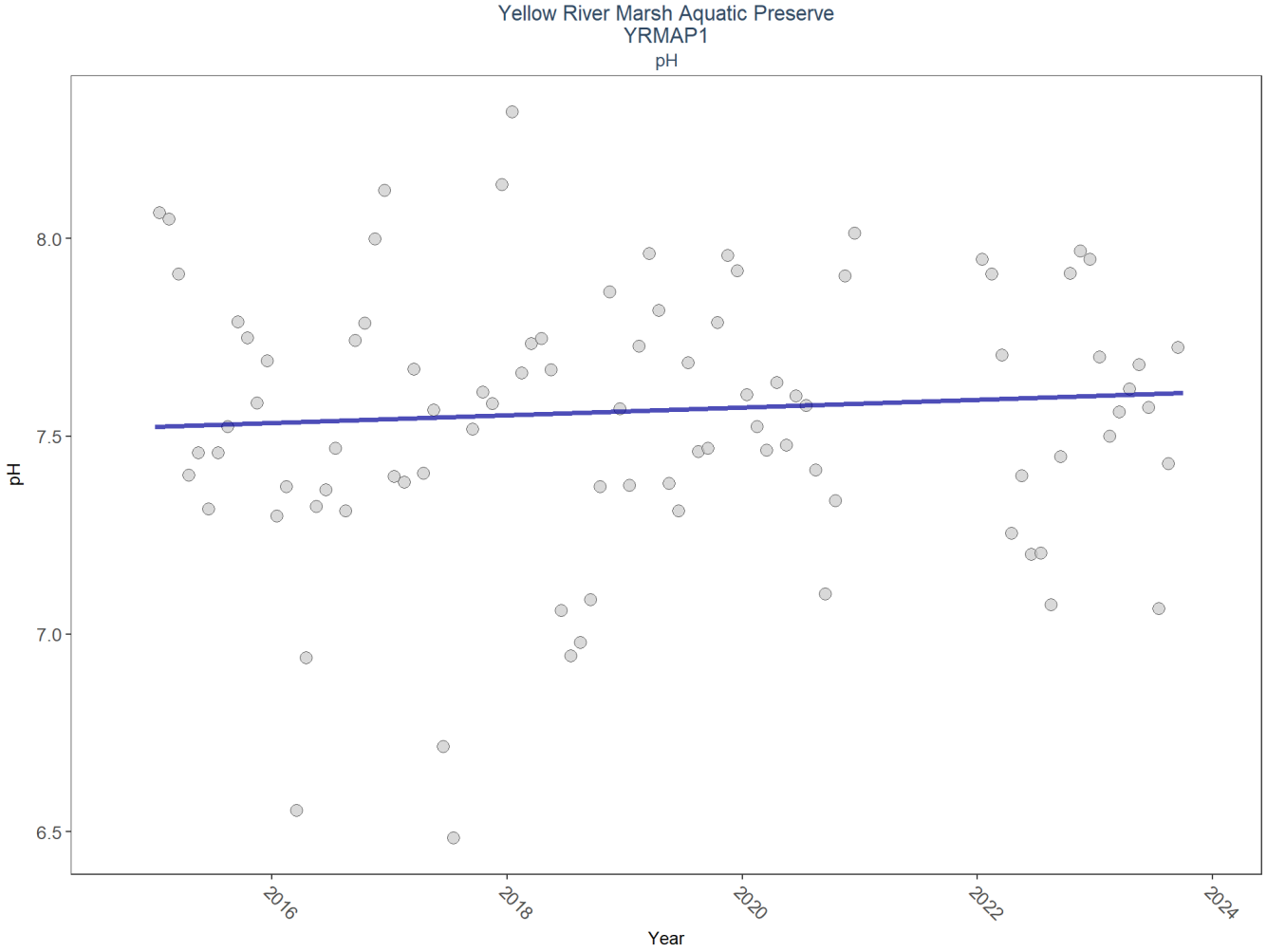
Table 23: Seasonal Kendall-Tau Results for All Stations - Dissolved Oxygen Saturation

Station	N_Data	N_Years	Period of Record	Median	tau	SennIntercept	SennSlope	p
P11	126	7	2002 - 2012	79.93	0.09	79.97	1.09	0.7119
YRMAP1	227789	8	2015 - 2023	86.80	0.02	85.13	0.01	1.0000

pH - Continuous Water Quality

YRMAP1

Yellow River Marsh Aquatic Preserve Continuous Water Quality Monitoring (467)



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	236519	8	7.6	TRUE	0.0652	0.4727	0.009765749	7.523941	4.7552	0.9424	0

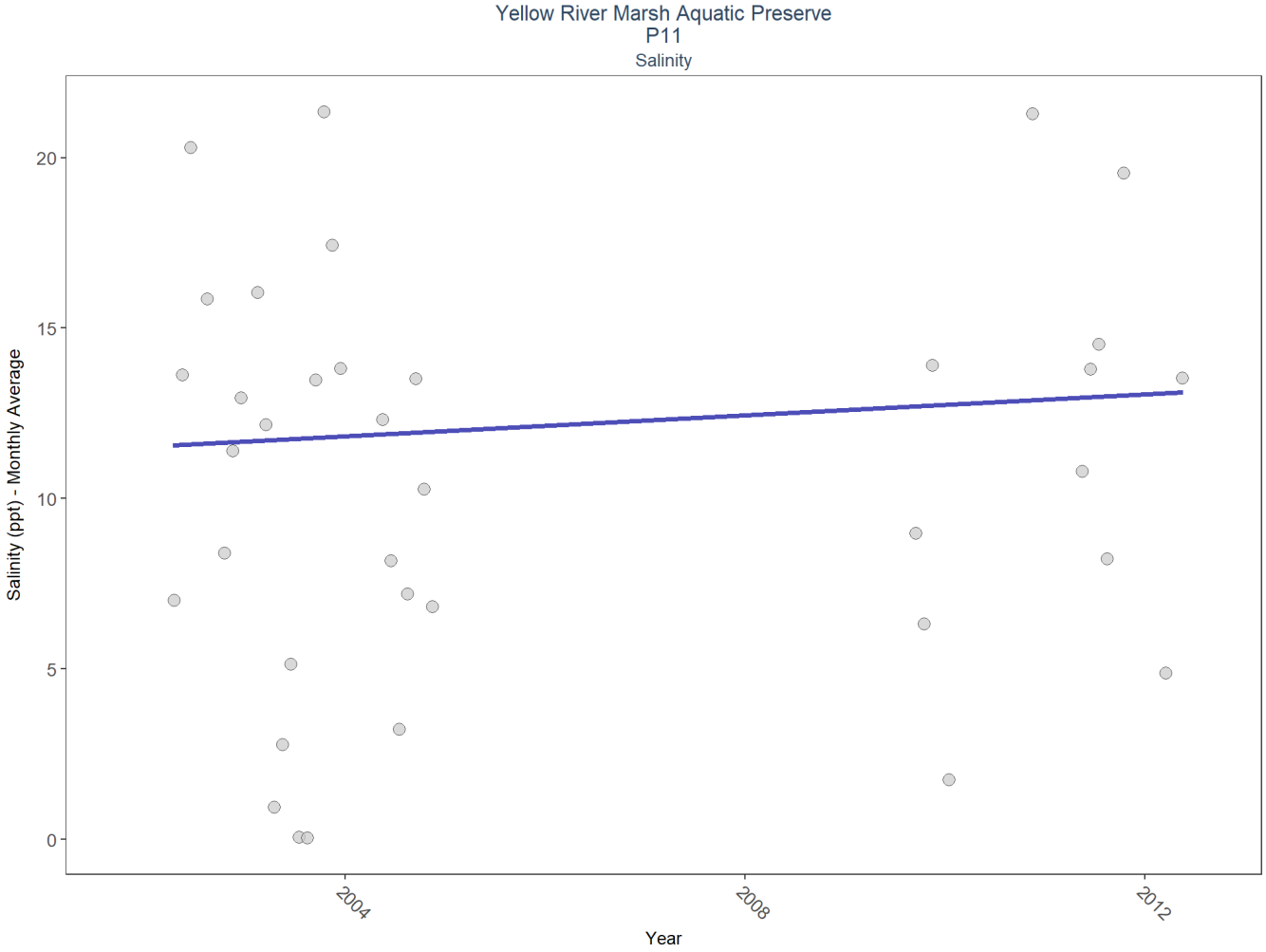
p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Salinity - Continuous Water Quality

P11

Pensacola Bay Water Quality Monitoring Program (505)



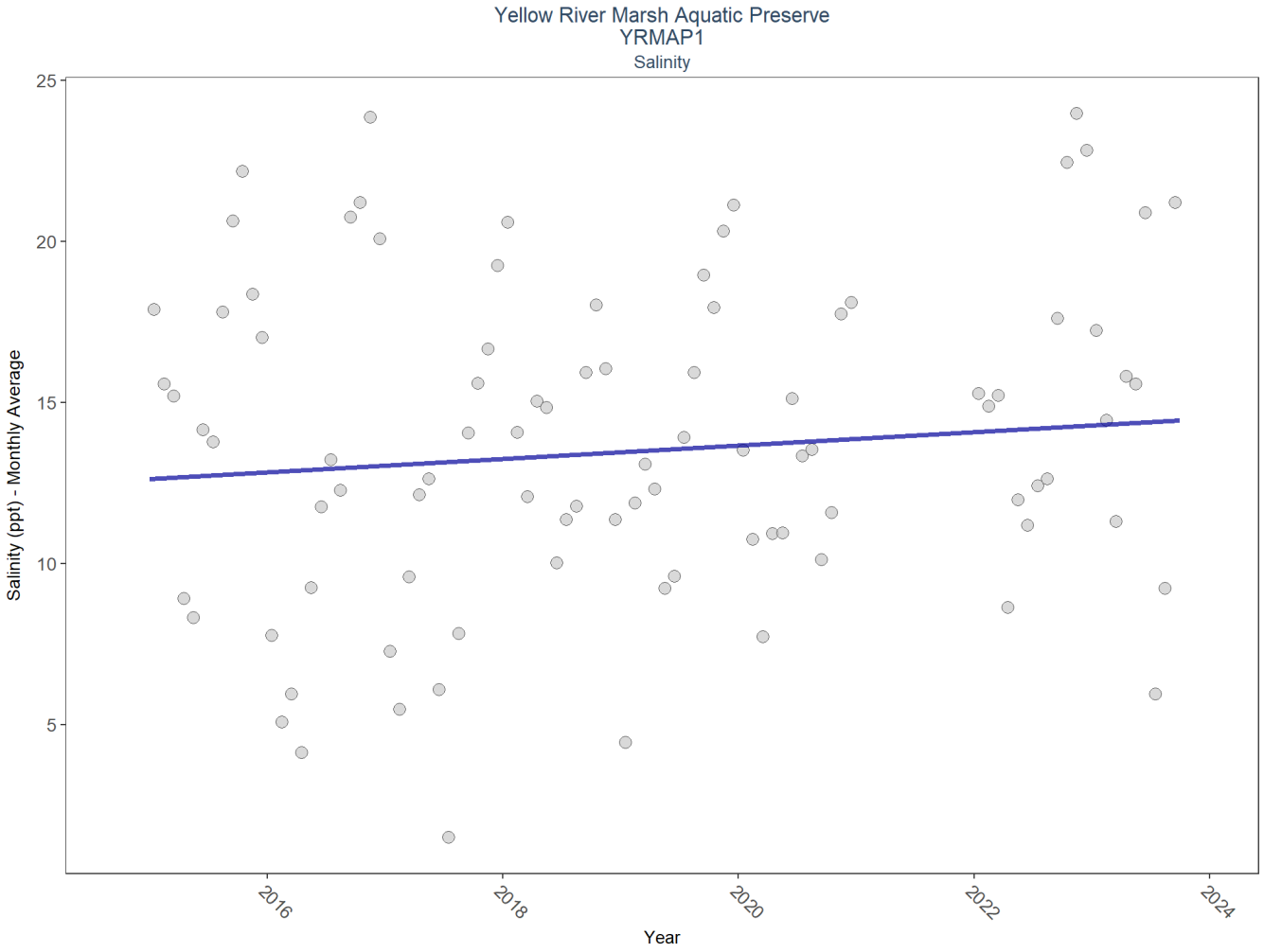
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
Surface	136	7	10.0516	TRUE	0.0571	0.6499	0.1538938	11.51699	6.5824	0.6805	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

YRMAP1

Yellow River Marsh Aquatic Preserve Continuous Water Quality Monitoring (467)



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	238173	8	14	TRUE	0.1039	0.2334	0.2093604	12.61382	6.8814	0.8086	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

All Stations Combined

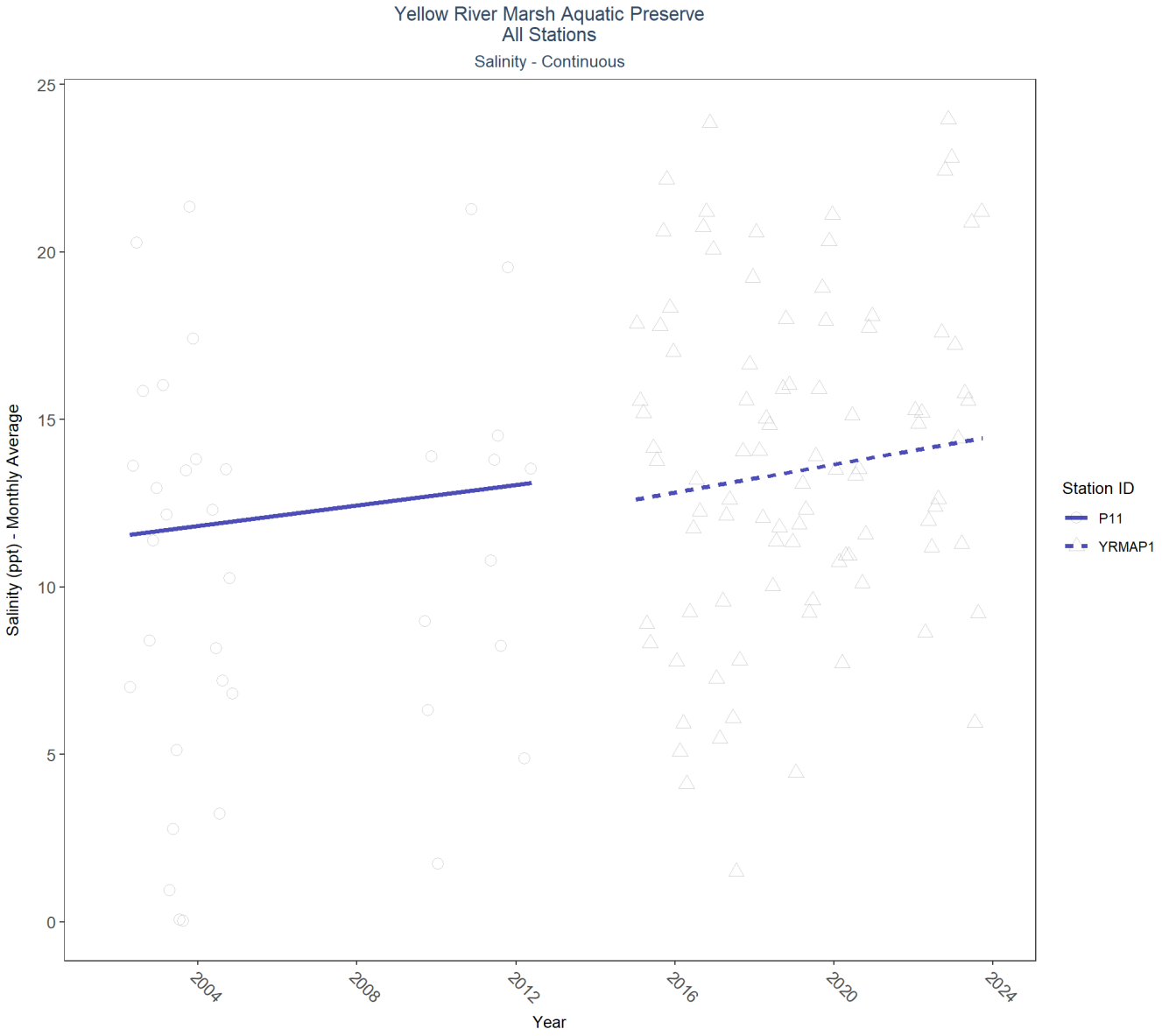


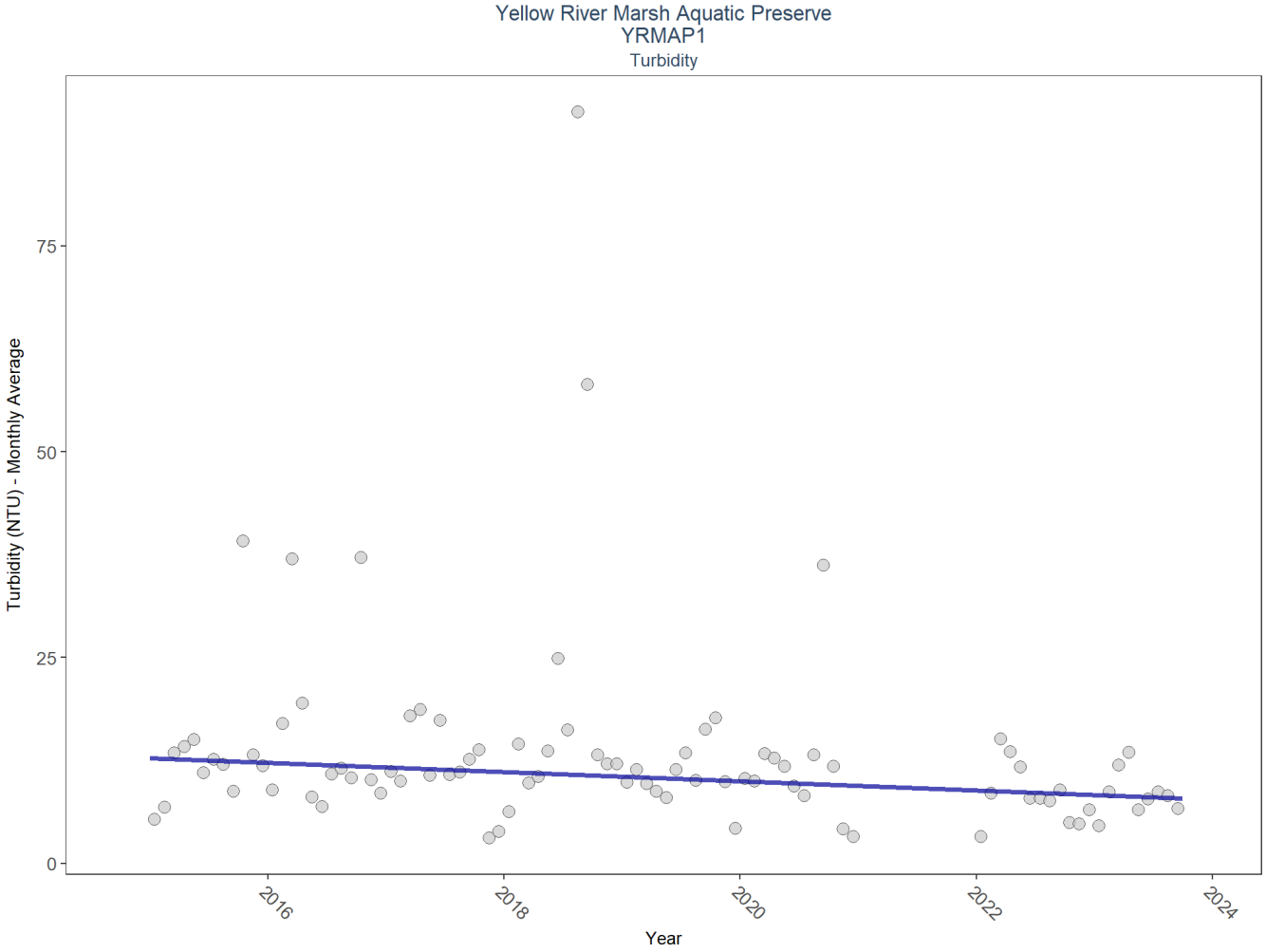
Table 24: Seasonal Kendall-Tau Results for All Stations - Salinity

Station	N_Data	N_Years	Period of Record	Median	tau	SennIntercept	SennSlope	p
P11	136	7	2002 - 2012	10.05	0.06	11.52	0.15	0.6499
YRMAP1	238173	8	2015 - 2023	14.00	0.10	12.61	0.21	0.2334

Turbidity - Continuous Water Quality

YRMAP1

Yellow River Marsh Aquatic Preserve Continuous Water Quality Monitoring (467)



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	250273	8	6	TRUE	-0.3272	0.0002	-0.5610084	12.76457	4.2304	0.9627	-1

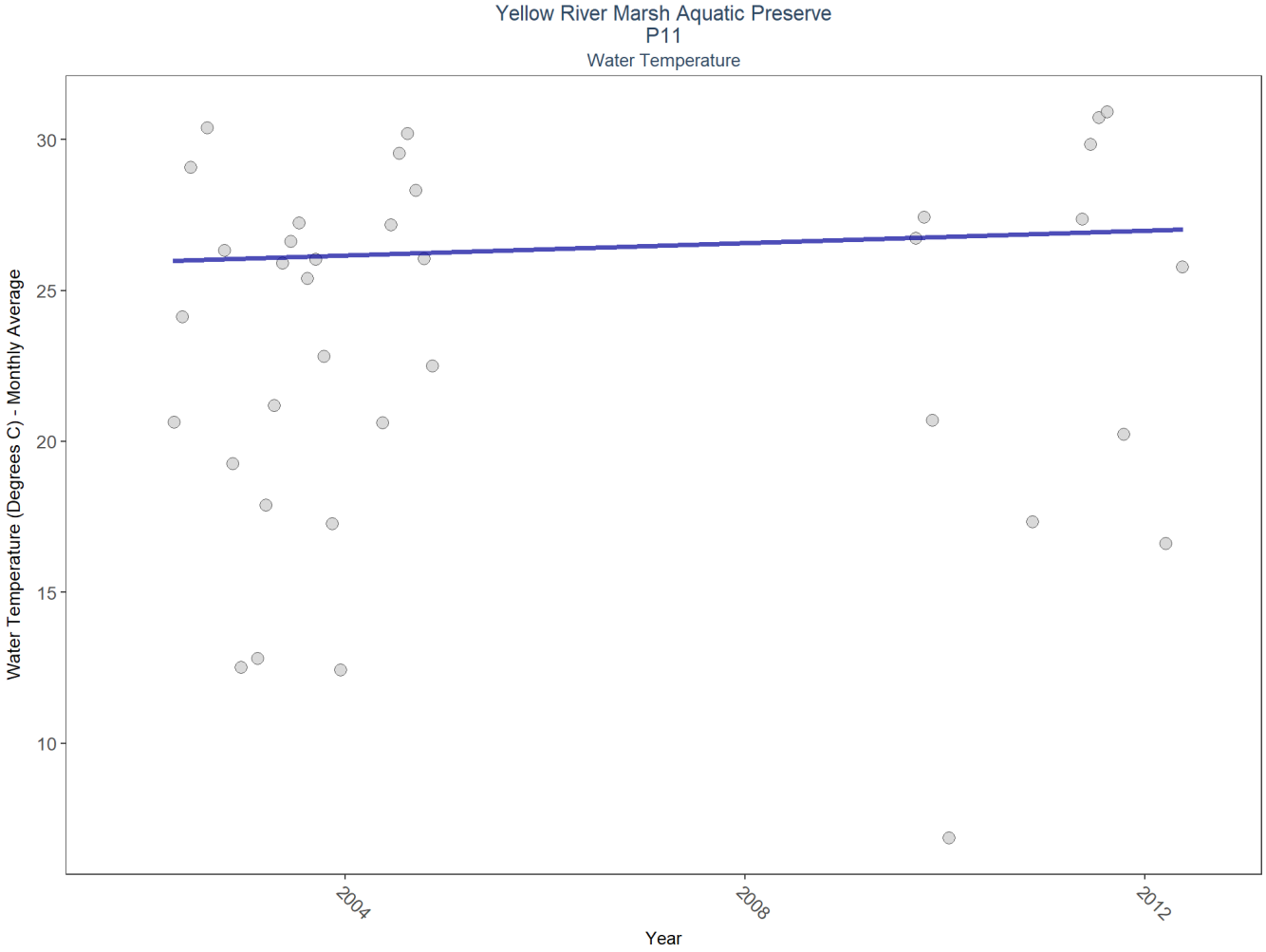
p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Water Temperature - Continuous Water Quality

P11

Pensacola Bay Water Quality Monitoring Program (505)



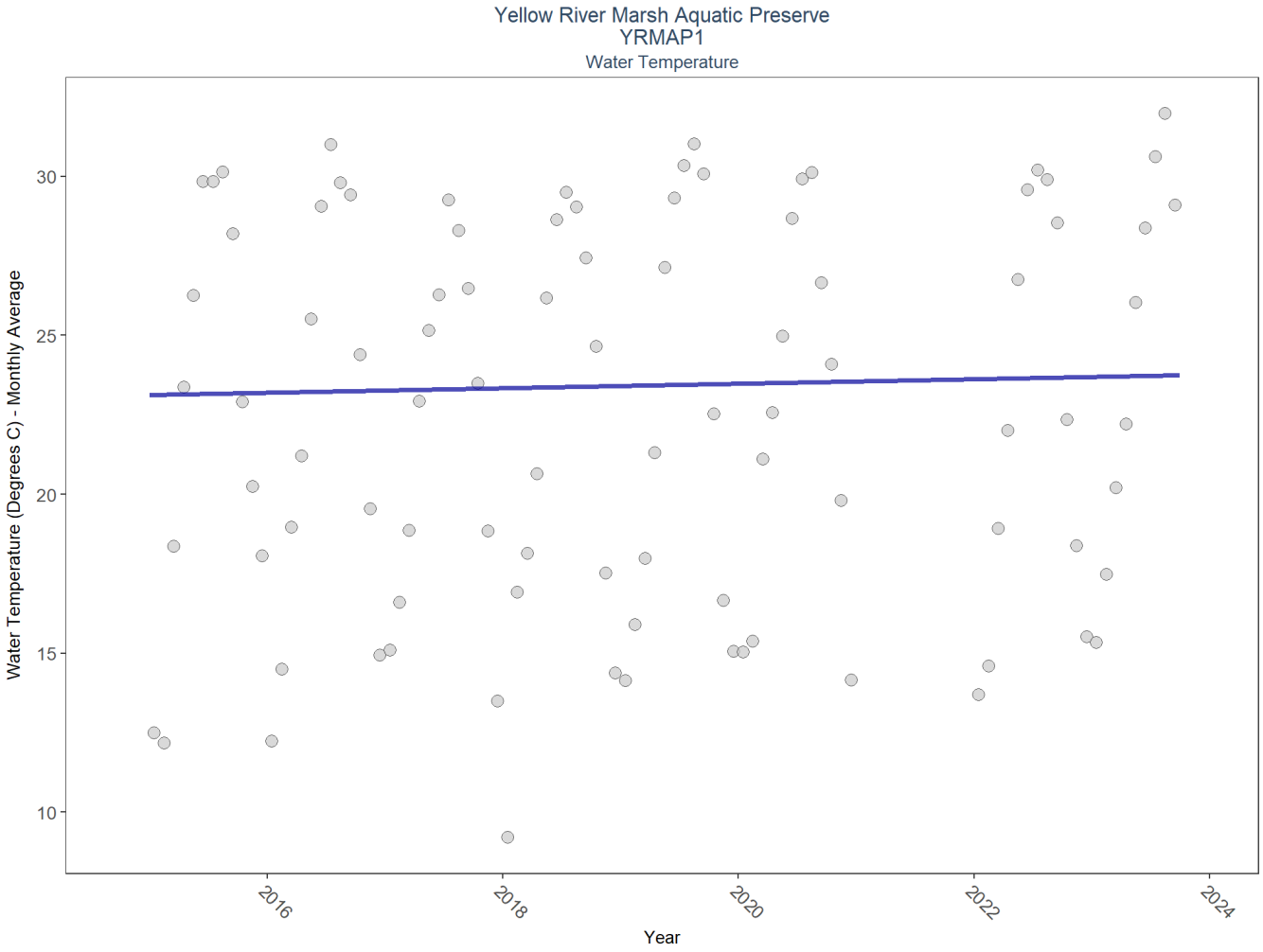
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
Surface	136	7	26.21545	TRUE	0.1333	0.4960	0.1030612	25.96092	6.5312	0.6858	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

YRMAP1

Yellow River Marsh Aquatic Preserve Continuous Water Quality Monitoring (467)



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	262942	8	23	TRUE	0.0691	0.3714	0.0701581	23.1246	7.9303	0.7195	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

All Stations Combined

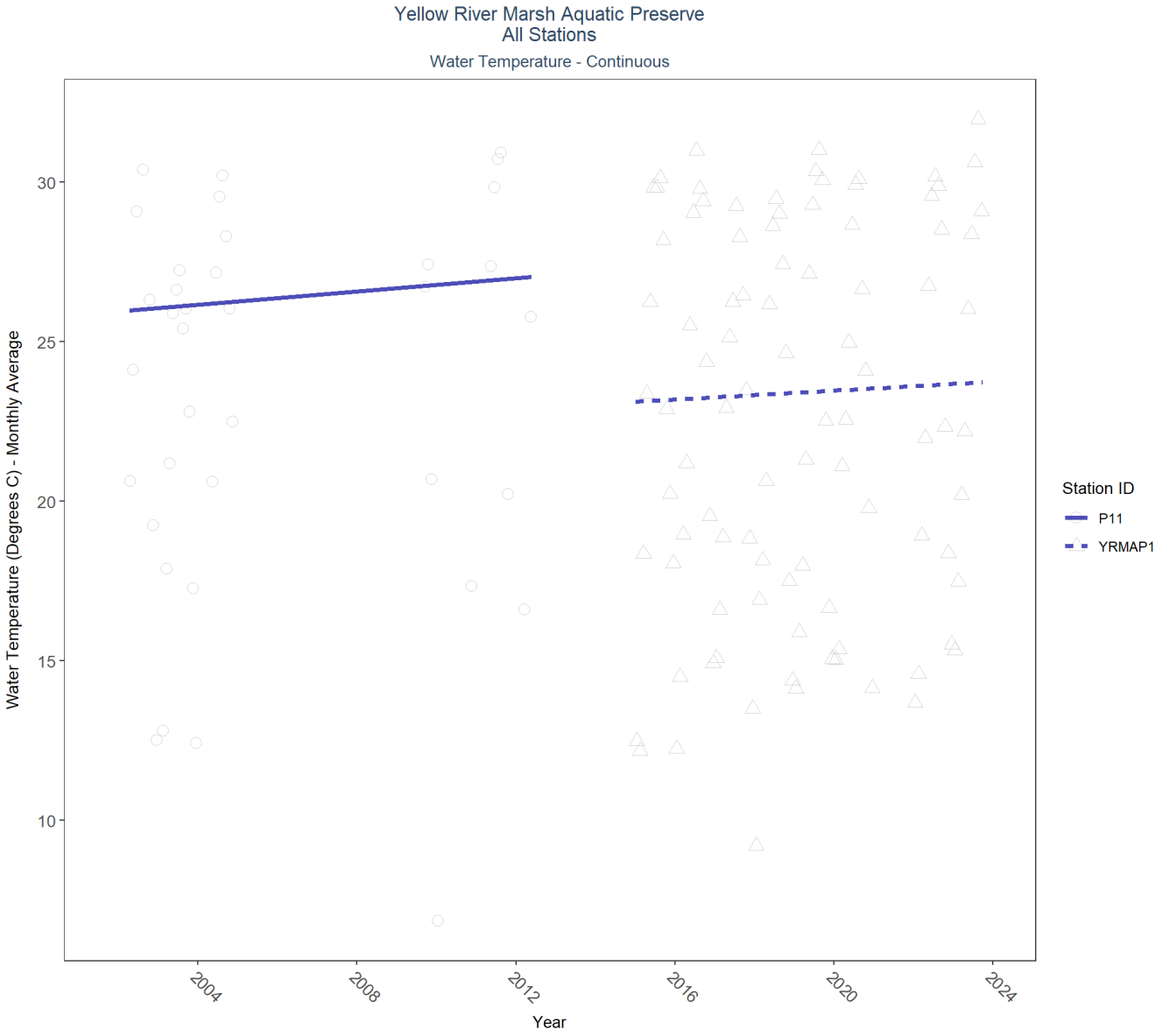


Table 25: Seasonal Kendall-Tau Results for All Stations - Water Temperature

Station	N_Data	N_Years	Period of Record	Median	tau	SennIntercept	SennSlope	p
P11	136	7	2002 - 2012	26.22	0.13	25.96	0.10	0.4960
YRMAP1	262942	8	2015 - 2023	23.00	0.07	23.12	0.07	0.3714