

Estero Bay Aquatic Preserve

SEACAR Habitat Analyses

Last compiled on 30 November, 2023

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Threshold Filtering

Threshold filters, following Florida Department of Environmental Protection Division of Environmental Assessment and Restoration (DEAR) are used to exclude specific results values from the SEACAR Analysis. Based on the threshold filters, QAQC Flags are inserted into the SEACAR_QAQCFlagCode and SEACAR_QAQC_Description columns of the export data. The Include_YN 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_YN column to exclude data.

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		2	14	Analysis Only - 2022-04-04
pH		2	14	6600 Series
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	22
Salinity	ppt	0	70
Water Temperature	Degrees C	3	40
pH		2	13
Dissolved Oxygen Saturation	%	>0	310
Specific Conductivity	mS/cm	>0.005	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	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	
NO ₂ +3 Filtered	mg/L	0	
NH ₄ Filtered	mg/L	0	

Parameter Name	Units	Low Threshold	High Threshold
Total Phosphorus	mg/L	0	
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: QA Flags inserted based on threshold checks

SEACAR QAQC Description	Include YN	SEACAR QAQCFlagCode
Exceeds Maximum threshold. Not verified in raw data	N	2Q
Exceeds Maximum threshold. Verified in raw data	N	3Q
Below Minimum threshold. Not verified in raw data	N	4Q
Below Minimum threshold. Verified in raw data	N	5Q
Within threshold tolerance	Y	6Q
No defined thresholds for this parameter	Y	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_YN column in data exports.

Table 4: Value Qualifier codes excluded from analysis

Value Qualifier	Include YN/10	MDL YN/10	Qualifier Source
H	0	0	STORET-WIN
J	0	0	STORET-WIN
V	0	0	STORET-WIN
Y	0	0	STORET-WIN

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_YN column in data exports. SWMP Qualifier Codes are indicated by QualifierSource=SWMP.

Table 5: SWMP Value Qualifier codes

Qualifier Source	ValueQualifier	Include YN	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

<i>Qualifier</i>	<i>Source</i>	<i>Value</i>	<i>Qualifier</i>	<i>Include</i>	<i>YN</i>	<i>Description</i>
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

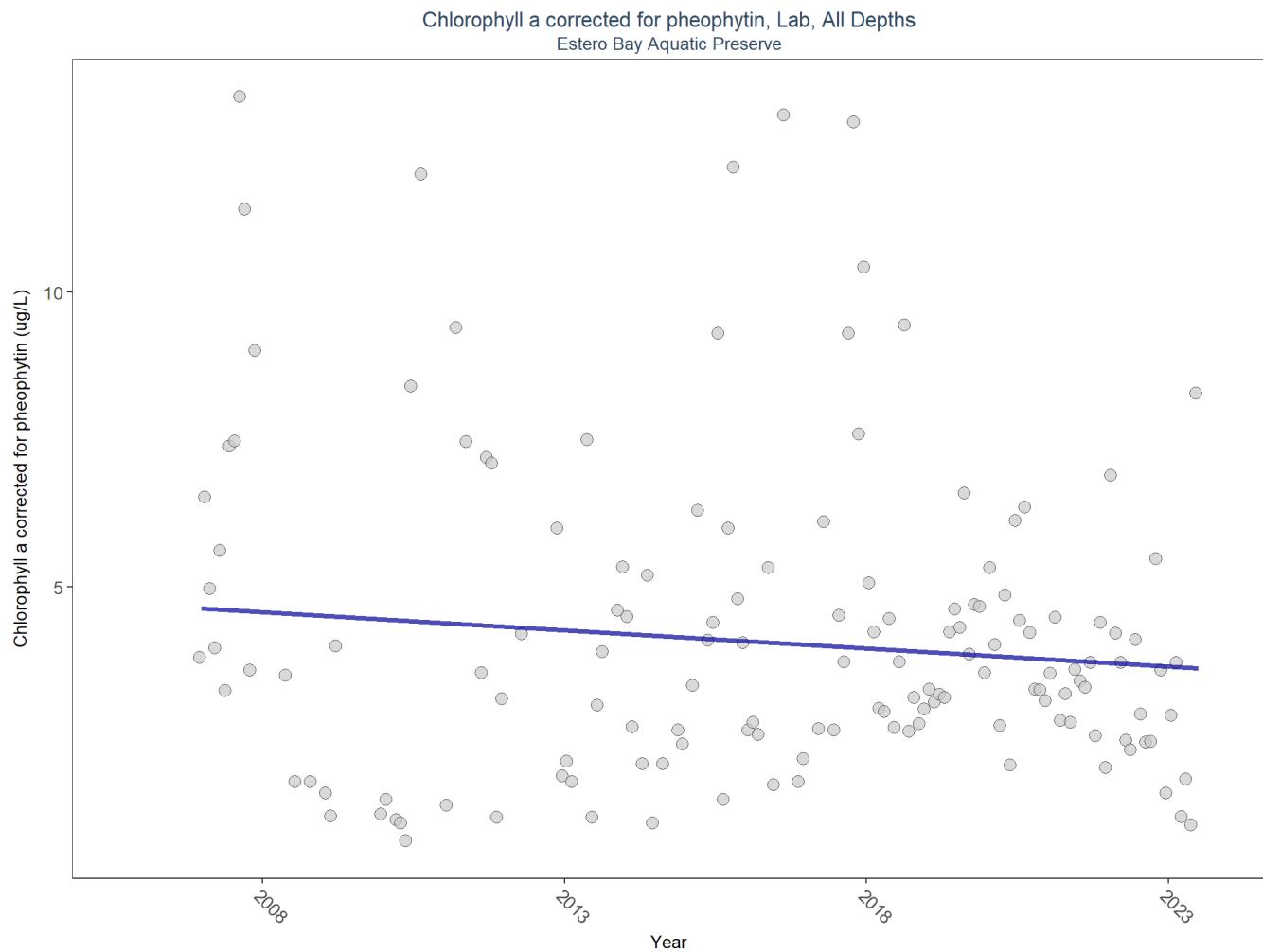
Water Quality - Discrete

The following files were used in the discrete analysis:

- *Combined_WQ_WC_NUT_Chlorophyll_a_corrected_for_pheophytin-2023-Oct-11.txt*
- *Combined_WQ_WC_NUT_Chlorophyll_a_uncorrected_for_pheophytin-2023-Oct-11.txt*
- *Combined_WQ_WC_NUT_Colored_dissolved_organic_matter_CDOM-2023-Oct-11.txt*
- *Combined_WQ_WC_NUT_Dissolved_Oxygen-2023-Oct-11.txt*
- *Combined_WQ_WC_NUT_Dissolved_Oxygen_Saturation-2023-Oct-11.txt*
- *Combined_WQ_WC_NUT_pH-2023-Oct-11.txt*
- *Combined_WQ_WC_NUT_Salinity-2023-Oct-11.txt*
- *Combined_WQ_WC_NUT_Secchi_Depth-2023-Oct-11.txt*
- *Combined_WQ_WC_NUT_Total_Nitrogen-2023-Oct-11.txt*
- *Combined_WQ_WC_NUT_Total_Phosphorus-2023-Oct-11.txt*
- *Combined_WQ_WC_NUT_Total_Suspended_Solids_TSS-2023-Oct-11.txt*
- *Combined_WQ_WC_NUT_Turbidity-2023-Oct-11.txt*
- *Combined_WQ_WC_NUT_Water_Temperature-2023-Oct-11.txt*

Chlorophyll a corrected for pheophytin

Discrete Seasonal Kendall-Tau Trend Analysis



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	2028	18	2.9	TRUE	-0.0774	0.3014	-0.06159879	4.698829	16.8313	0.113	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Table 6: Programs contributing data for Chlorophyll a corrected for pheophytin

ProgramID	N_Data	YearMin	YearMax
5002	1347	2006	2023
476	486	2008	2023
103	170	2020	2021
4063	59	2018	2022

Program names:

5002 - Florida STORET / WIN

476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network

103 - EPA STOrage and RETrieval Data Warehouse (STORET)

4063 - Estero Bay Tributary Monitoring

Table 7: Value Qualifiers for Chlorophyll a corrected for pheophytin

Year	N_Total	N_I	perc_I	N_Q	perc_Q	N_U	perc_U
2006	1	1	100.0				
2007	46	3	6.5			4	8.7
2008	5	2	40.0				
2009	8	7	87.5				
2010	9	5	55.6	3	33.3	1	11.1
2011	14	3	21.4	6	42.9		
2012	6	2	33.3			2	33.3
2013	25	10	40.0			5	20.0
2014	20	1	5.0	1	5.0	5	25.0
2015	26	4	15.4			3	11.5
2016	22	8	36.4	2	9.1		
2017	49	4	8.2				
2018	304	78	25.7				
2019	310	66	21.3			2	0.7
2020	307	60	19.5	3	1.0	1	0.3
2021	514	120	23.4			13	2.5
2022	310	110	35.5	3	1.0	20	6.4
2023	86	29	33.7			24	27.9

Programs containing Value Qualified data:

476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network

5002 - Florida STORET / WIN

4063 - Estero Bay Tributary Monitoring

Value Qualifiers

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

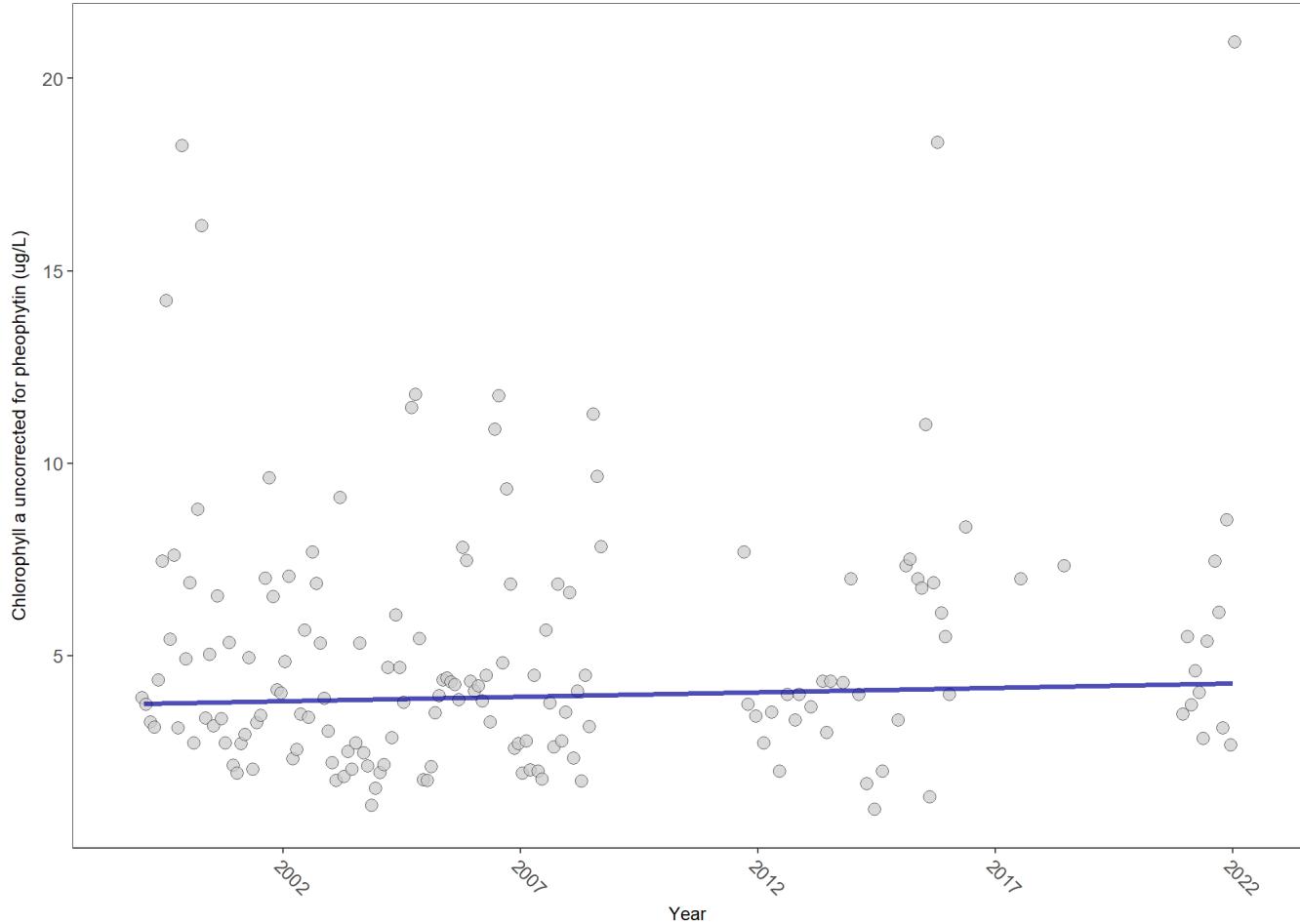
Q - Sample held beyond the accepted holding time. This code shall be used if the value is derived from a sample that was prepared or analyzed after the approved holding time restrictions for sample preparation or analysis.

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

Chlorophyll a uncorrected for pheophytin

Discrete Seasonal Kendall-Tau Trend Analysis

Chlorophyll a uncorrected for pheophytin, Lab, All Depths
Estero Bay Aquatic Preserve



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	601	21	3.84	TRUE	0.0462	0.4425	0.02310179	3.759233	9.6145	0.5654	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Table 8: Programs contributing data for Chlorophyll a uncorrected for pheophytin

ProgramID	N_Data	YearMin	YearMax
509	347	1999	2008
103	110	2003	2022
5002	82	2011	2016
476	69	1999	2008
514	7	2013	2018
115	1	2003	2003

Program names:

509 - SERC Water Quality Monitoring Network

103 - EPA STOrage and RETrieval Data Warehouse (STORET)

5002 - Florida STORET / WIN

476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network

514 - Florida LAKEWATCH Program

115 - Environmental Monitoring Assessment Program

Table 9: Value Qualifiers for Chlorophyll a uncorrected for pheophytin

	Year	N_Total	N_I	perc_I	N_Q	perc_Q	N_U	perc_U
2	2000	46					2	4.3
3	2001	42					6	14.3
5	2003	44					6	13.6
6	2004	40	6	15.0			1	2.5
7	2005	37					1	2.7
8	2006	45					4	8.9
9	2007	55	14	25.4			2	3.6
10	2008	31	3	9.7				
11	2011	7			1	14.3		

Programs containing Value Qualified data:

476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network

5002 - Florida STORET / WIN

Value Qualifiers

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

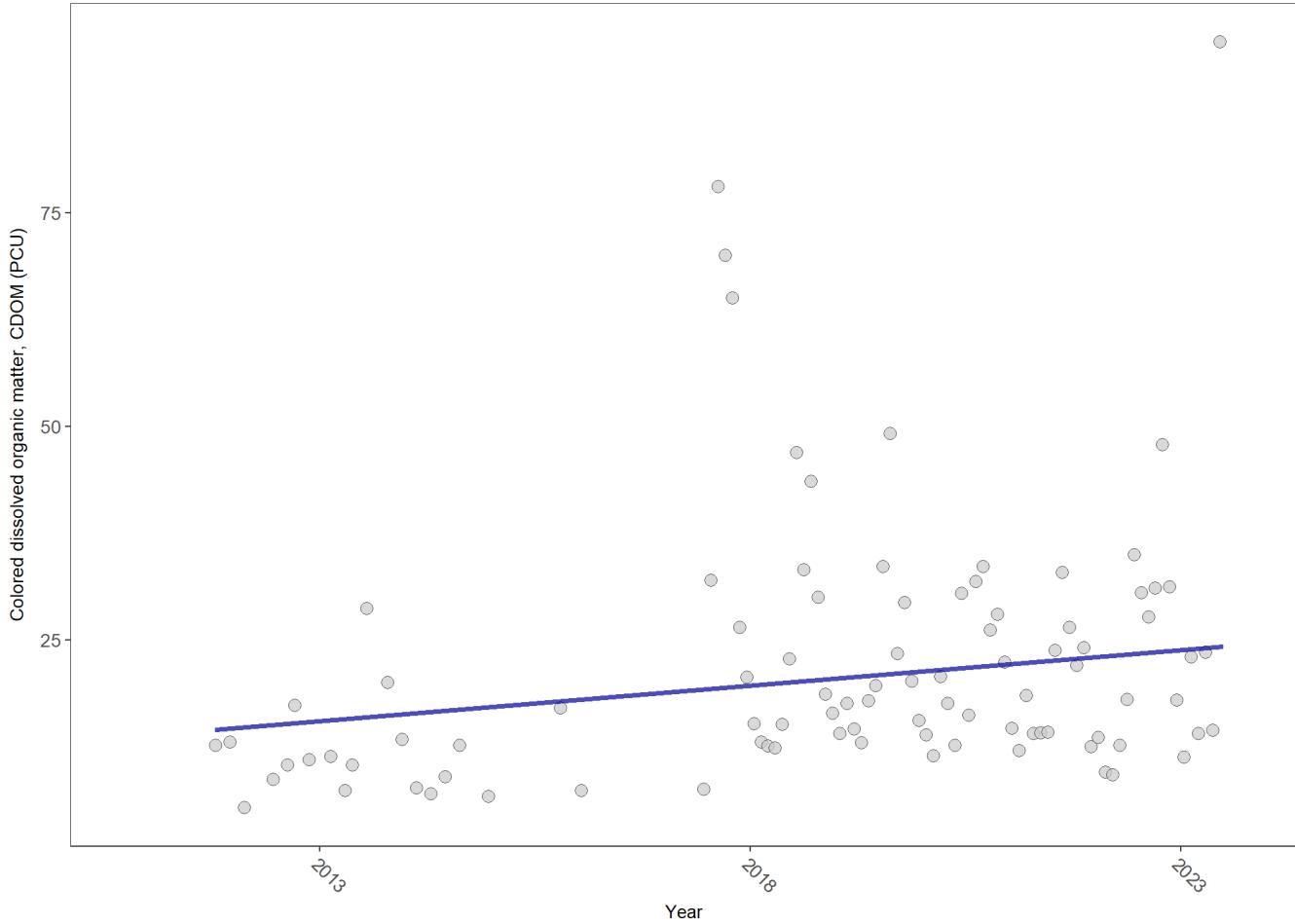
Q - Sample held beyond the accepted holding time. This code shall be used if the value is derived from a sample that was prepared or analyzed after the approved holding time restrictions for sample preparation or analysis.

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

Colored dissolved organic matter, CDOM

Discrete Seasonal Kendall-Tau Trend Analysis

Colored dissolved organic matter, CDOM, Lab, All Depths
Estero Bay Aquatic Preserve



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	1504	13	14	TRUE	0.2632	0.0009	0.8307738	13.86907	13.4404	0.2655	1

$p < 0.00005$ appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Table 10: Programs contributing data for Colored dissolved organic matter, CDOM

ProgramID	N_Data	YearMin	YearMax
5002	1170	2018	2023
476	216	2017	2023
514	63	2011	2017
4063	59	2018	2022

Program names:

5002 - Florida STORET / WIN

476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network

514 - Florida LAKEWATCH Program

4063 - Estero Bay Tributary Monitoring

Table 11: Value Qualifiers for Colored dissolved organic matter,
CDOM

	Year	N_Total	N_I	perc_I	N_Q	perc_Q	N_U	perc_U
7	2017	35	4	11.4				
8	2018	275	34	12.4			4	1.4
9	2019	268	36	13.4			9	3.4
10	2020	242	49	20.2	1	0.4	2	0.8
11	2021	299	39	13.0			11	3.7
12	2022	261	38	14.6			7	2.7
13	2023	68	9	13.2				

Programs containing Value Qualified data:

5002 - Florida STORET / WIN

476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network

Value Qualifiers

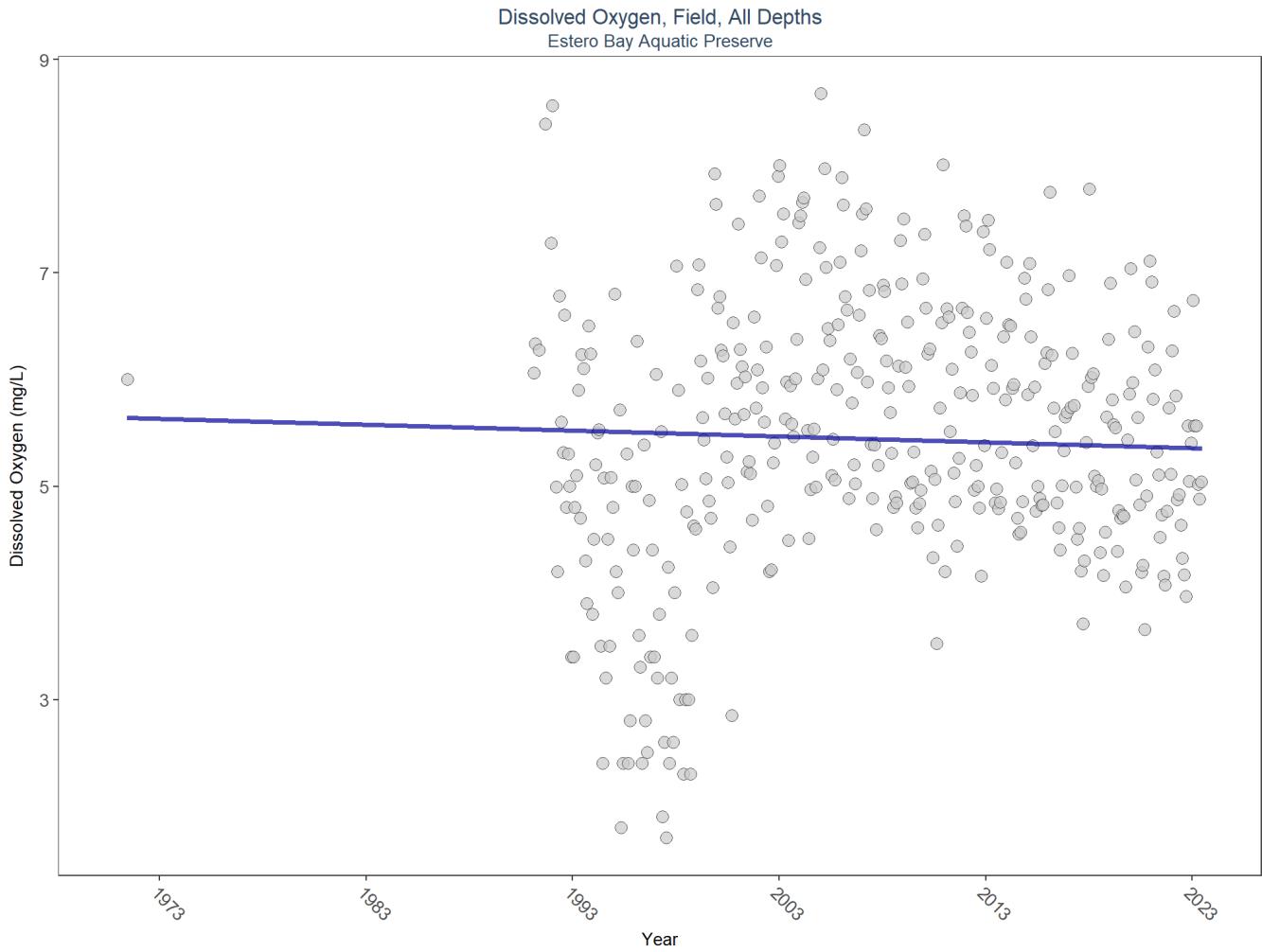
I - The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

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.

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

Dissolved Oxygen

Discrete Seasonal Kendall-Tau Trend Analysis



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	10458	34	5.87755	TRUE	-0.0406	0.2784	-0.005504329	5.644494	11.387	0.4114	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Table 12: Programs contributing data for Dissolved Oxygen

ProgramID	N_Data	YearMin	YearMax
5002	6026	1991	2023
69	2258	2001	2007
509	696	1999	2008
4064	619	2011	2012
95	442	1971	2018
476	305	2008	2023
103	252	2003	2022
4042	46	2016	2022
115	2	2003	2003

Program names:

5002 - Florida STORET / WIN
69 - Fisheries-Independent Monitoring (FIM) Program
509 - SERC Water Quality Monitoring Network
4064 - A spatial model to improve site selection for seagrass restoration in shallow boating environments
95 - Harmful Algal Bloom Marine Observation Network
476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network
103 - EPA STOrage and RETrieval Data Warehouse (STORET)
4042 - Estero Bay Oyster Monitoring
115 - Environmental Monitoring Assessment Program

Table 13: Value Qualifiers for Dissolved Oxygen

	Year	N_Total	N_H	perc_H
19	2008	301	10	3.3

Programs containing Value Qualified data:

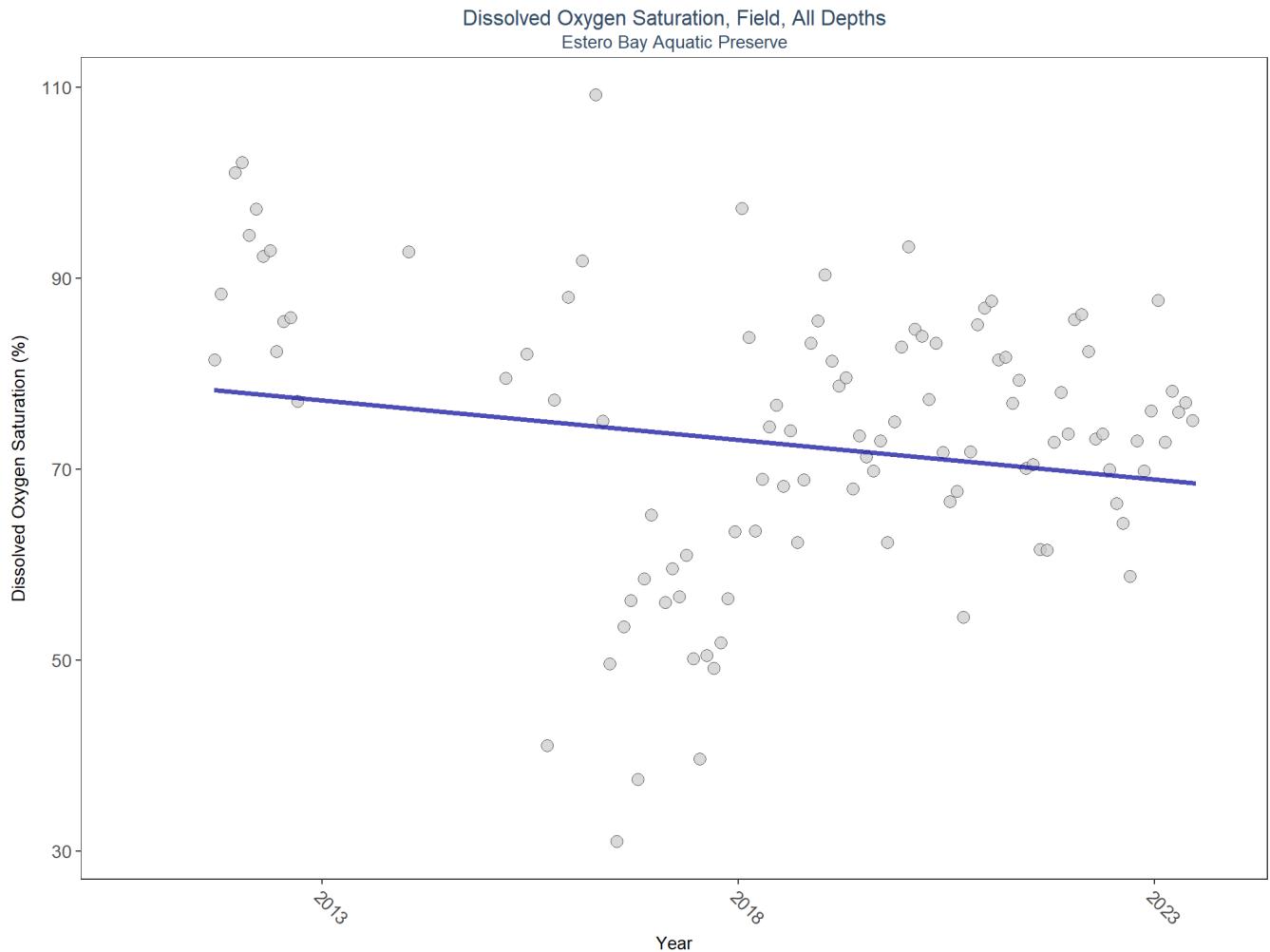
476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network

Value Qualifiers

H - Value based on field kit determination; 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.

Dissolved Oxygen Saturation

Discrete Seasonal Kendall-Tau Trend Analysis



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	2280	12	82.7	TRUE	-0.1542	0.0474	-0.8296853	78.86781	7.1184	0.7894	-1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Table 14: Programs contributing data for Dissolved Oxygen Saturation

ProgramID	N_Data	YearMin	YearMax
5002	1328	2015	2023
4064	619	2011	2012
476	182	2017	2023
95	120	2011	2018
4042	37	2016	2022

Program names:

5002 - Florida STORET / WIN

4064 - A spatial model to improve site selection for seagrass restoration in shallow boating environments

476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network

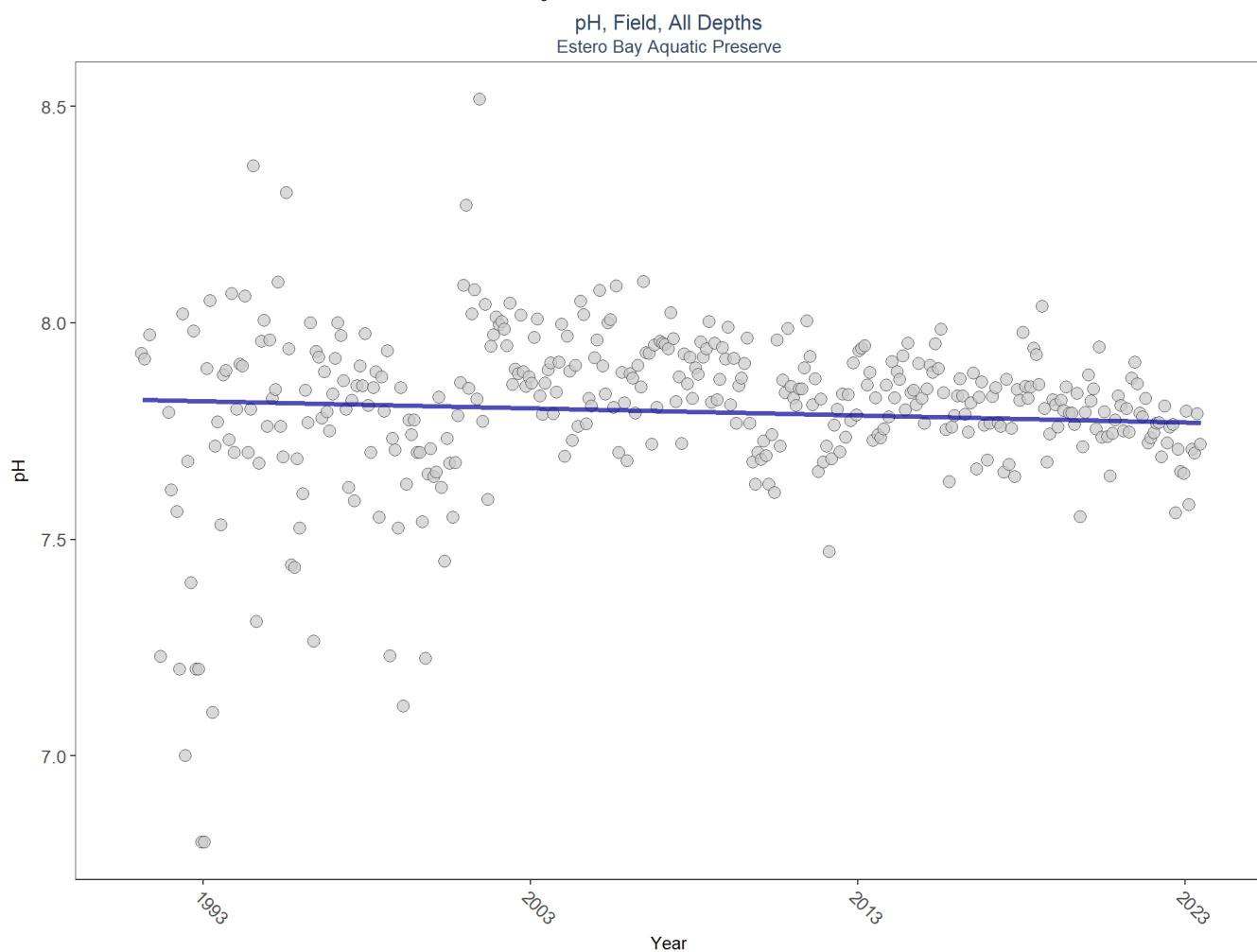
95 - Harmful Algal Bloom Marine Observation Network

4042 - Estero Bay Oyster Monitoring

There are no qualifying Value Qualifiers for Dissolved Oxygen Saturation in Estero Bay Aquatic Preserve

pH

Discrete Seasonal Kendall-Tau Trend Analysis



p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Table 15: Programs contributing data for pH

ProgramID	N_Data	YearMin	YearMax
5002	6311	1991	2023
69	2264	2001	2007
95	444	2005	2018
509	270	2001	2008
103	252	2020	2022

ProgramID	N_Data	YearMin	YearMax
476	243	2009	2023
4042	40	2016	2022
115	2	2003	2003

Program names:

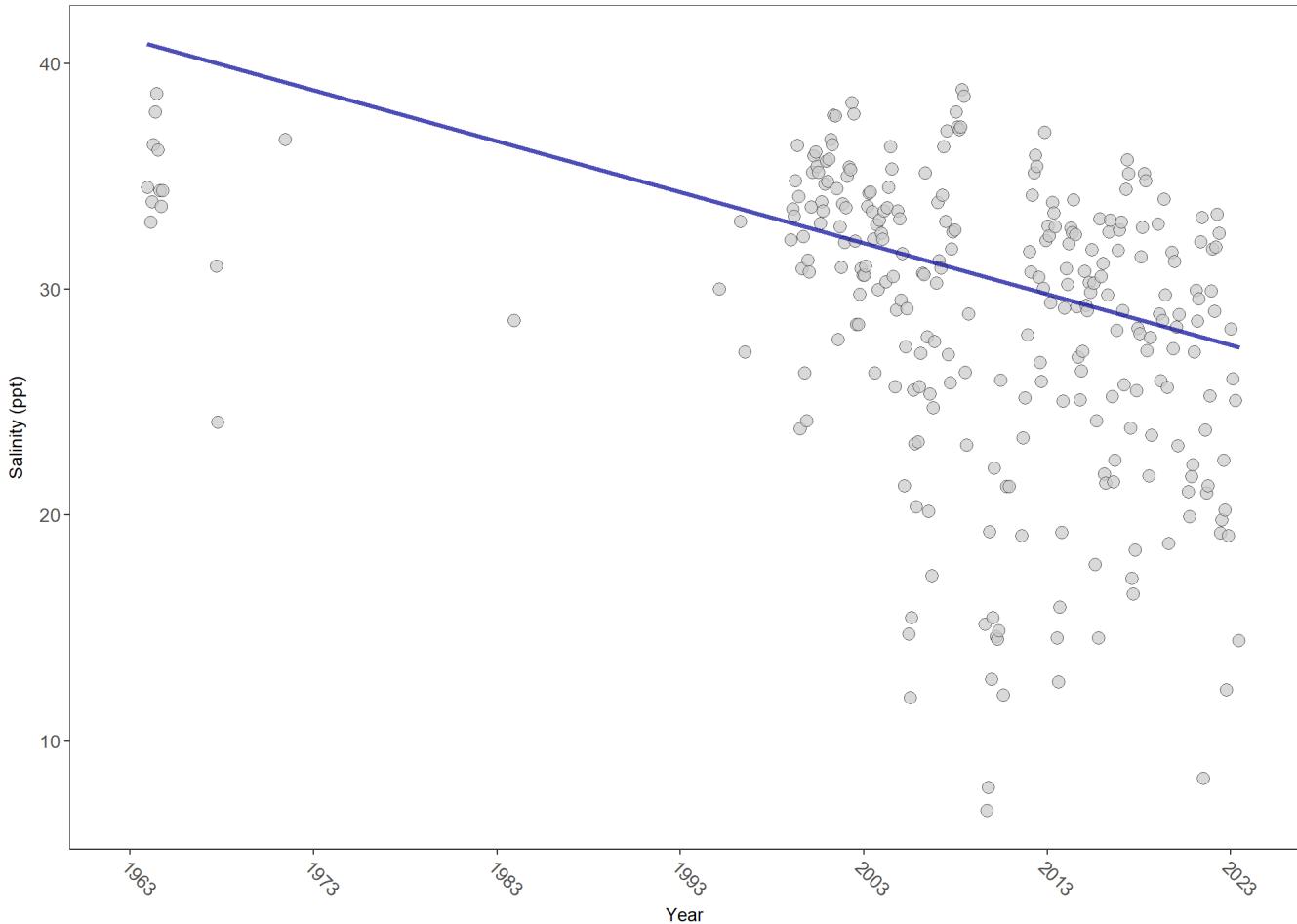
5002 - Florida STORET / WIN
 69 - Fisheries-Independent Monitoring (FIM) Program
 95 - Harmful Algal Bloom Marine Observation Network
 509 - SERC Water Quality Monitoring Network
 103 - EPA STOrage and RETrieval Data Warehouse (STORET)
 476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network
 4042 - Estero Bay Oyster Monitoring
 115 - Environmental Monitoring Assessment Program

There are no qualifying Value Qualifiers for pH in Estero Bay Aquatic Preserve

Salinity

Discrete Seasonal Kendall-Tau Trend Analysis

Salinity, Lab and Field Combined, All Depths
Estero Bay Aquatic Preserve



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	4468	32	32.4	TRUE	-0.3774	0.0000	-0.2258036	41.08287	4.8618	0.9377	-1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Table 16: Programs contributing data for Salinity

ProgramID	N_Data	YearMin	YearMax
69	2258	2001	2007
509	702	1999	2008
4064	619	2011	2012
95	526	1963	2018
476	213	2014	2023
5002	111	2009	2023
4042	46	2016	2022
115	2	2003	2003

Program names:

69 - Fisheries-Independent Monitoring (FIM) Program

509 - SERC Water Quality Monitoring Network

4064 - A spatial model to improve site selection for seagrass restoration in shallow boating environments

95 - Harmful Algal Bloom Marine Observation Network

476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network

5002 - Florida STORET / WIN

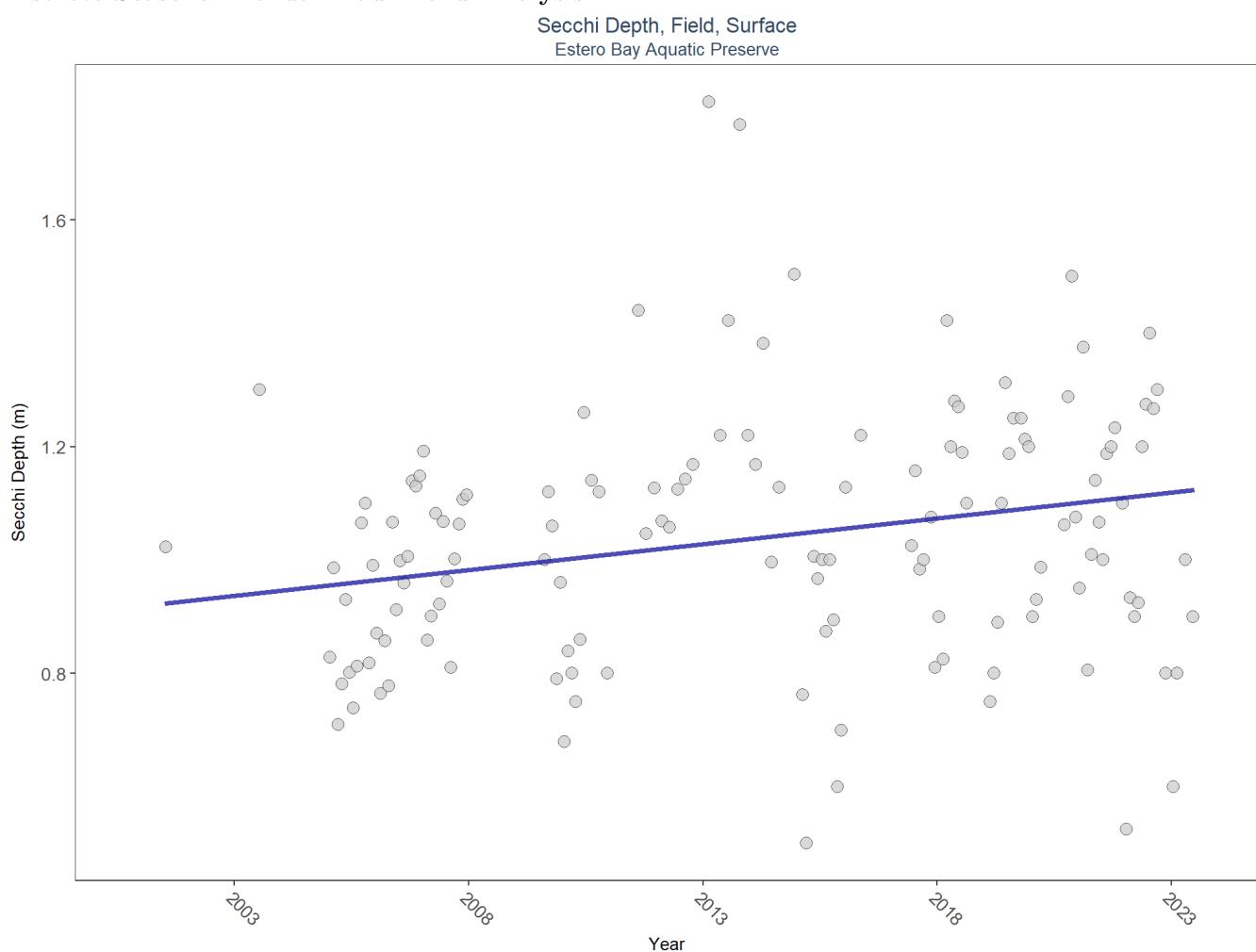
4042 - Estero Bay Oyster Monitoring

115 - Environmental Monitoring Assessment Program

There are no qualifying Value Qualifiers for Salinity in Estero Bay Aquatic Preserve

Secchi Depth

Discrete Seasonal Kendall-Tau Trend Analysis



$p < 0.00005$ appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Table 17: Programs contributing data for Secchi Depth

ProgramID	N_Data	YearMin	YearMax
69	2264	2001	2007
476	196	2017	2023
5002	147	2006	2023
514	76	2011	2018
103	53	2020	2022

Program names:

- 69 - Fisheries-Independent Monitoring (FIM) Program
- 476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network
- 5002 - Florida STORET / WIN
- 514 - Florida LAKEWATCH Program
- 103 - EPA STOrage and RETrieval Data Warehouse (STORET)

Table 18: Value Qualifiers for Secchi Depth

Year	N_Total	N_S	perc_S
12	2015	21	4
14	2017	24	2
15	2018	34	9
16	2019	42	14
17	2020	31	9
18	2021	94	14
19	2022	32	8
20	2023	5	2

Programs containing Value Qualified data:

- 5002 - Florida STORET / WIN
- 476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network

Value Qualifiers

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.

Total Nitrogen

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.

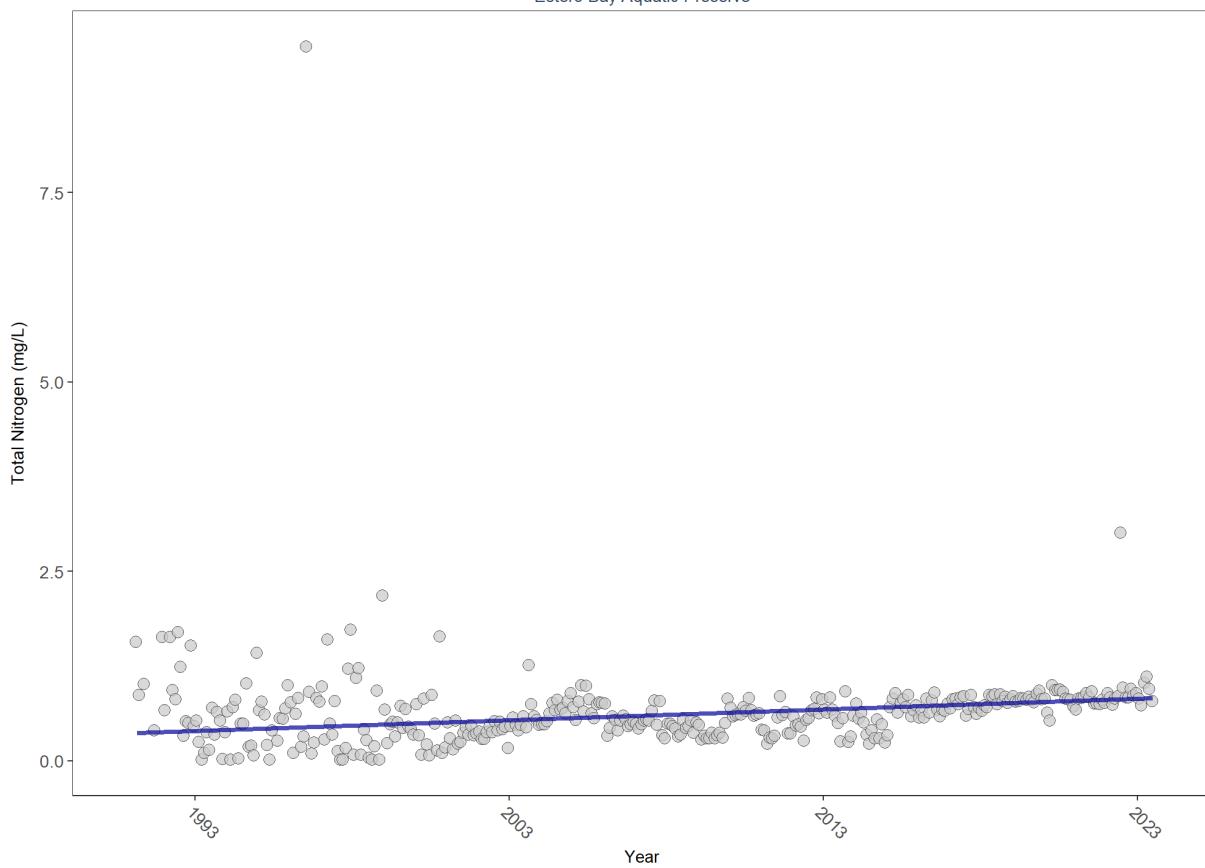
- 1) $TN = TKN + NO_3O_2;$
- 2) $TN = TKN + NO_3 + NO_2;$
- 3) $TN = ORGN + NH_4 + NO_3O_2;$
- 4) $TN = ORGN + NH_4 + NO_2 + NO_3;$
- 5) $TN = TKN + NO_3;$
- 6) $TN = ORGN + NH_4 + NO_3;$

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_QAACFlagCode = “1Q”
 - SEACAR_QAAC>Description = “SEACAR Calculated”

Discrete Seasonal Kendall-Tau Trend Analysis

Total Nitrogen, Lab, All Depths
Estero Bay Aquatic Preserve



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	6854	33	0.61	TRUE	0.3036	0.0000	0.01421027	0.3650016	13.5597	0.2583	1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Table 19: Programs contributing data for Total Nitrogen

ProgramID	N_Data	YearMin	YearMax
5002	6117	1991	2023
509	351	1999	2008
476	264	1998	2023
514	81	2011	2017
4063	54	2018	2022
303	8	2020	2021
103	6	2003	2003
115	1	2003	2003

Program names:

5002 - Florida STORET / WIN

509 - SERC Water Quality Monitoring Network

476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network

514 - Florida LAKEWATCH Program

4063 - Estero Bay Tributary Monitoring

303 - River, Estuary and Coastal Observing Network
 103 - EPA STOrage and RETrieval Data Warehouse (STORET)
 115 - Environmental Monitoring Assessment Program

Table 20: Value Qualifiers for Total Nitrogen

	Year	N_Total	N_I	perc_I	N_Q	perc_Q	N_U	perc_U
1	1991	55	1	1.8			1	1.8
2	1992	79					1	1.3
3	1993	41	1	2.4			19	46.3
4	1994	54	2	3.7			15	27.8
5	1995	39					1	2.6
6	1996	54	2	3.7			22	40.7
7	1997	54	1	1.9			15	27.8
8	1998	70	1	1.4			55	78.6
9	1999	109	1	0.9			20	18.4
10	2000	132	1	0.8			47	35.6
11	2001	209					4	1.9
12	2002	227	5	2.2			2	0.9
14	2004	322	2	0.6	2	0.6		
15	2005	324	16	4.9				
16	2006	313	100	32.0				
17	2007	356	61	17.1			11	3.1
18	2008	304	24	7.9			1	0.3
19	2009	281	57	20.3			19	6.8
21	2011	256	46	18.0			17	6.6
22	2012	255	6	2.4			5	2.0
23	2013	242	25	10.3			30	12.4
24	2014	283	42	14.8			13	4.6
25	2015	298	6	2.0			2	0.7
27	2017	280	1	0.4			1	0.4
30	2020	263			2	0.8		

Programs containing Value Qualified data:

5002 - Florida STORET / WIN

303 - River, Estuary and Coastal Observing Network

Value Qualifiers

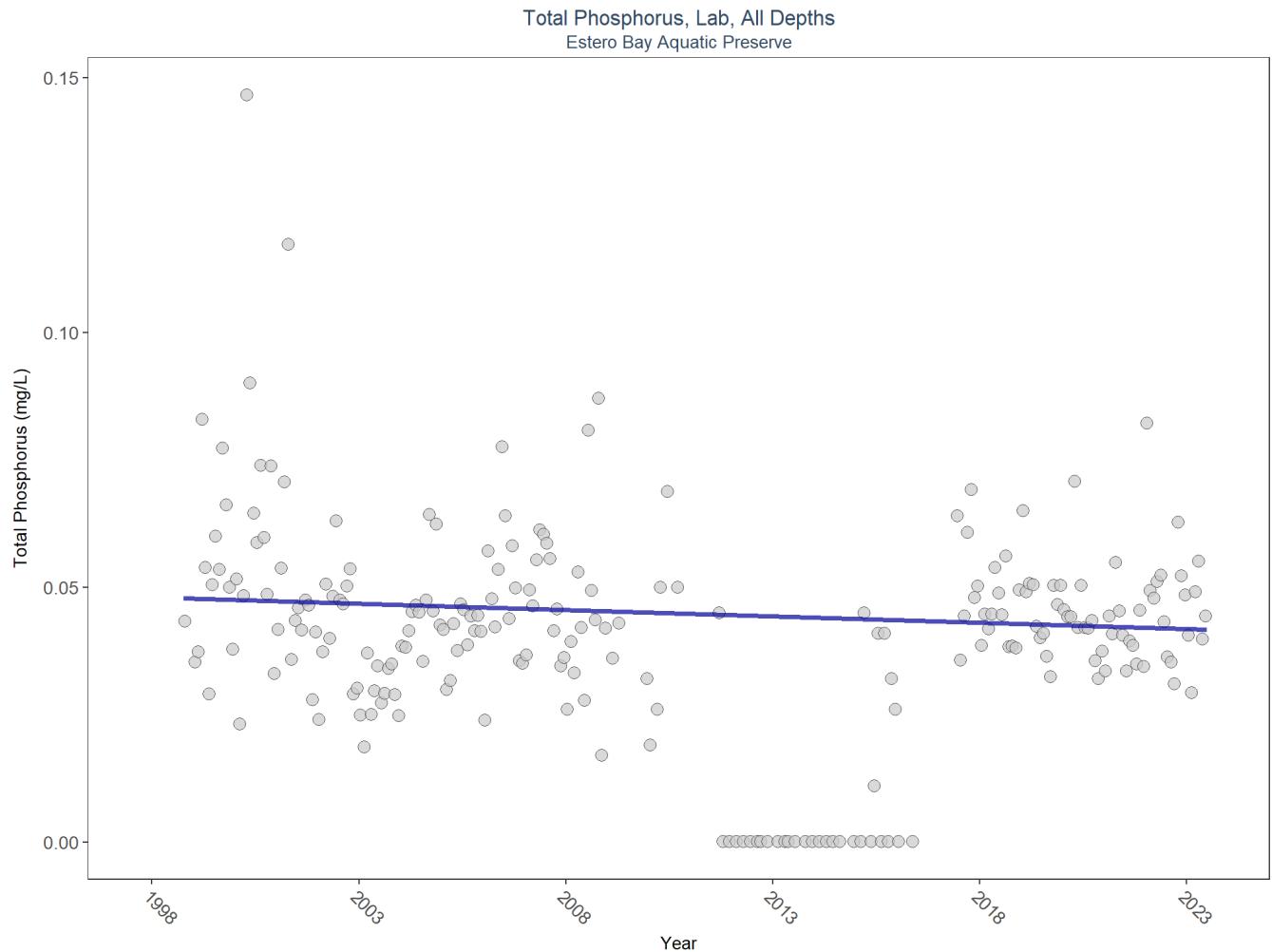
I - The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

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.

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

Total Phosphorus

Discrete Seasonal Kendall-Tau Trend Analysis



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	2369	26	0.041	TRUE	-0.0933	0.0545	-0.0002481456	0.04805668	12.9431	0.2971	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Table 21: Programs contributing data for Total Phosphorus

ProgramID	N_Data	YearMin	YearMax
5002	1293	2006	2023
476	376	1998	2023
509	351	1999	2008
103	230	2003	2022
514	81	2011	2017
4063	59	2018	2022
303	8	2020	2021
115	1	2003	2003

Program names:

5002 - Florida STORET / WIN

476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network

509 - SERC Water Quality Monitoring Network

103 - EPA STOrage and RETrieval Data Warehouse (STORET)

514 - Florida LAKEWATCH Program

4063 - Estero Bay Tributary Monitoring

303 - River, Estuary and Coastal Observing Network

115 - Environmental Monitoring Assessment Program

Table 22: Value Qualifiers for Total Phosphorus

	Year	N_Total	N_I	perc_I	N_Q	perc_Q	N_U	perc_U
1	1998	3			3	100.0		
2	1999	41			5	12.2		
4	2001	38	1	2.6			1	2.6
5	2002	43					7	16.3
6	2003	47					1	2.1
7	2004	51	10	19.6	4	7.8		
8	2005	65	24	36.9			5	7.7
9	2006	74	37	50.0			1	1.4
10	2007	99	49	49.5			2	2.0
11	2008	34	1	2.9				
13	2010	10	2	20.0				
21	2018	275	20	7.3			4	1.4
22	2019	268	8	3.0				
23	2020	287	20	7.0			5	1.7
24	2021	523	22	4.2			4	0.8
25	2022	280	19	6.8			3	1.1
26	2023	81	8	9.9			5	6.2

Programs containing Value Qualified data:

476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network

5002 - Florida STORET / WIN

303 - River, Estuary and Coastal Observing Network

4063 - Estero Bay Tributary Monitoring

Value Qualifiers

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

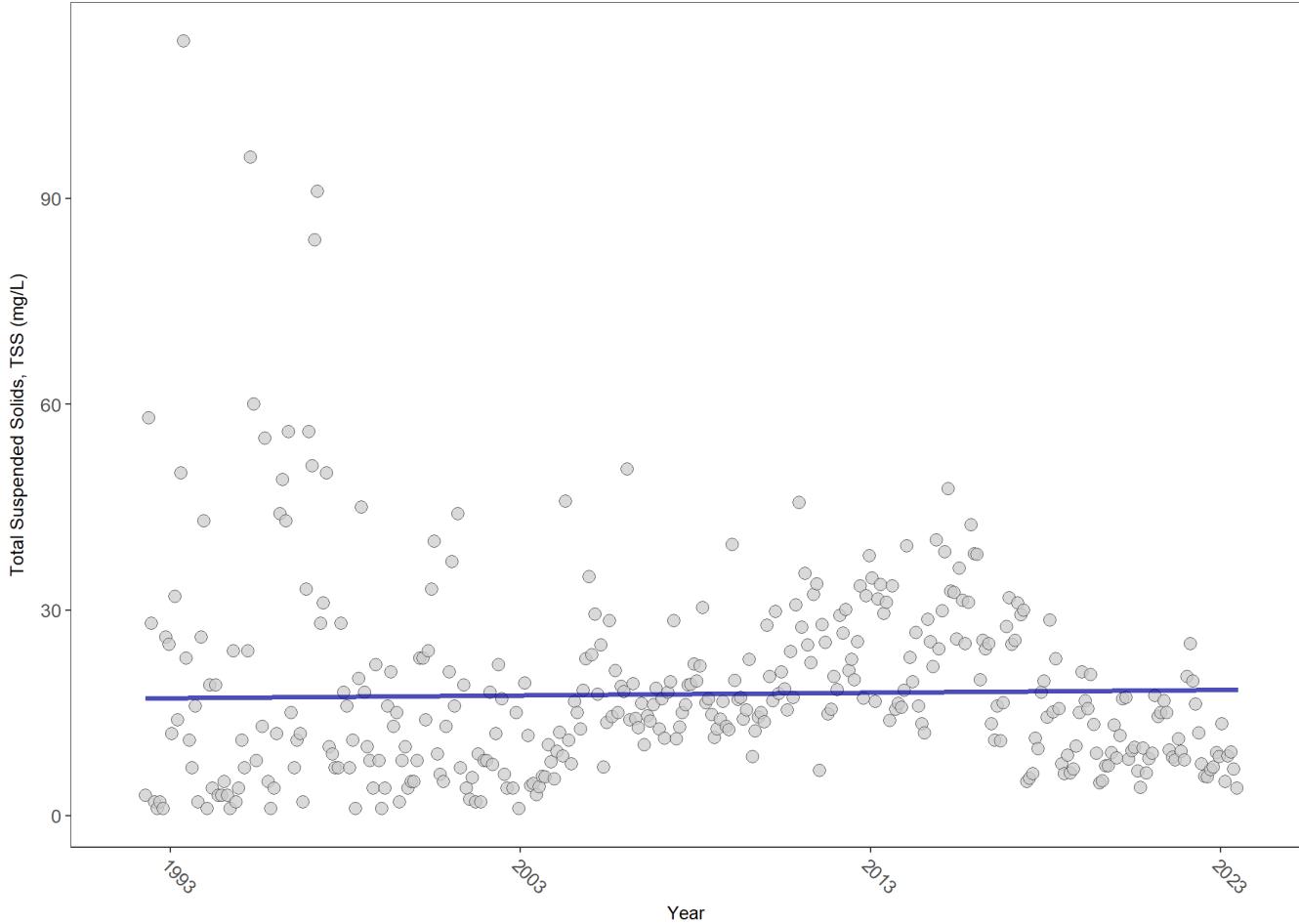
Q - Sample held beyond the accepted holding time. This code shall be used if the value is derived from a sample that was prepared or analyzed after the approved holding time restrictions for sample preparation or analysis.

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

Total Suspended Solids, TSS

Discrete Seasonal Kendall-Tau Trend Analysis

Total Suspended Solids, TSS, Lab and Field Combined, All Depths
Estero Bay Aquatic Preserve



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	5217	32	14.2	TRUE	0.0269	0.4986	0.04030556	17.07072	15.0737	0.1791	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Table 23: Programs contributing data for Total Suspended Solids, TSS

ProgramID	N_Data	YearMin	YearMax
5002	5055	1992	2023
103	170	2020	2021
4063	59	2018	2022

Program names:

- 5002 - Florida STORET / WIN
- 103 - EPA STOrage and RETrieval Data Warehouse (STORET)
- 4063 - Estero Bay Tributary Monitoring

Table 24: Value Qualifiers for Total Suspended Solids, TSS

	Year	N_Total	N_I	perc_I	N_U	perc_U
1	1992	9	3	33.3	2	22.2
2	1993	13	2	15.4		
3	1994	12	4	33.3	2	16.7
4	1995	11			1	9.1
5	1996	12	1	8.3		
7	1998	12			1	8.3
8	1999	12	1	8.3	1	8.3
10	2001	16	6	37.5		
11	2002	14	2	14.3	1	7.1
12	2003	188	85	45.2	36	19.1
13	2004	280	92	32.9	7	2.5
14	2005	286	8	2.8		
15	2006	276			1	0.4
16	2007	276	3	1.1		
17	2008	273	4	1.5		
18	2009	276	5	1.8	1	0.4
19	2010	217	7	3.2		
20	2011	242	6	2.5		
21	2012	218	3	1.4		
22	2013	204	1	0.5		
23	2014	250	4	1.6		
24	2015	265	9	3.4	1	0.4
25	2016	254	7	2.8		
26	2017	244	13	5.3		
27	2018	244	10	4.1	5	2.0
28	2019	226	13	5.8	5	2.2
29	2020	233	6	2.6	1	0.4
30	2021	401	4	1.0	7	1.8
31	2022	229	5	2.2	2	0.9
32	2023	67	3	4.5		

Programs containing Value Qualified data:

5002 - Florida STORET / WIN

4063 - Estero Bay Tributary Monitoring

Value Qualifiers

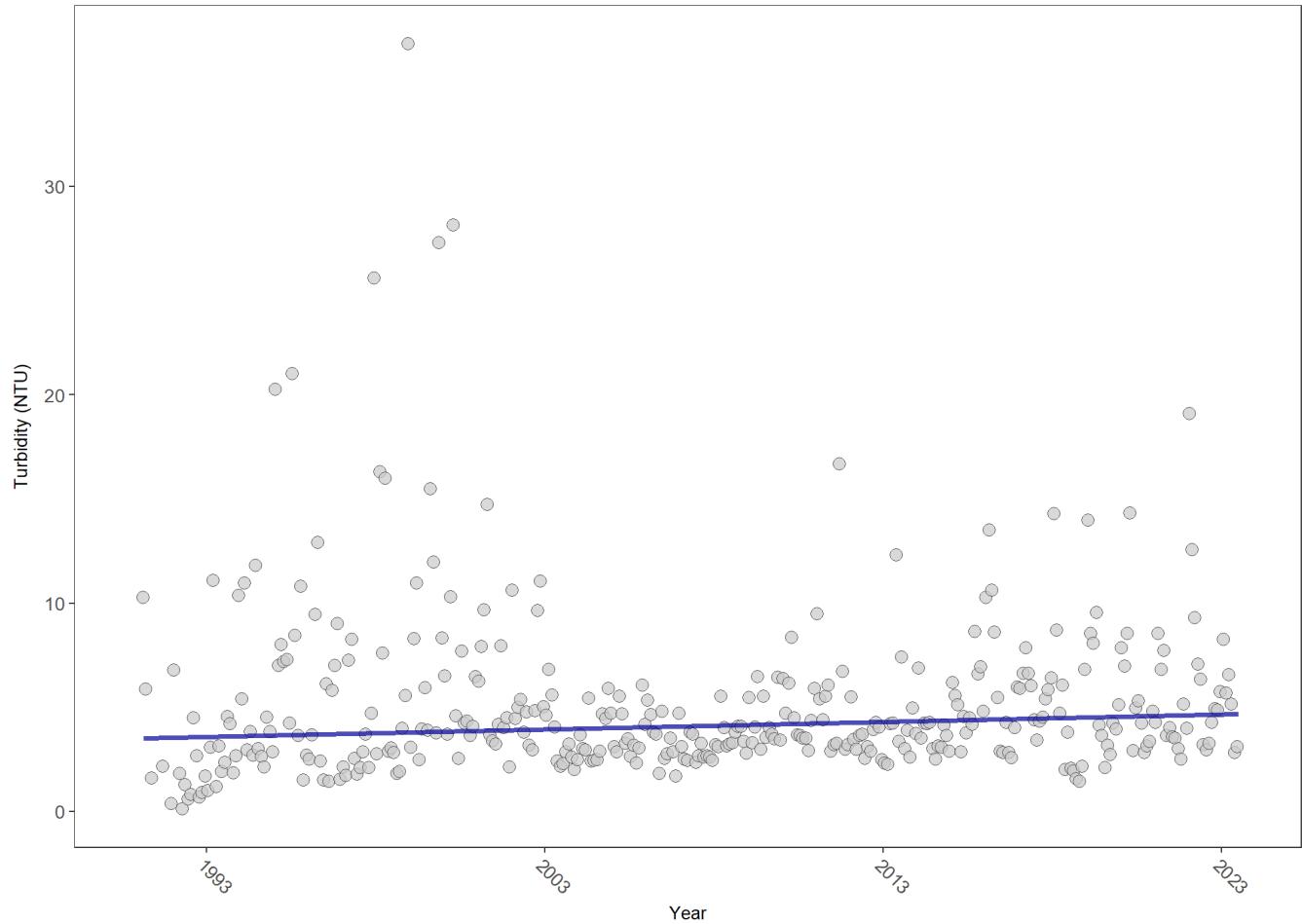
I - The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

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

Turbidity

Discrete Seasonal Kendall-Tau Trend Analysis

Turbidity, Lab and Field Combined, All Depths
Estero Bay Aquatic Preserve



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	7095	33	3.37	TRUE	0.1206	0.0007	0.03547639	3.515312	9.1264	0.6102	1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Table 25: Programs contributing data for Turbidity

ProgramID	N_Data	YearMin	YearMax
5002	6158	1991	2023
509	348	1999	2008
476	307	1999	2023
103	221	2020	2022
4063	59	2018	2022
4042	45	2016	2022

Program names:

5002 - Florida STORET / WIN

509 - SERC Water Quality Monitoring Network

476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network

103 - EPA STOrage and RETrieval Data Warehouse (STORET)

4063 - Estero Bay Tributary Monitoring

4042 - Estero Bay Oyster Monitoring

Table 26: Value Qualifiers for Turbidity

	Year	N_Total	N_I	perc_I	N_Q	perc_Q	N_U	perc_U
13	2003	295					2	0.7
14	2004	355	14	3.9				
20	2010	205			3	1.5		
21	2011	245			4	1.6		
24	2014	255			1	0.4		
26	2016	263			2	0.8		
28	2018	279	28	10.0			4	1.4
29	2019	257	8	3.1			3	1.2
30	2020	276	3	1.1	1	0.4		
31	2021	508	7	1.4	4	0.8	1	0.2
32	2022	289	1	0.3				

Programs containing Value Qualified data:

5002 - Florida STORET / WIN

476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network

4063 - Estero Bay Tributary Monitoring

Value Qualifiers

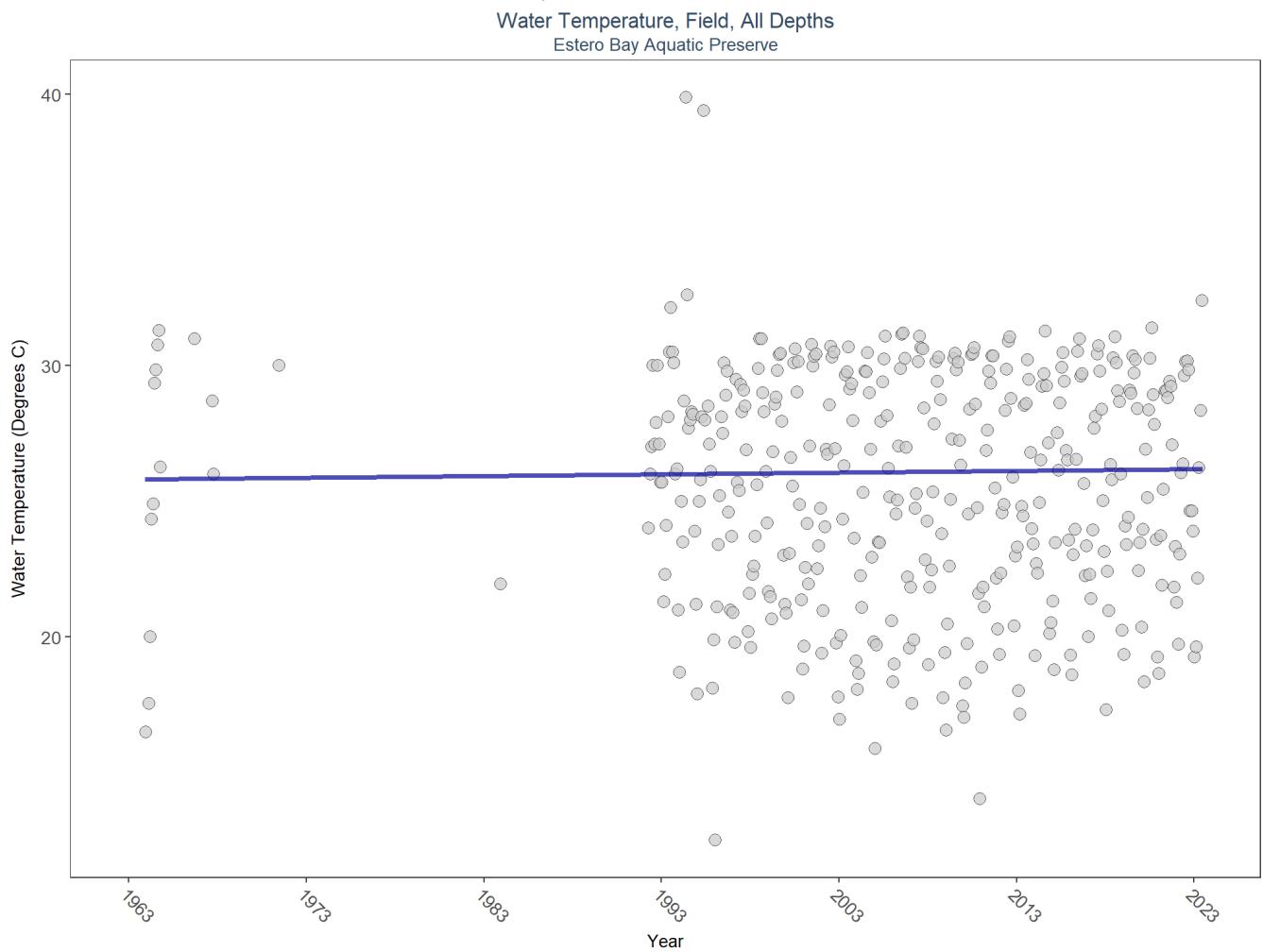
I - The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

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.

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

Water Temperature

Discrete Seasonal Kendall-Tau Trend Analysis



p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Table 27: Programs contributing data for Water Temperature

ProgramID	N_Data	YearMin	YearMax
5002	5334	1992	2023
69	2261	2001	2007
509	702	1999	2008
4064	619	2011	2012
95	492	1963	2018
103	253	2020	2022
476	208	2011	2023
4042	46	2016	2022
115	2	2003	2003

Program names:

5002 - Florida STORET / WIN
69 - Fisheries-Independent Monitoring (FIM) Program
509 - SERC Water Quality Monitoring Network
4064 - A spatial model to improve site selection for seagrass restoration in shallow boating environments
95 - Harmful Algal Bloom Marine Observation Network
103 - EPA STOrage and RETrieval Data Warehouse (STORET)
476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network
4042 - Estero Bay Oyster Monitoring
115 - Environmental Monitoring Assessment Program

There are no qualifying Value Qualifiers for Water Temperature in Estero Bay Aquatic Preserve

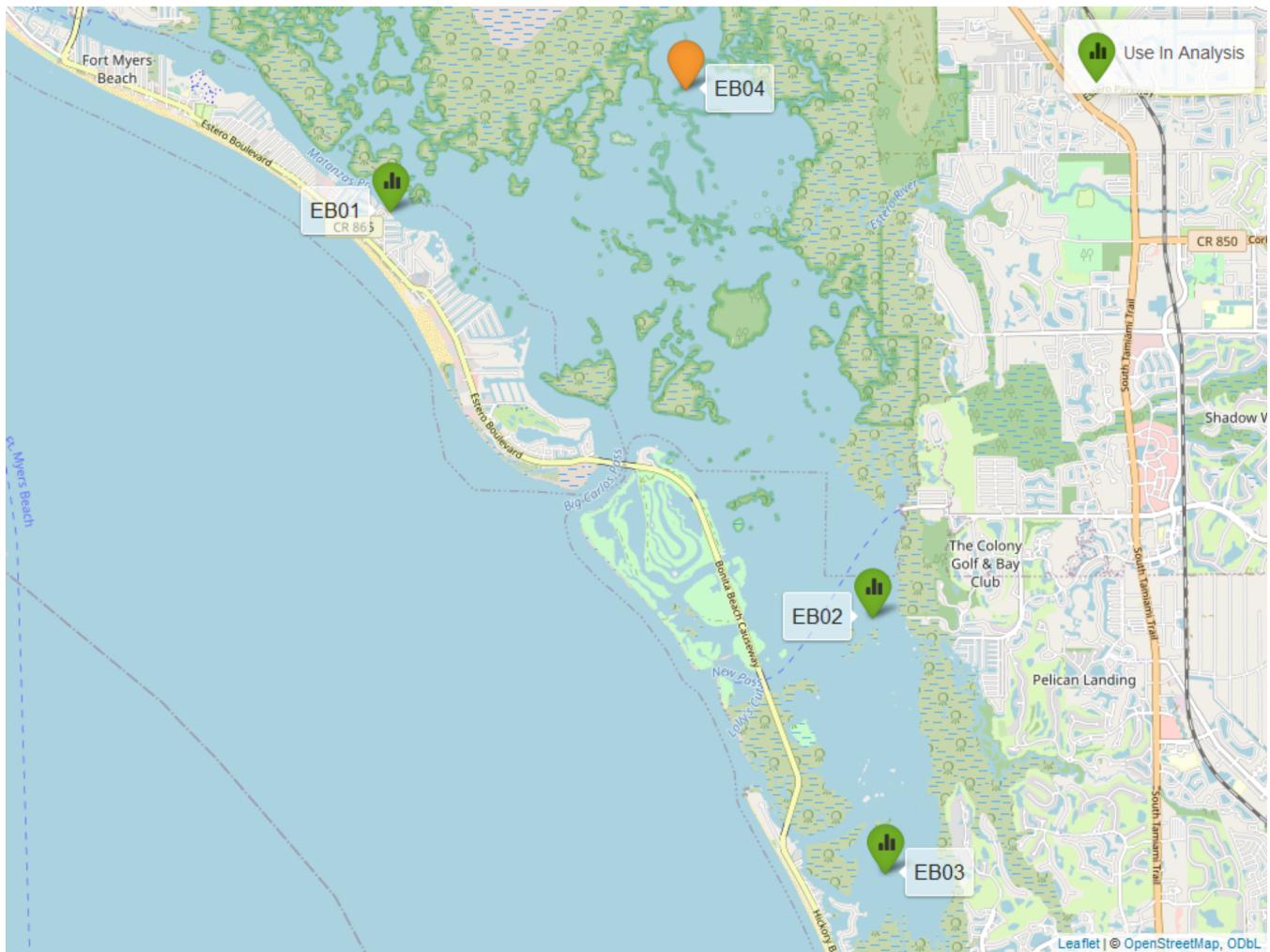
Water Quality - Continuous

The following files were used in the continuous analysis:

- *Combined_WQ_WC_NUT_cont_Dissolved_Oxygen_SW-2023-Jul-14.txt*
- *Combined_WQ_WC_NUT_cont_Dissolved_Oxygen_Saturation_SW-2023-Jul-14.txt*
- *Combined_WQ_WC_NUT_cont_pH_SW-2023-Jul-14.txt*
- *Combined_WQ_WC_NUT_cont_Salinity_SW-2023-Jul-14.txt*
- *Combined_WQ_WC_NUT_cont_Turbidity_SW-2023-Jul-14.txt*
- *Combined_WQ_WC_NUT_cont_Water_Temperature_SW-2023-Jul-14.txt*

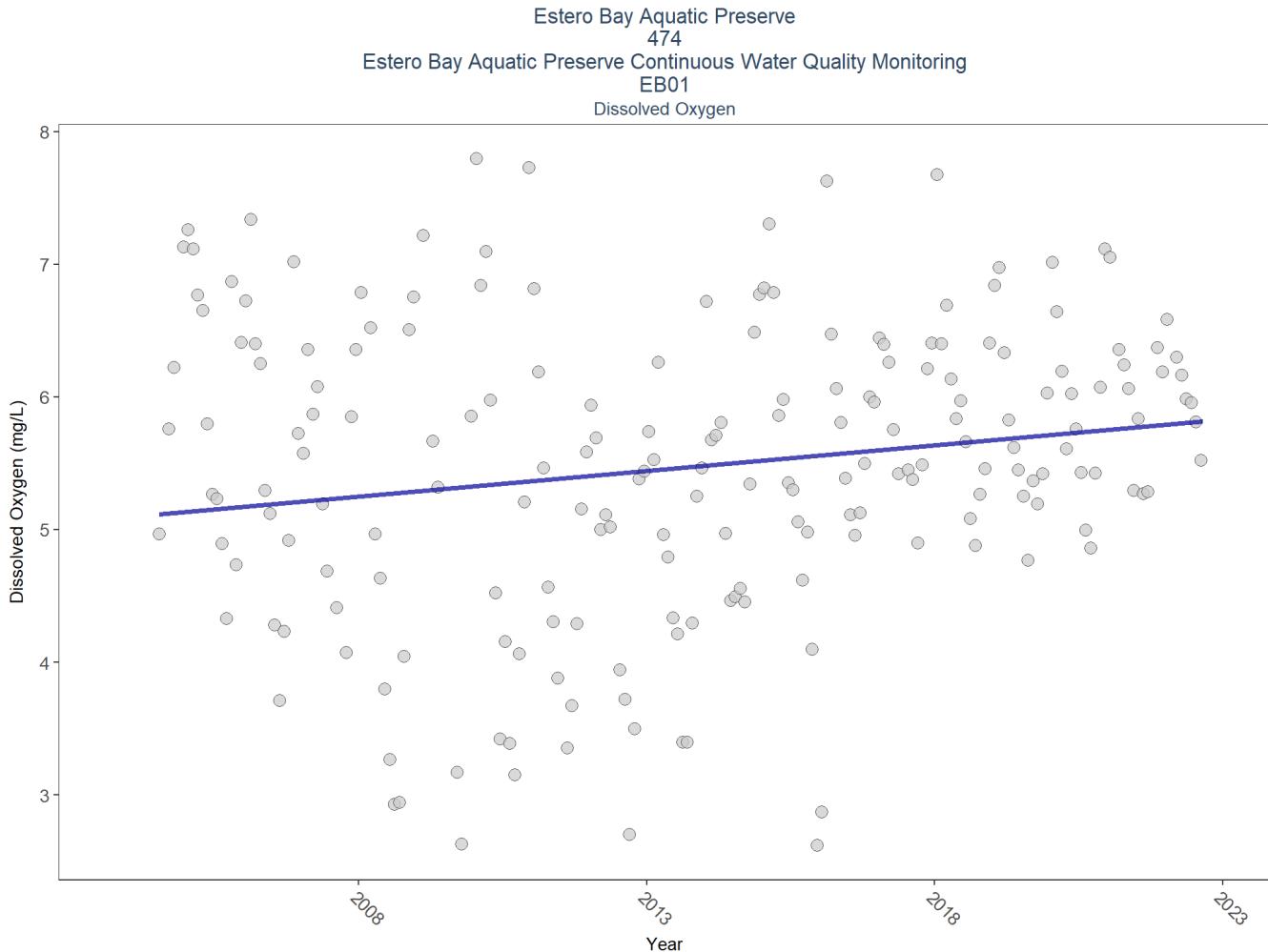
Table 28: Estero Bay Aquatic Preserve Continuous Water Quality Monitoring (474)

Program	LocationID	years_of_data	Use_In_Analysis
EB01		19	TRUE
EB02		19	TRUE
EB03		19	TRUE
EB04		2	FALSE



Dissolved Oxygen

EB01



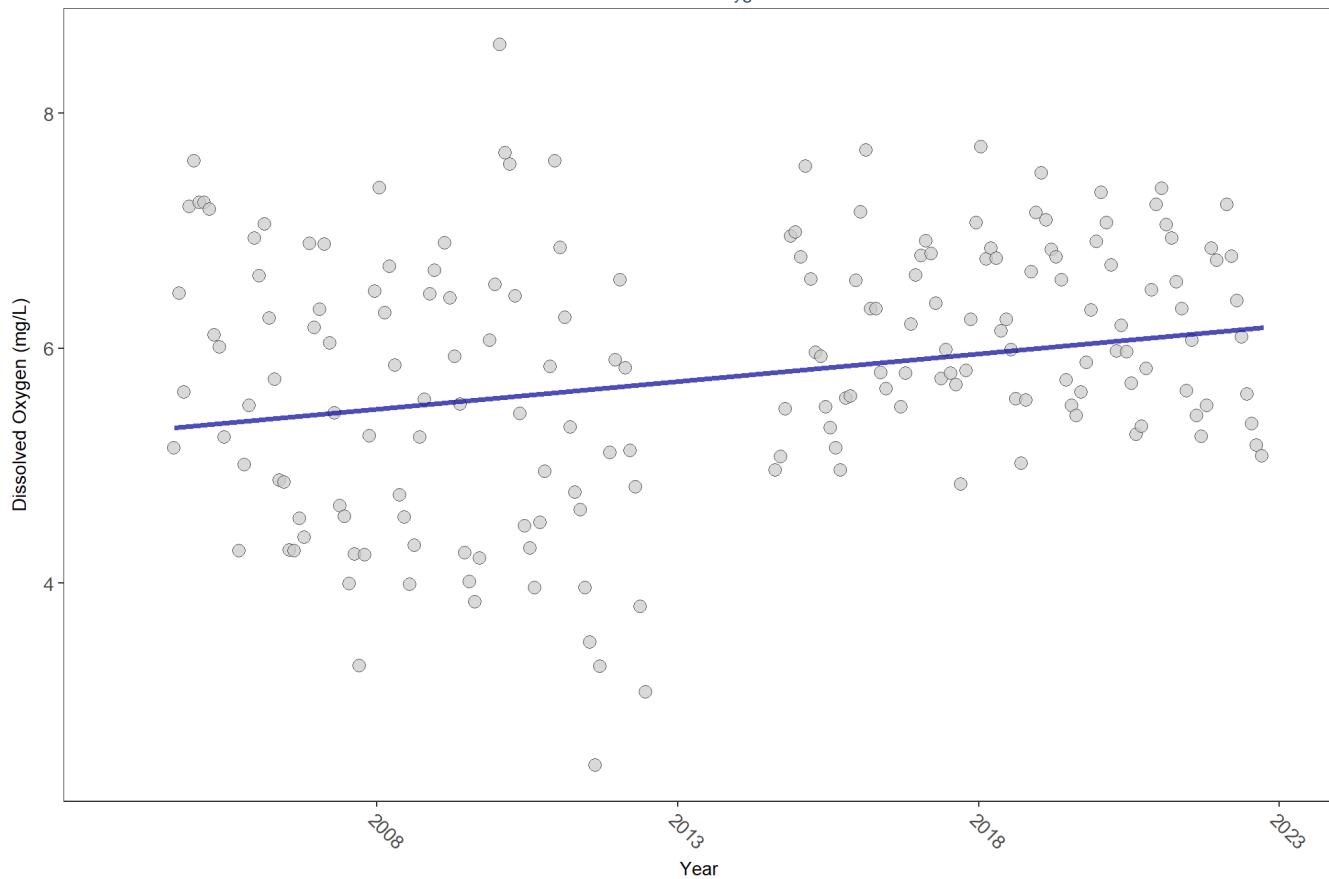
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	478415	19	5.6	TRUE	0.2196	0.0000	0.03869549	5.095745	20.9159	0.0343	1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB02

Estero Bay Aquatic Preserve
474
Estero Bay Aquatic Preserve Continuous Water Quality Monitoring
EB02
Dissolved Oxygen



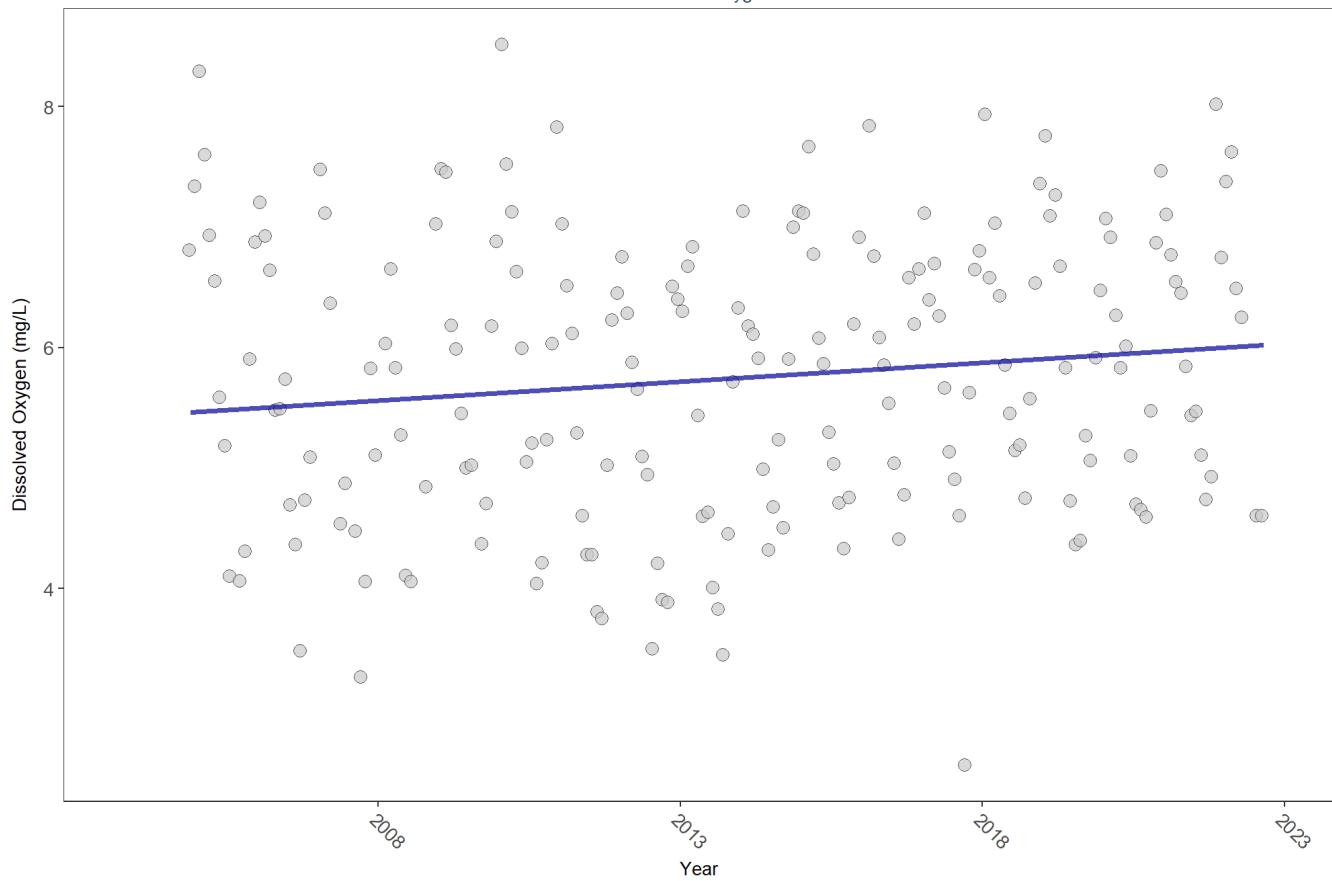
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	416255	18	6	TRUE	0.2991	0.0000	0.04707587	5.292665	5.2778	0.917	1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB03

Estero Bay Aquatic Preserve
474
Estero Bay Aquatic Preserve Continuous Water Quality Monitoring
EB03
Dissolved Oxygen



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	439701	19	5.9	TRUE	0.1991	0.0002	0.03138447	5.435208	11.2299	0.4242	1

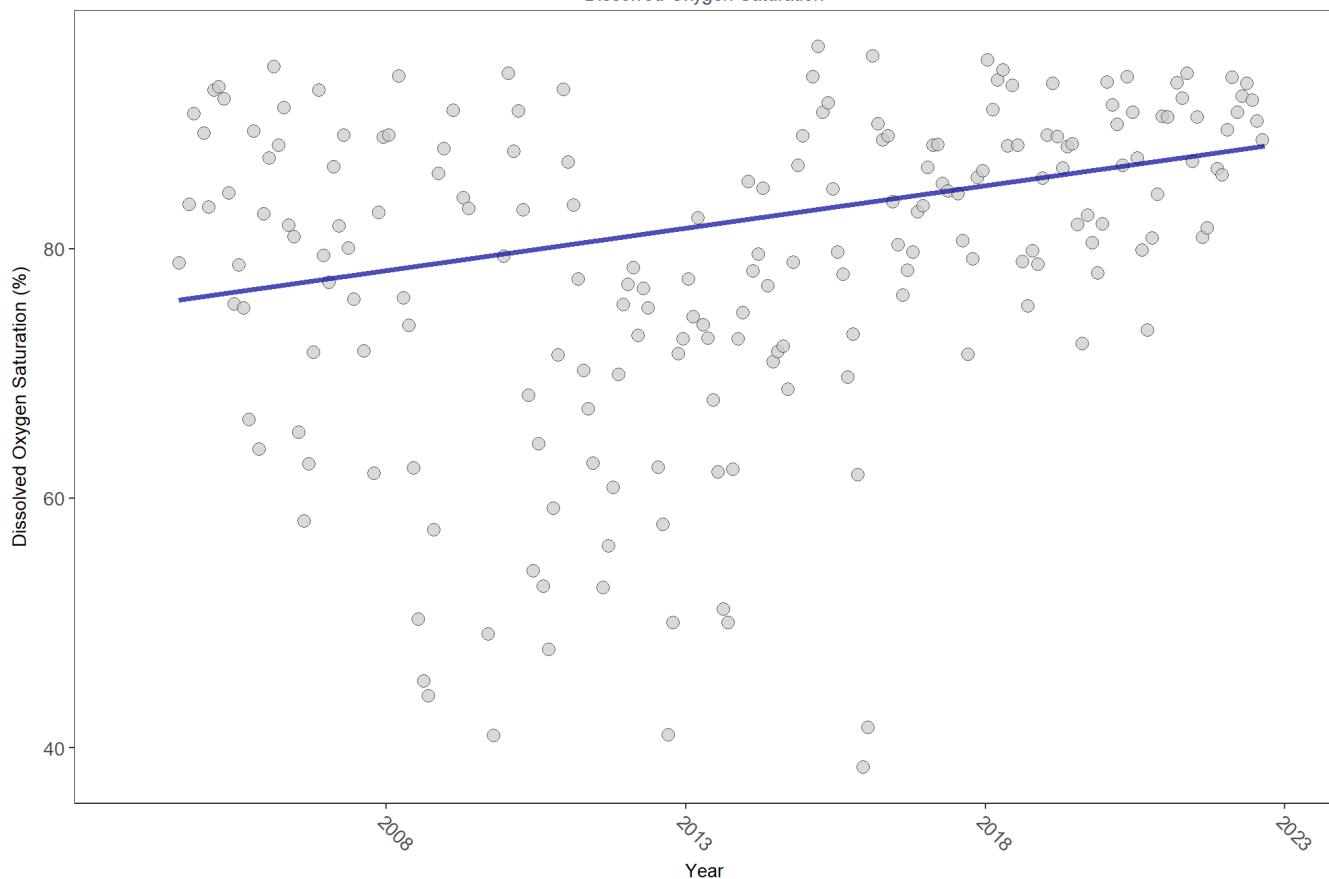
p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Dissolved Oxygen Saturation

EB01

Estero Bay Aquatic Preserve
474
Estero Bay Aquatic Preserve Continuous Water Quality Monitoring
EB01
Dissolved Oxygen Saturation



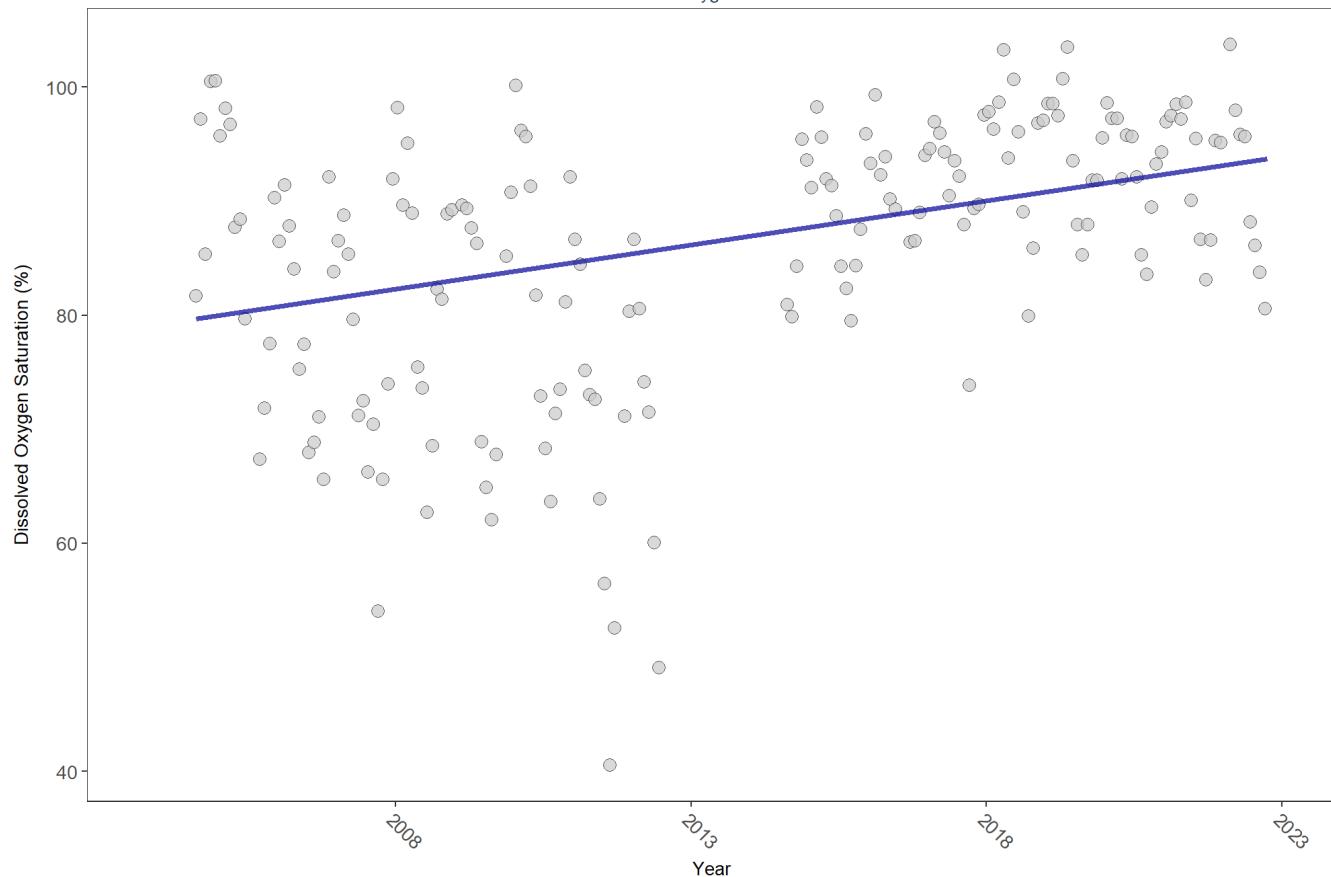
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	480233	19	81.6	TRUE	0.3057	0.0000	0.6815911	75.49737	13.4272	0.2663	1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB02

Estero Bay Aquatic Preserve
474
Estero Bay Aquatic Preserve Continuous Water Quality Monitoring
EB02
Dissolved Oxygen Saturation



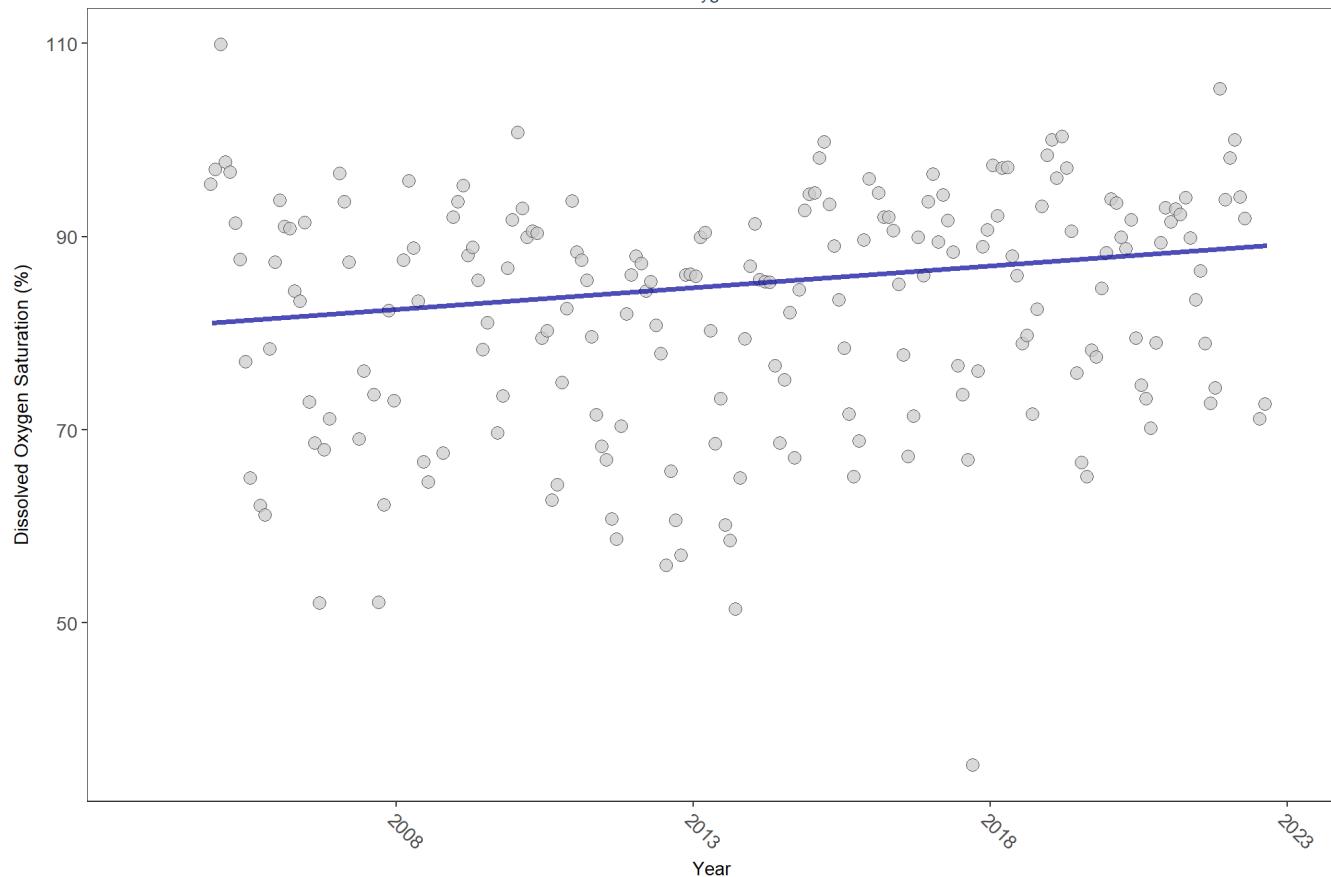
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	416492	18	87.5	TRUE	0.4277	0.0000	0.7768762	79.15597	3.1342	0.9888	1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB03

Estero Bay Aquatic Preserve
474
Estero Bay Aquatic Preserve Continuous Water Quality Monitoring
EB03
Dissolved Oxygen Saturation



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	441227	19	83.7	TRUE	0.2531	0.0000	0.4503603	80.68982	6.4615	0.8409	1

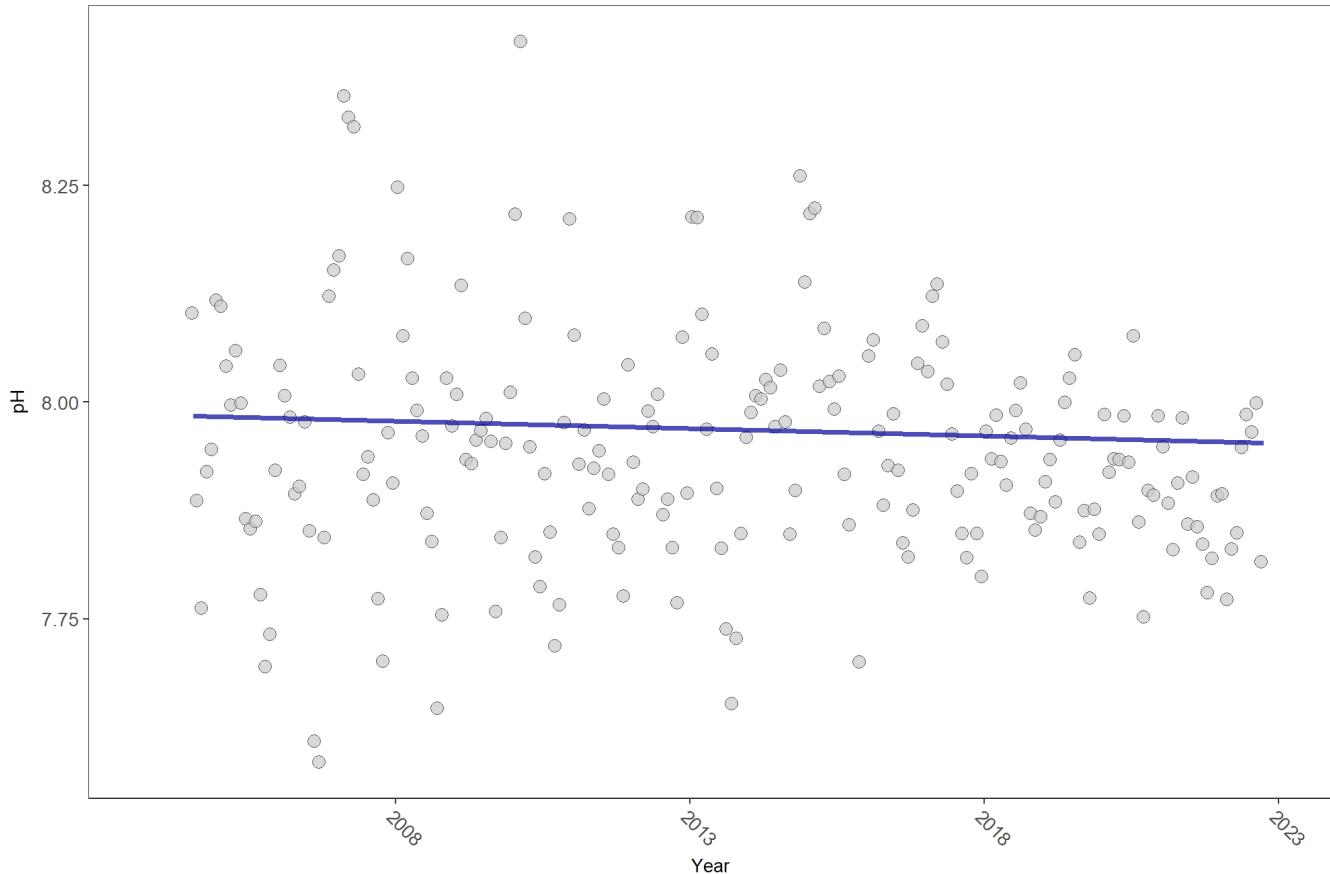
p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

pH

EB01

Estero Bay Aquatic Preserve
474
Estero Bay Aquatic Preserve Continuous Water Quality Monitoring
EB01
pH



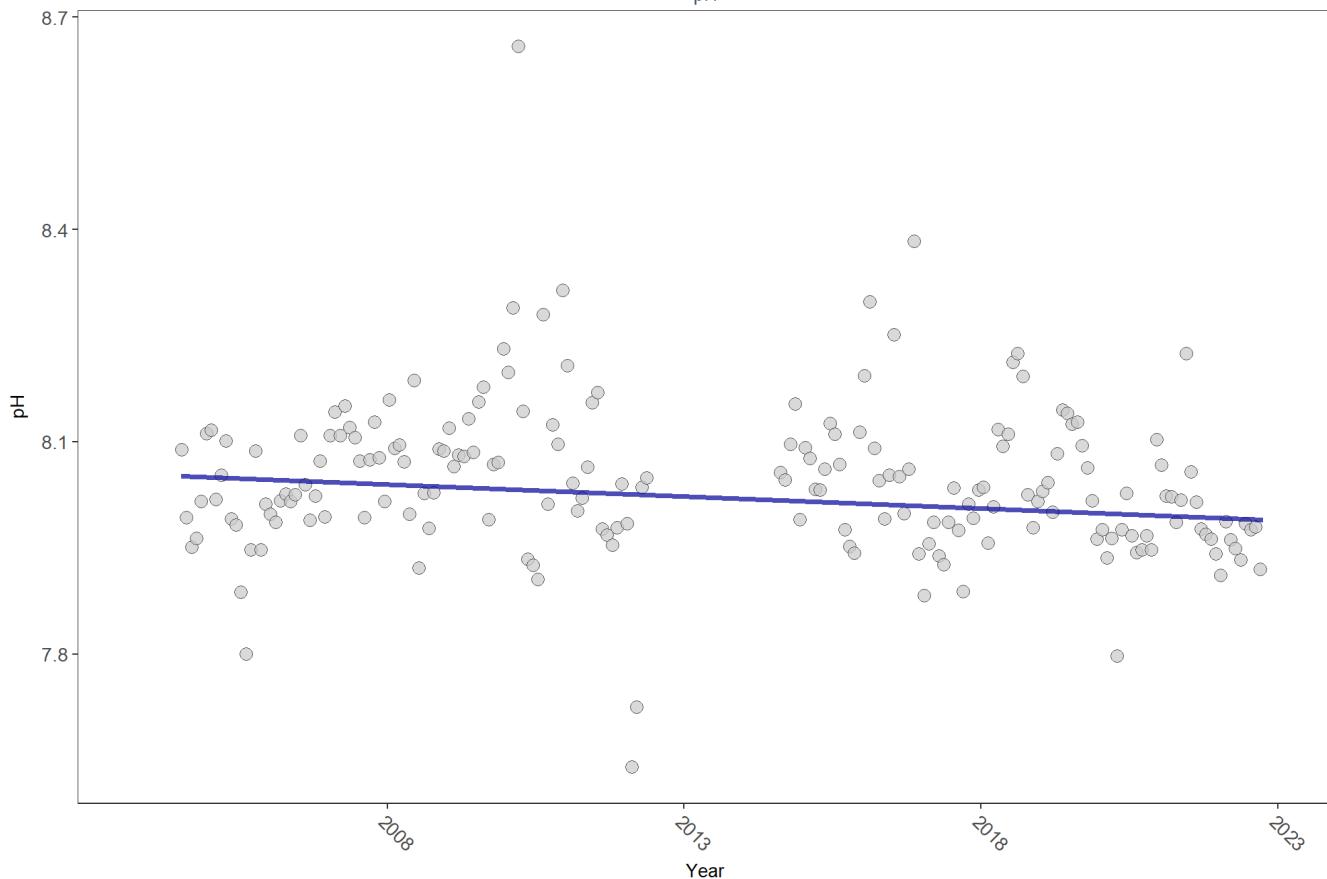
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	561177	19	7.9	TRUE	-0.0742	0.1620	-0.001714161	7.985223	29.3817	0.002	0

$p < 0.00005$ appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB02

Estero Bay Aquatic Preserve
474
Estero Bay Aquatic Preserve Continuous Water Quality Monitoring
EB02
pH



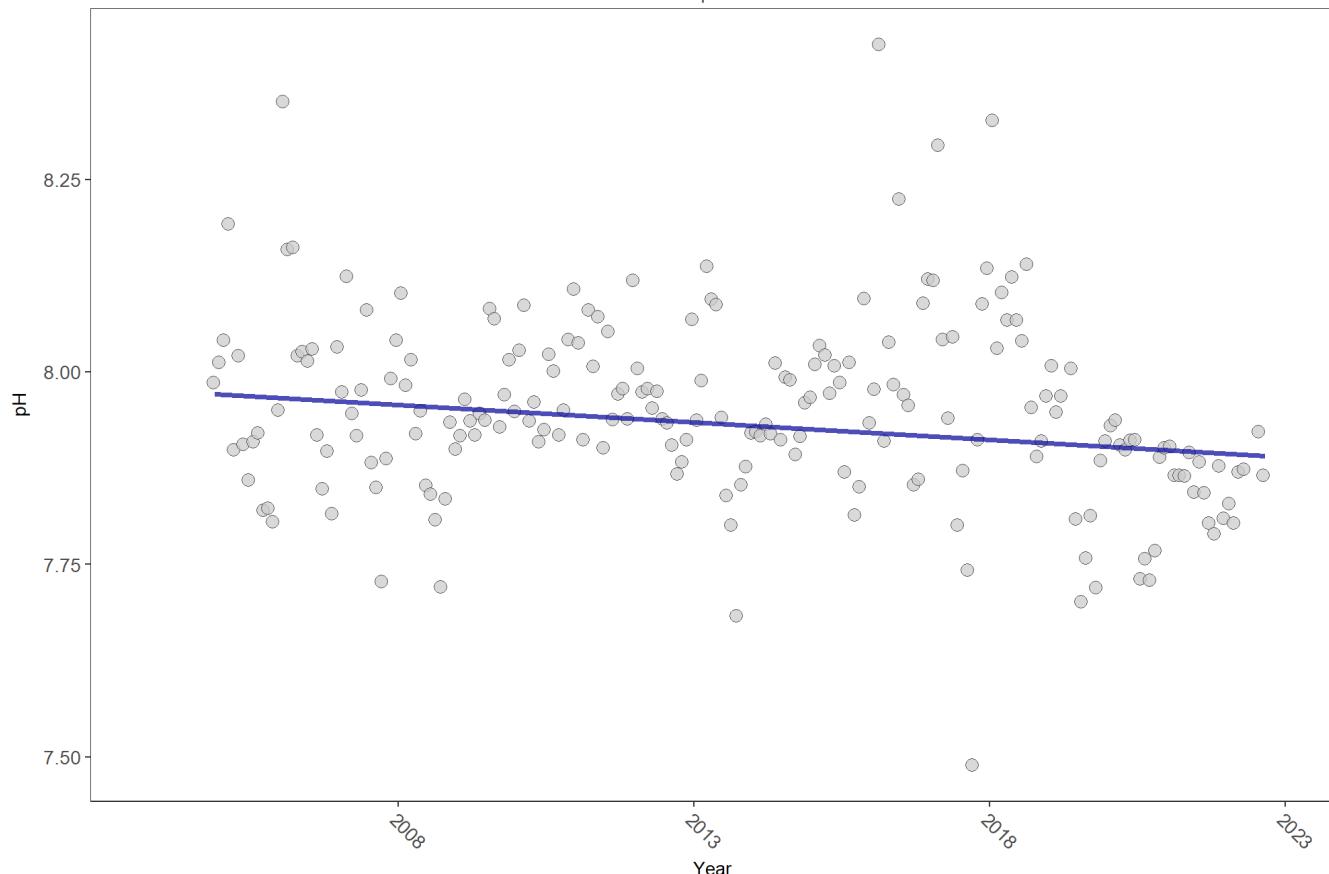
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	477038	18	8	TRUE	-0.1413	0.0086	-0.003392557	8.053129	9.7501	0.553	-1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB03

Estero Bay Aquatic Preserve
474
Estero Bay Aquatic Preserve Continuous Water Quality Monitoring
EB03
pH



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	525178	19	8	TRUE	-0.1705	0.0007	-0.004519888	7.974864	5.7266	0.891	-1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Salinity

EB01

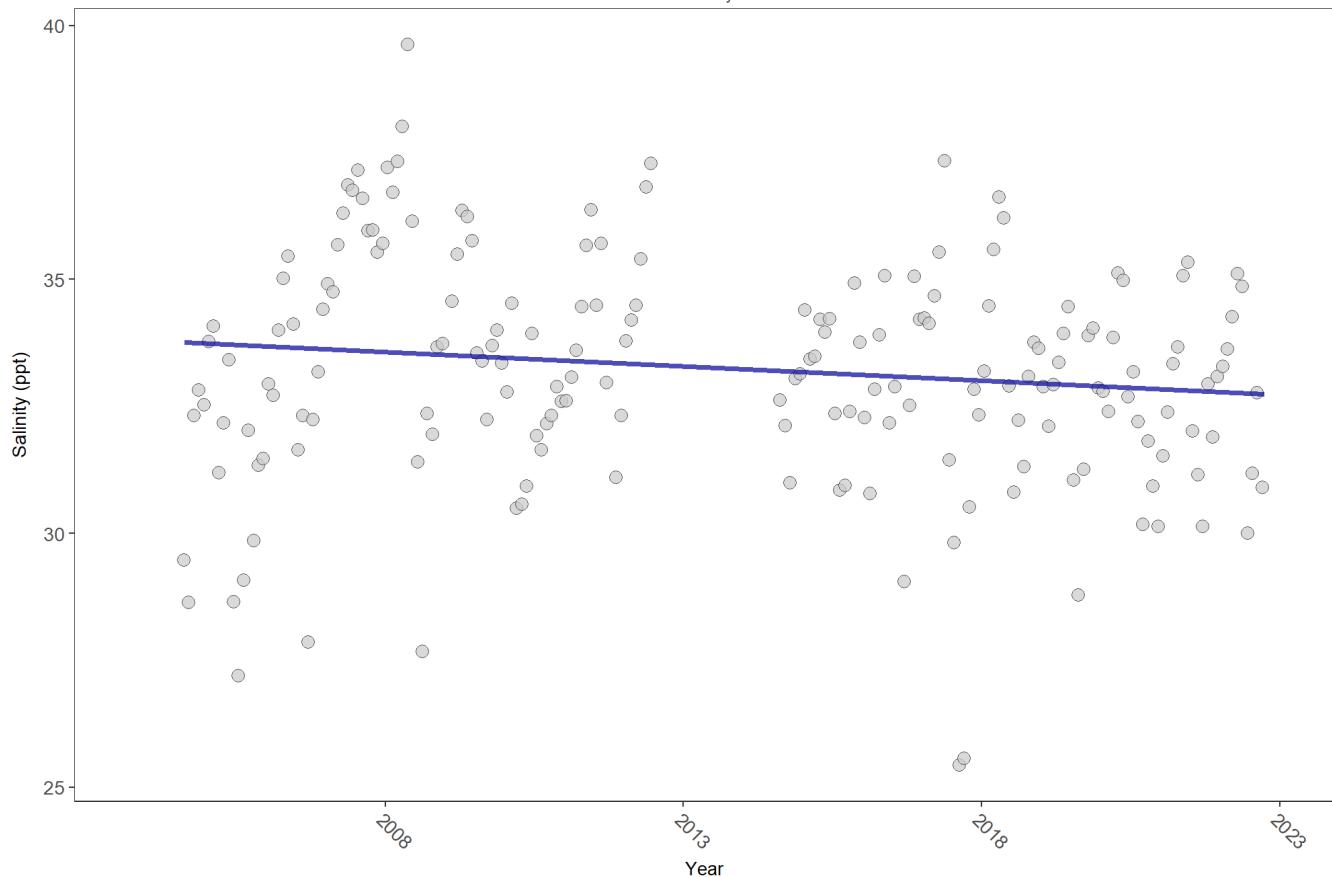


p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB02

Estero Bay Aquatic Preserve
474
Estero Bay Aquatic Preserve Continuous Water Quality Monitoring
EB02
Salinity



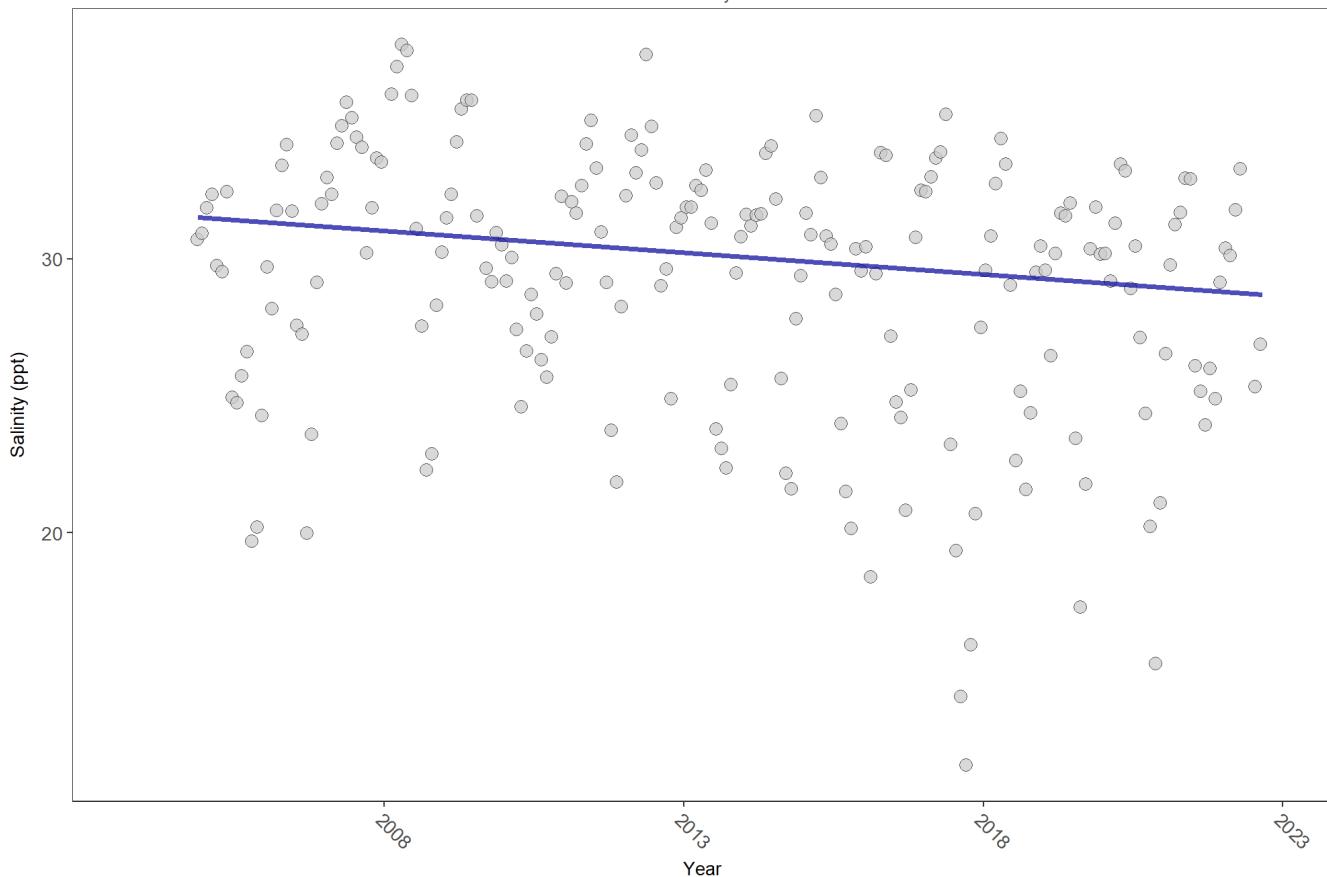
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	501373	18	33.6	TRUE	-0.1193	0.0251	-0.05580053	33.79427	6.2243	0.858	-1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB03

Estero Bay Aquatic Preserve
474
Estero Bay Aquatic Preserve Continuous Water Quality Monitoring
EB03
Salinity



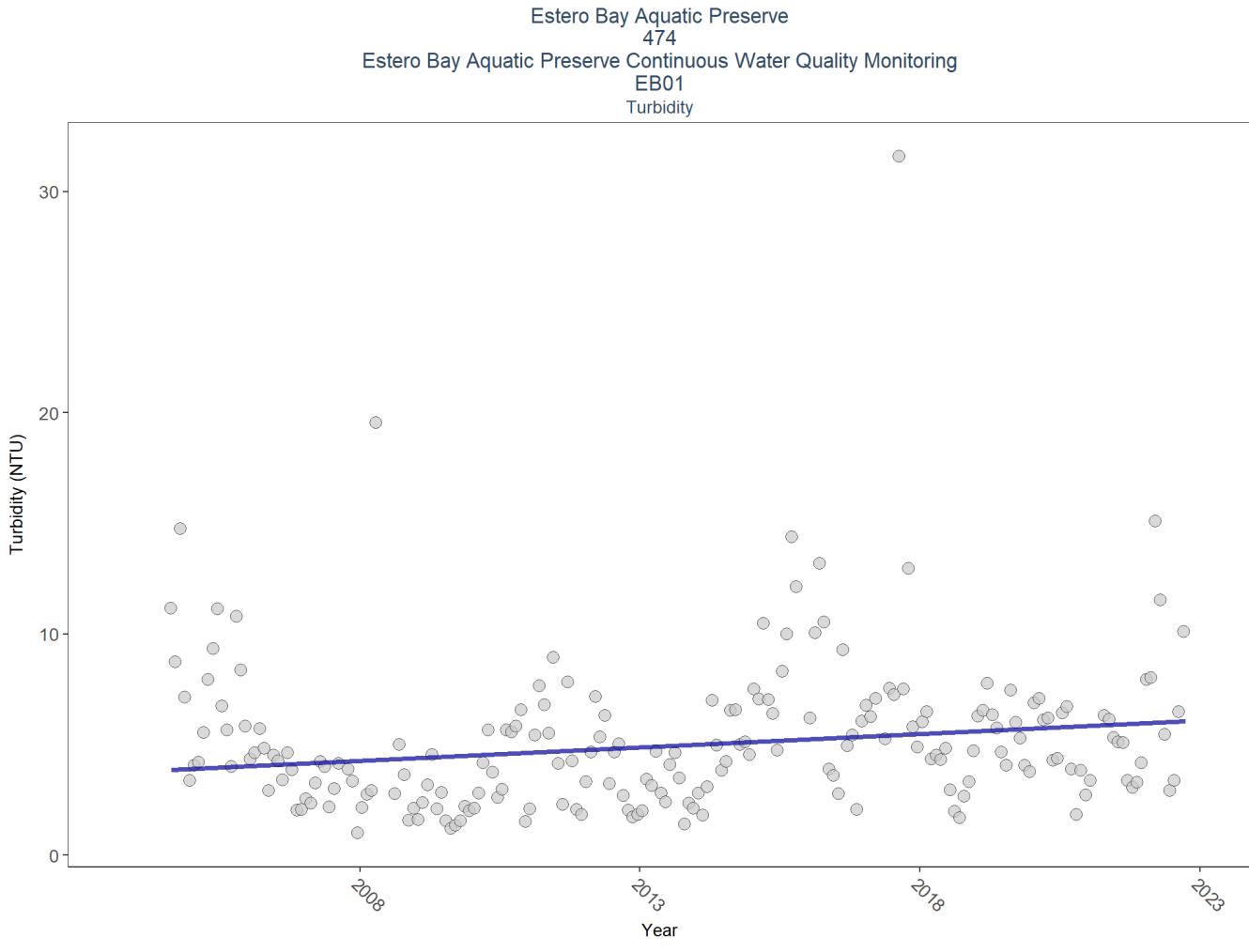
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	533169	19	30.9	TRUE	-0.2138	0.0000	-0.1580336	31.65294	4.2465	0.9621	-1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Turbidity

EB01

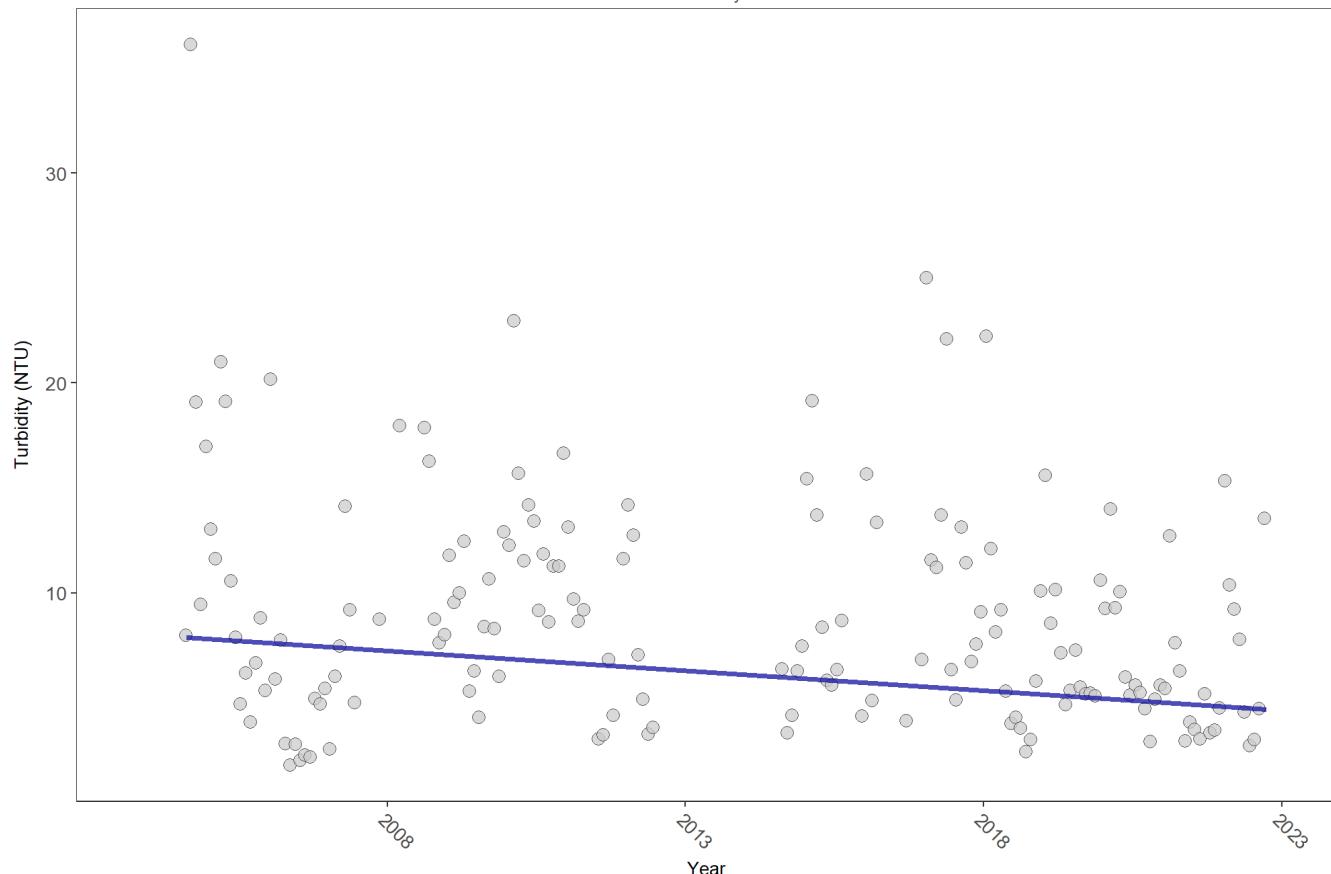


p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB02

Estero Bay Aquatic Preserve
474
Estero Bay Aquatic Preserve Continuous Water Quality Monitoring
EB02
Turbidity



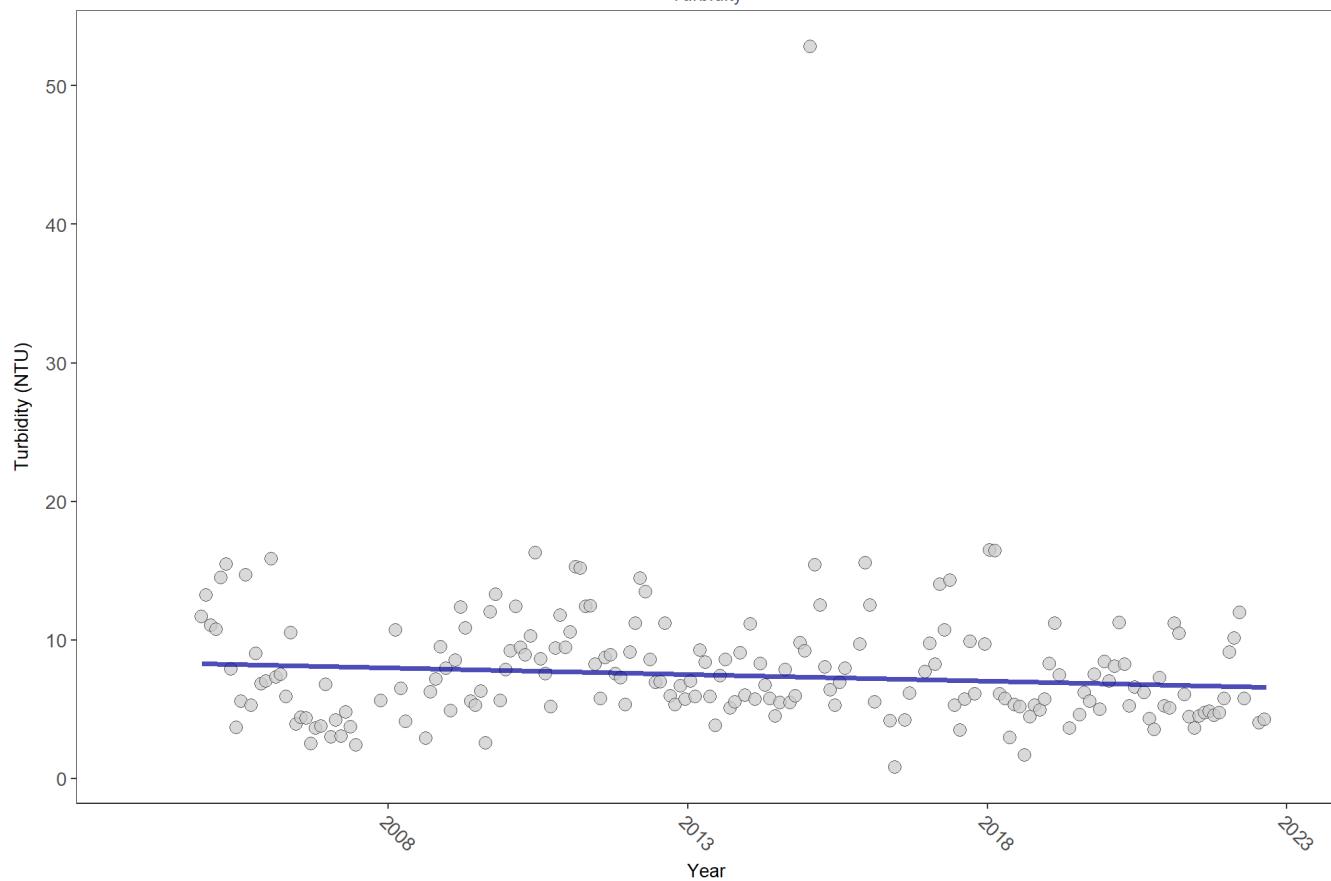
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	396630	18	5	TRUE	-0.1814	0.0028	-0.1889955	7.995252	13.1711	0.2823	-1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB03

Estero Bay Aquatic Preserve
474
Estero Bay Aquatic Preserve Continuous Water Quality Monitoring
EB03
Turbidity



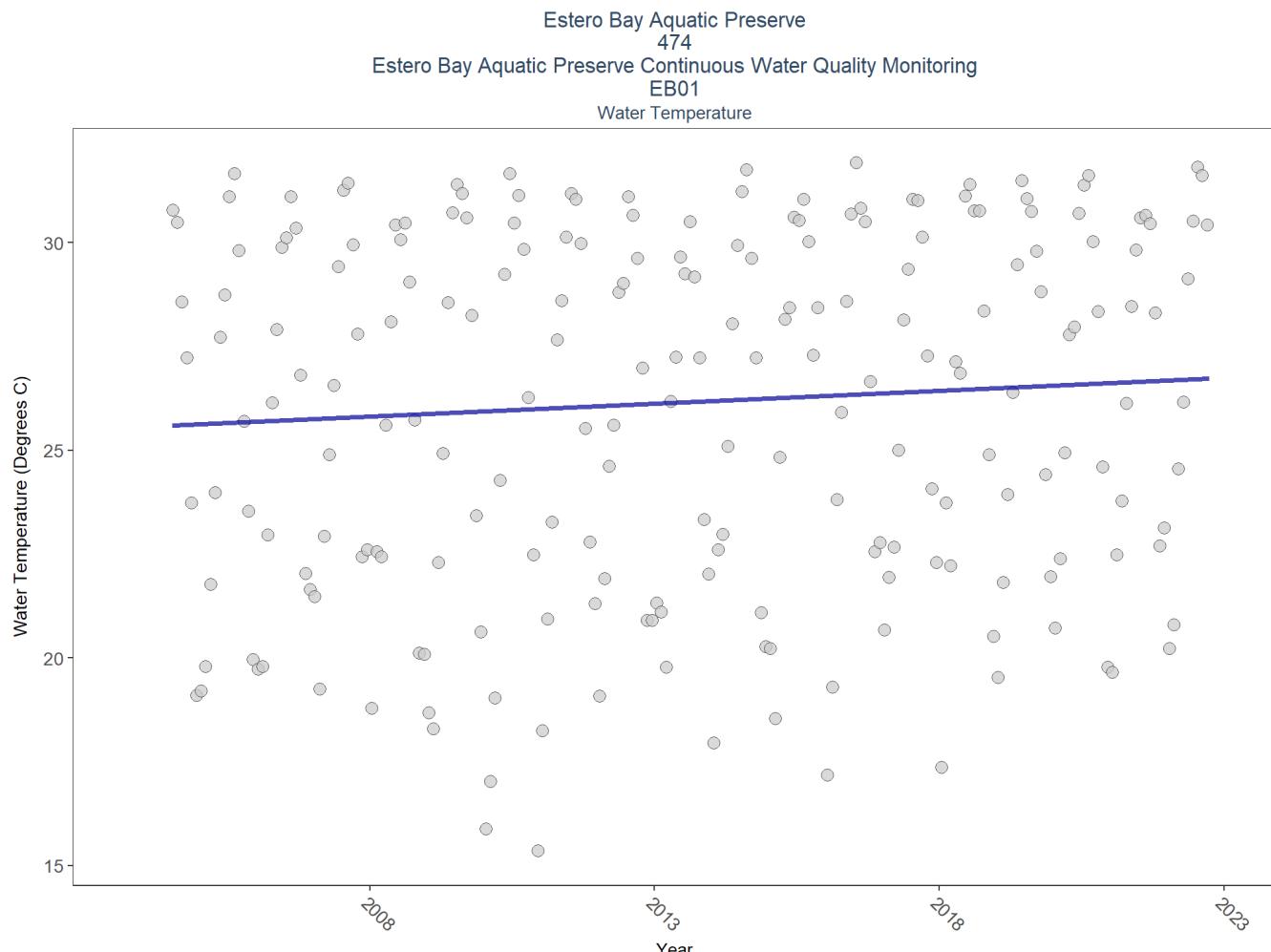
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	413599	19	5	TRUE	-0.1336	0.0190	-0.09501454	8.373902	7.8047	0.7307	-1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Water Temperature

EB01

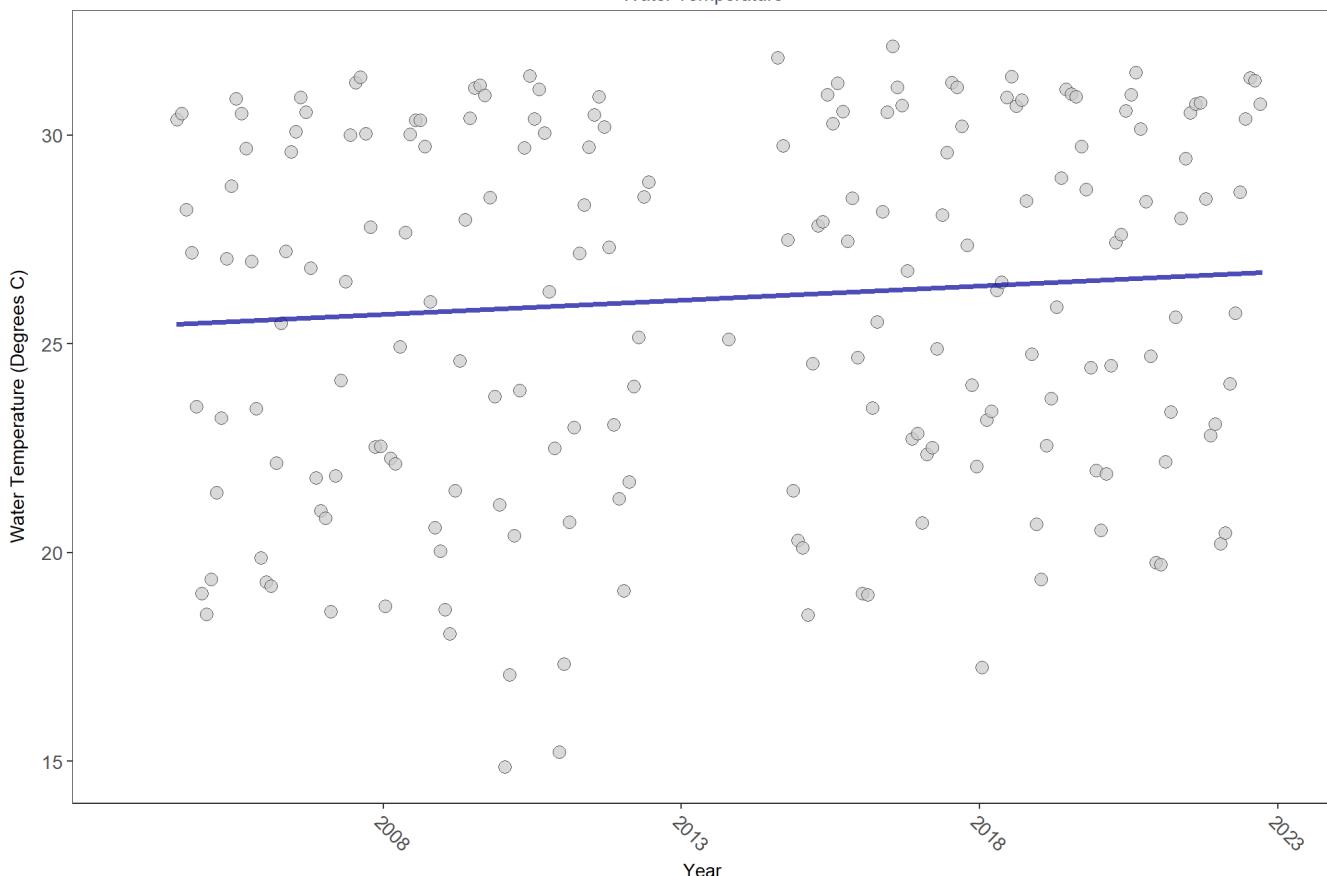


p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB02

Estero Bay Aquatic Preserve
474
Estero Bay Aquatic Preserve Continuous Water Quality Monitoring
EB02
Water Temperature

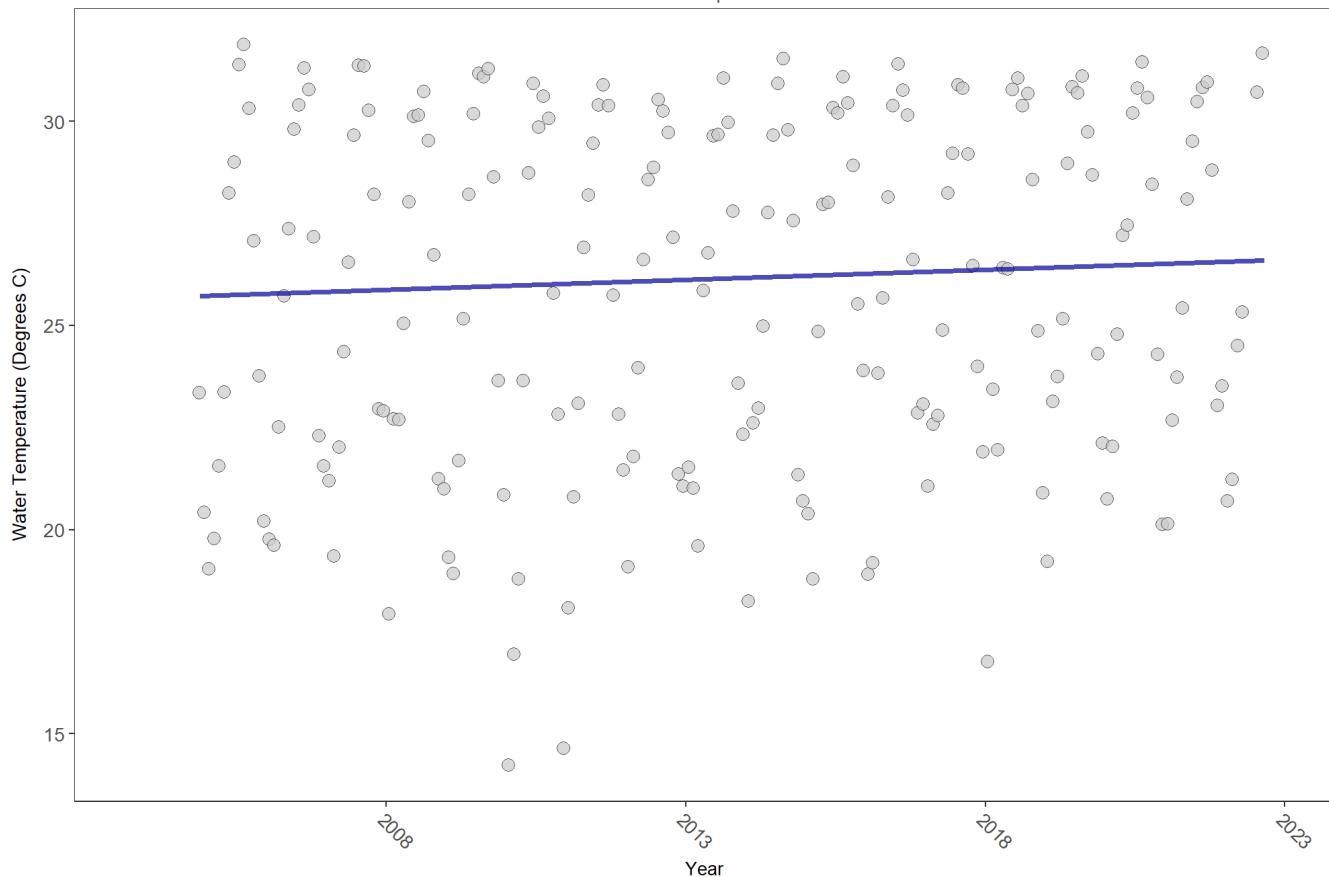


p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB03

Estero Bay Aquatic Preserve
474
Estero Bay Aquatic Preserve Continuous Water Quality Monitoring
EB03
Water Temperature



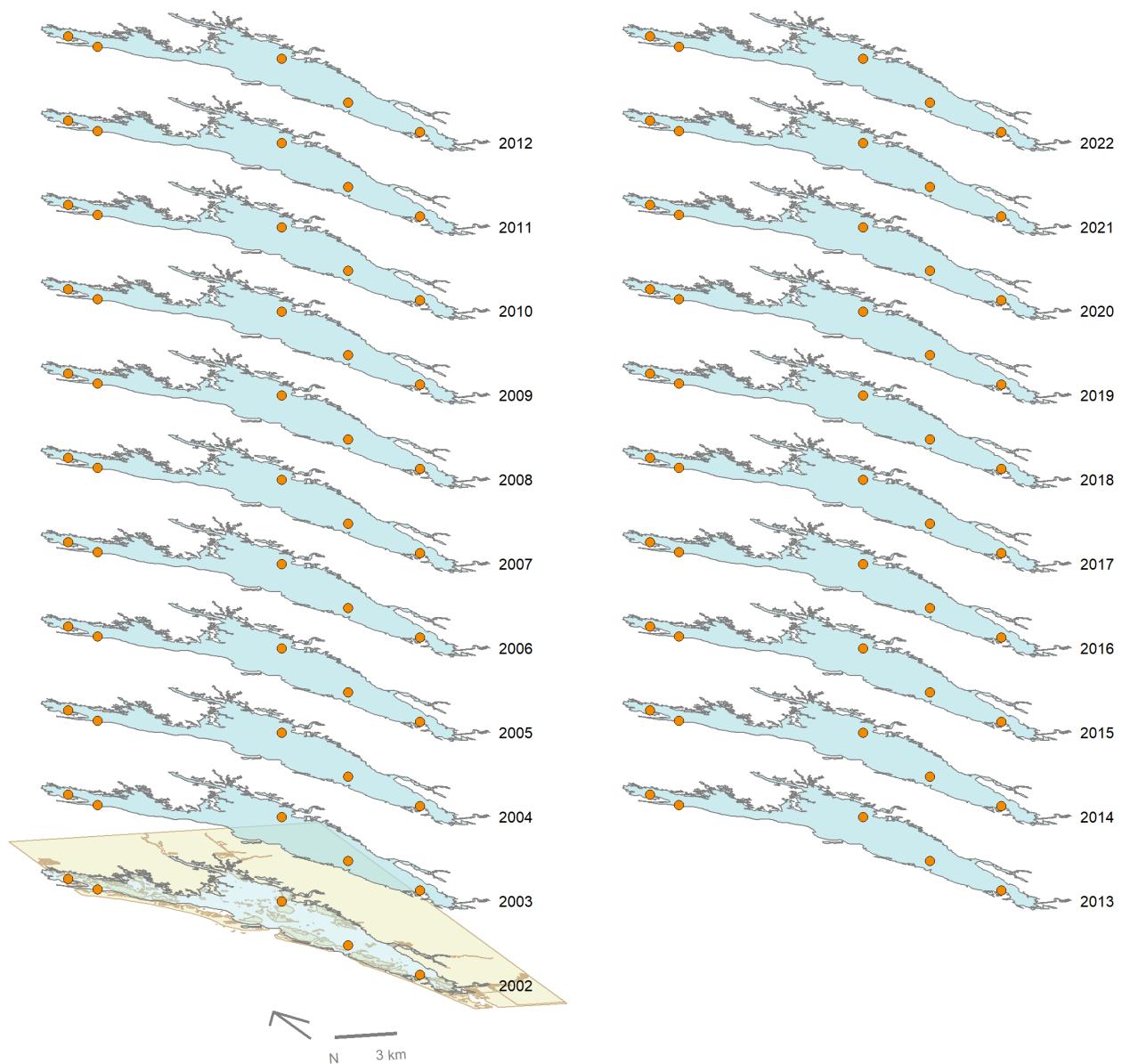
p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

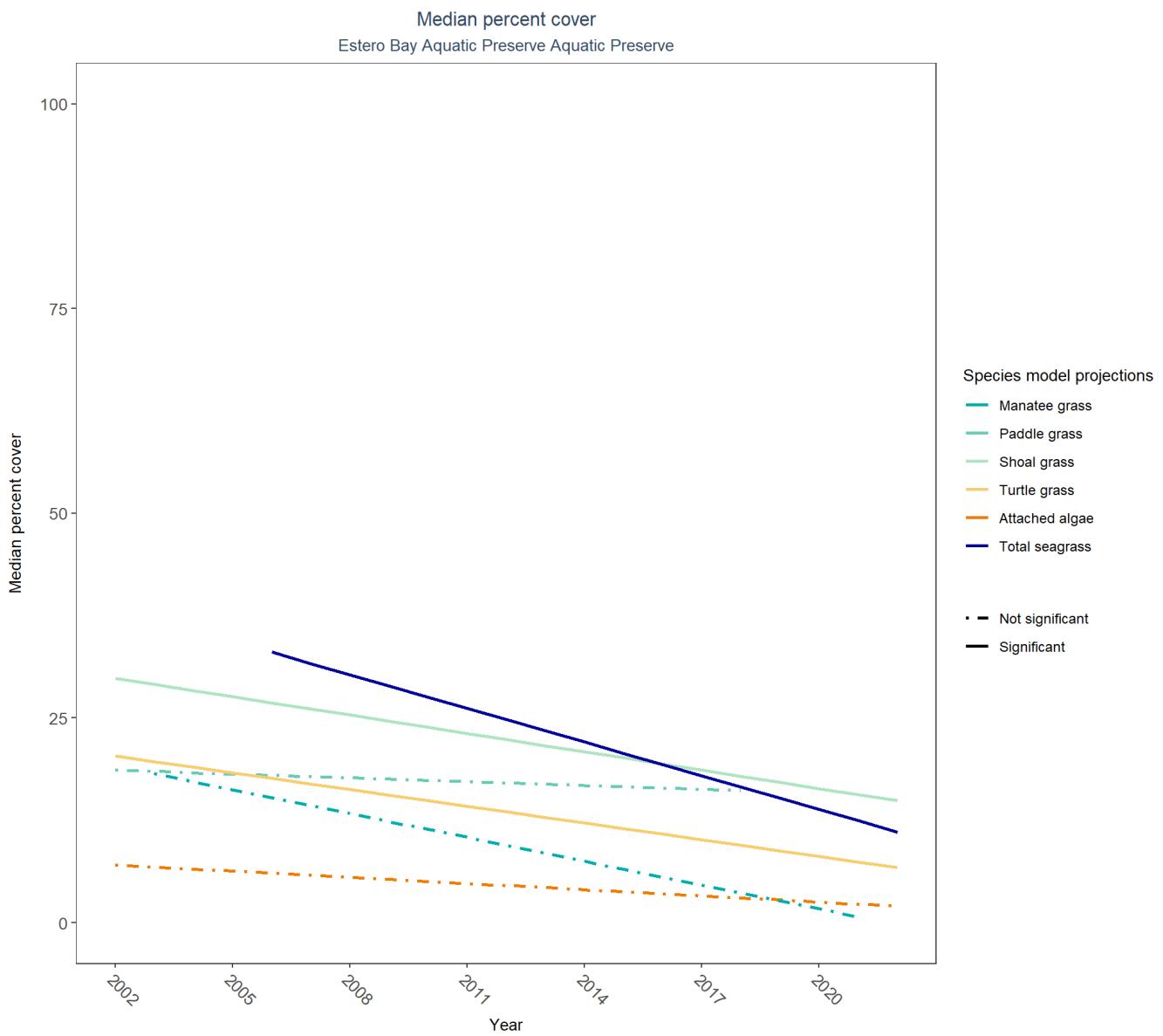
Submerged Aquatic Vegetation

The data file used is: All_SAV_Parameters-2023-Oct-12.txt

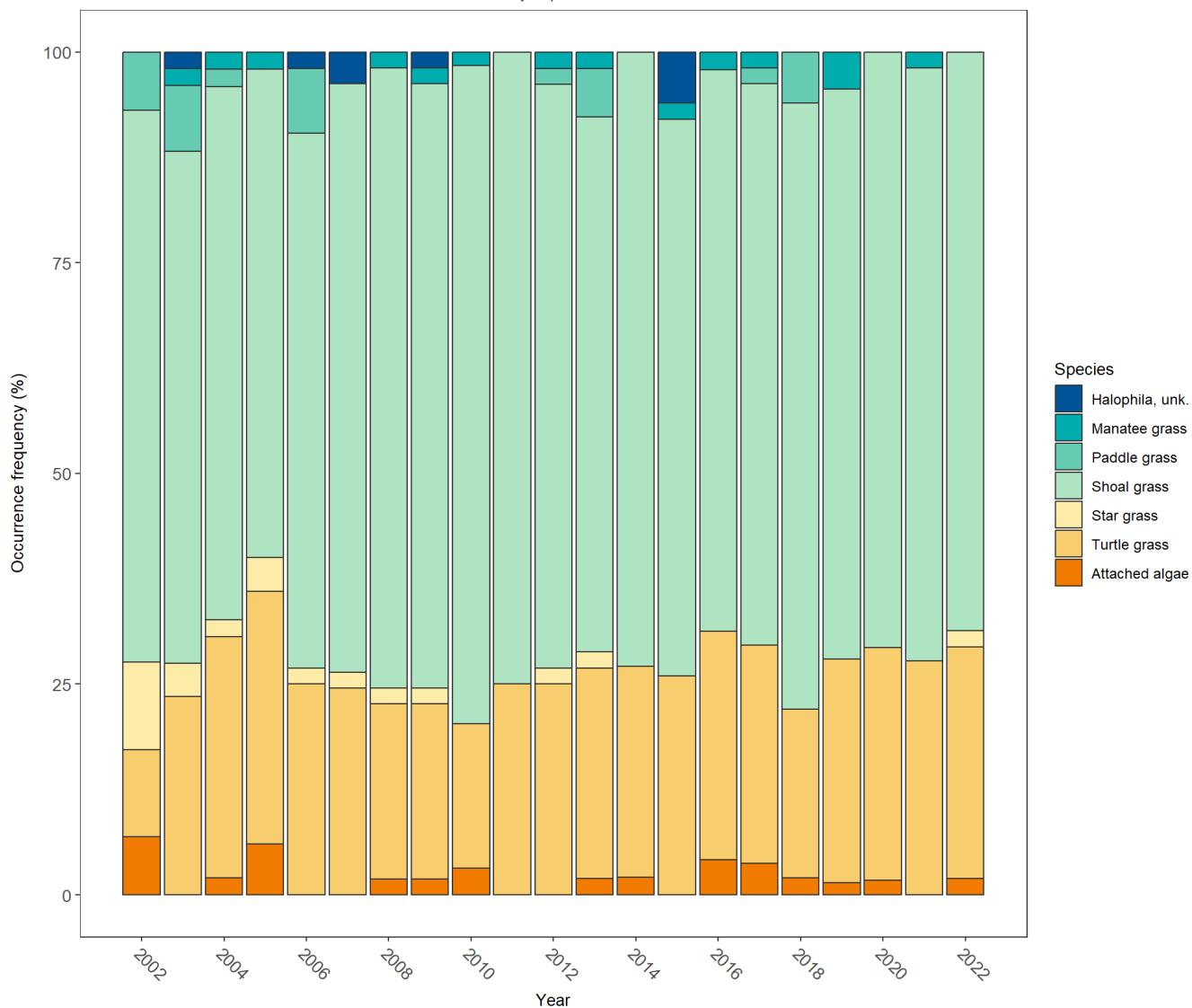
Estero Bay Aquatic Preserve
Sample Locations - SAV Percent Cover



Program name
● Ester Bay Seagrass Monitoring



Frequency of occurrence
Estero Bay Aquatic Preserve



BB_pct over Years for Seagrass Species in Estero Bay Aquatic Preserve

