Estero Bay Aquatic Preserve

SEACAR Habitat Analyses

Last compiled on 01 November, 2023

Contents

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: 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 2: 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 3: SWMP Value Qualifier codes

Qualifier Source	*ValueQualifier*	*Include YN*
SWMP	-1	1
SWMP	-2	0
SWMP	-3	0
SWMP	-4	0
SWMP	-5	0

Qualifier Source	*ValueQualifier*	*Include YN*
SWMP	0	1
SWMP	1	0
SWMP	2	1
SWMP	3	1
SWMP	4	1
SWMP	5	1

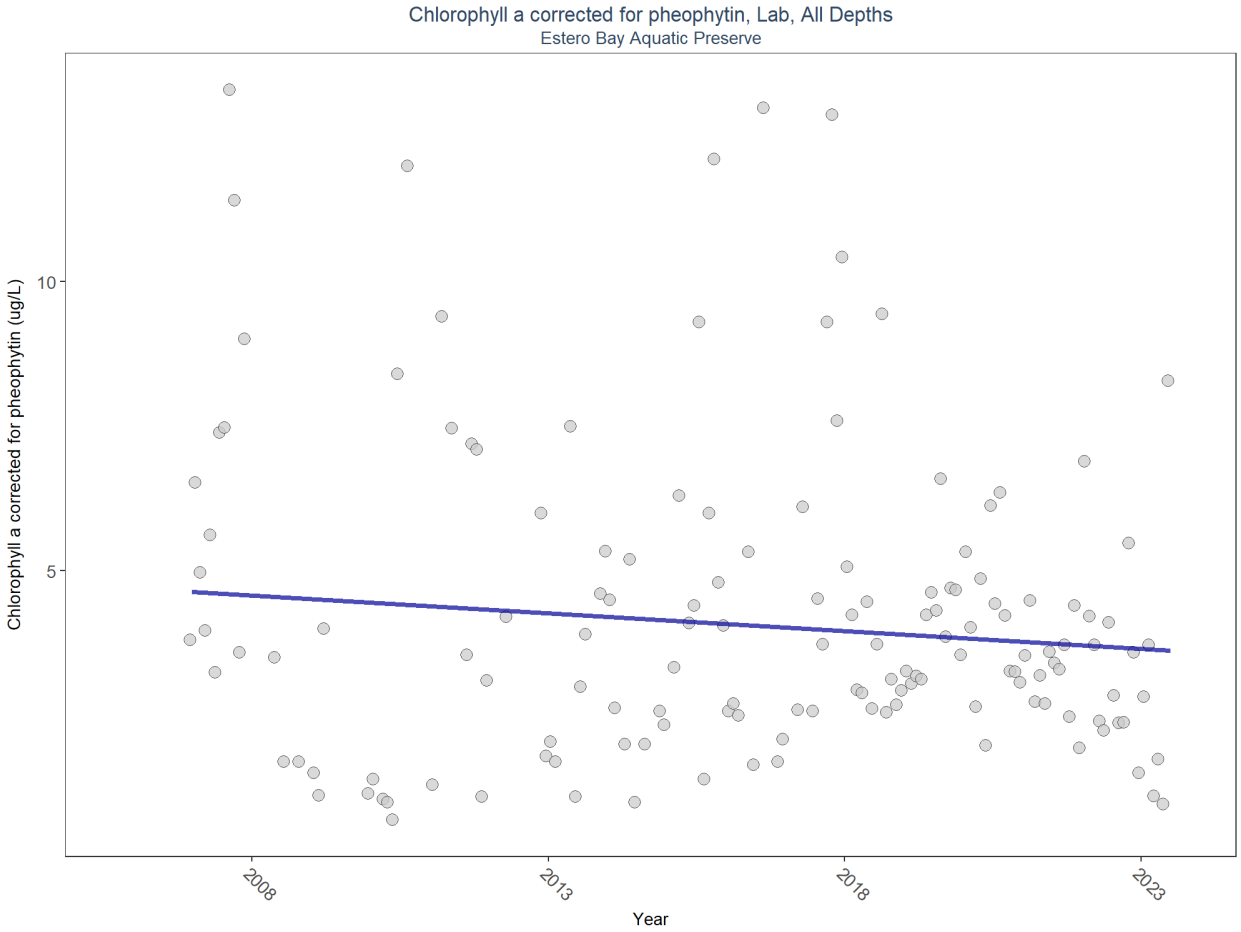
Water Quality - Discrete

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 4: 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

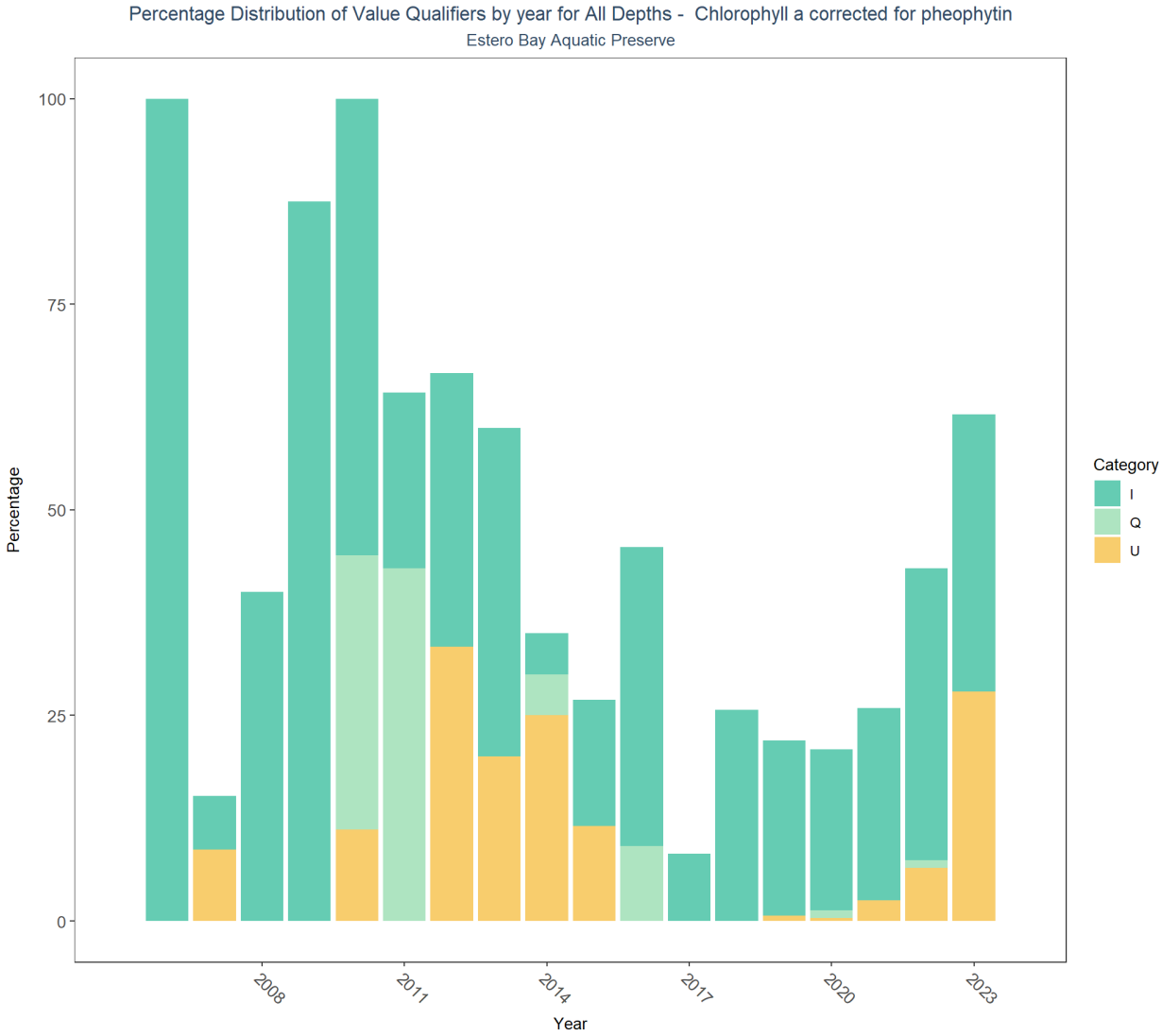


Table 5: Value Qualifiers for Chlorophyll a corrected for pheophytin

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				

Year	N_Total	N_I	perc_I	N_Q	perc_Q	N_U	perc_U
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

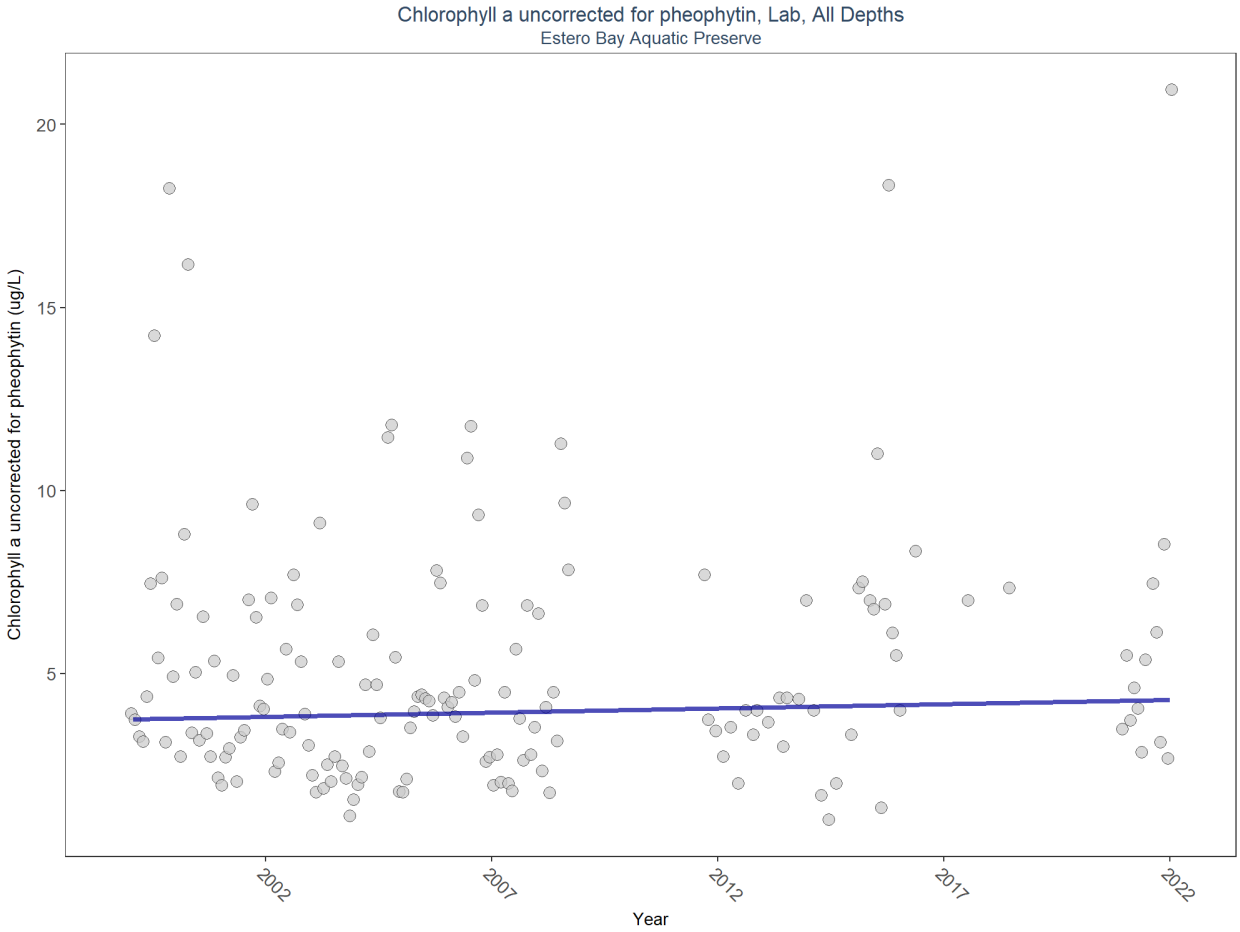
I - The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

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



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 6: 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

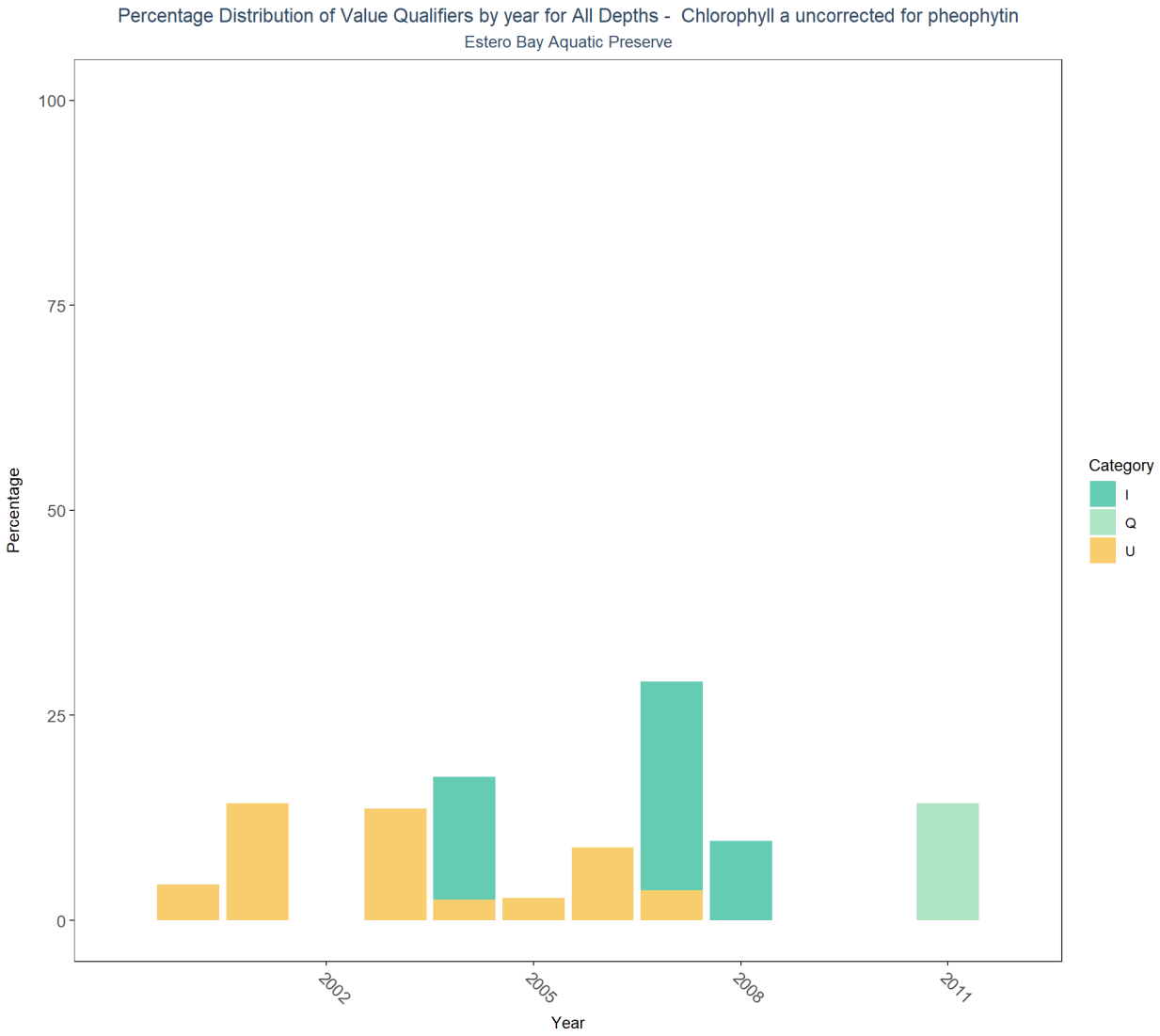


Table 7: Value Qualifiers for Chlorophyll a uncorrected for pheophytin

	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				

	Year	N_Total	N_I	perc_I	N_Q	perc_Q	N_U	perc_U
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

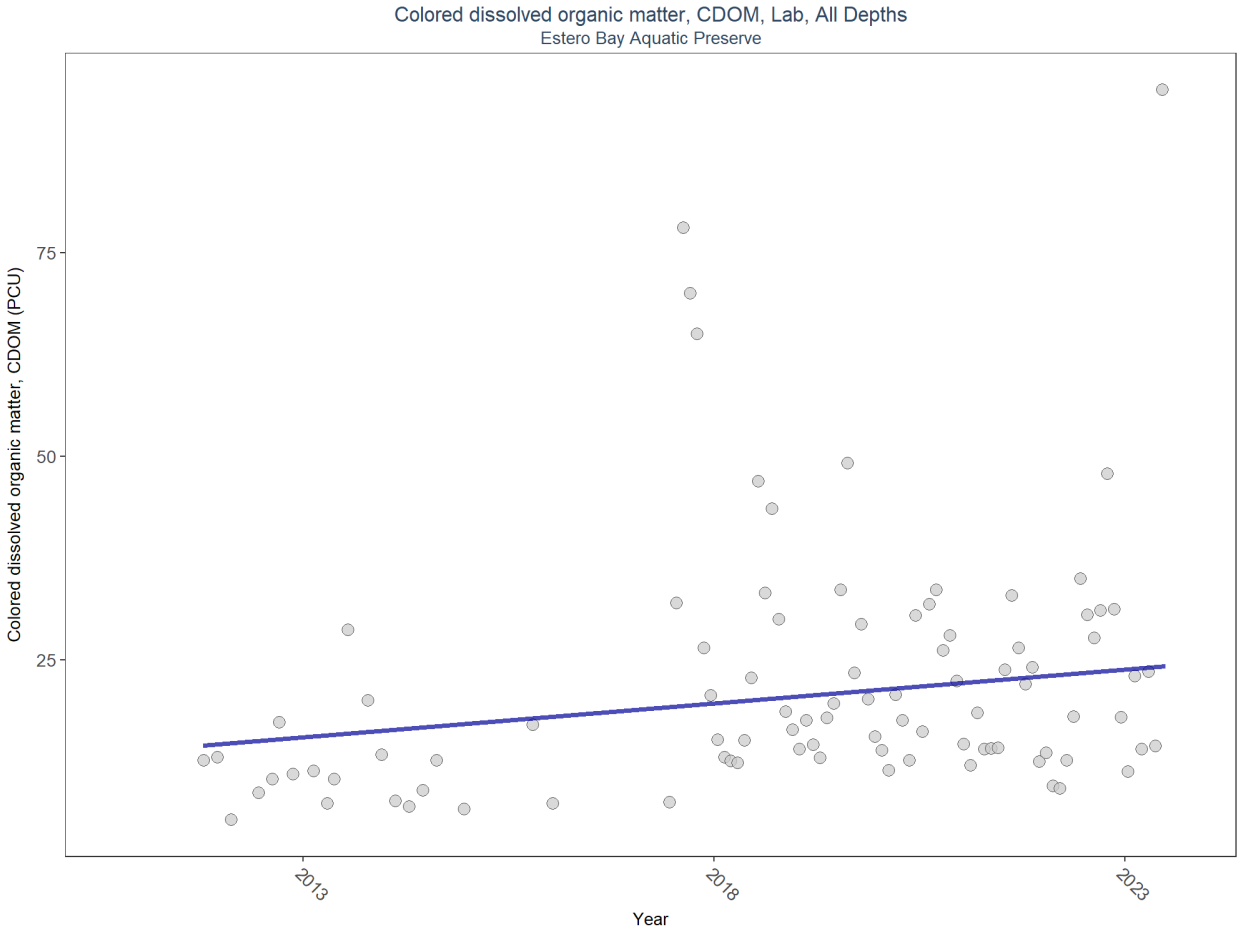
I - The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

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



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 8: 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

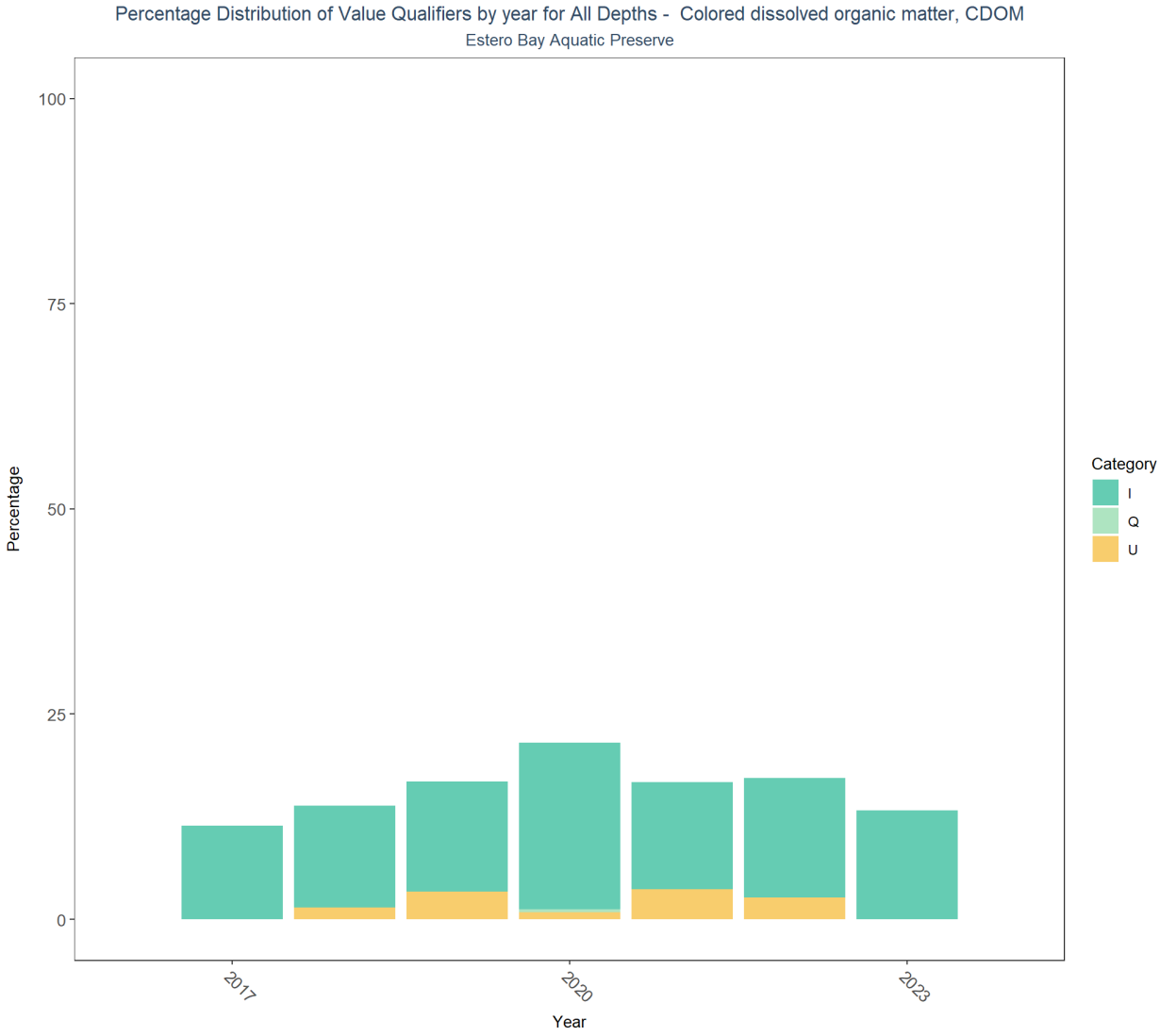


Table 9: Value Qualifiers for Colored dissolved organic matter, CDOM

	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

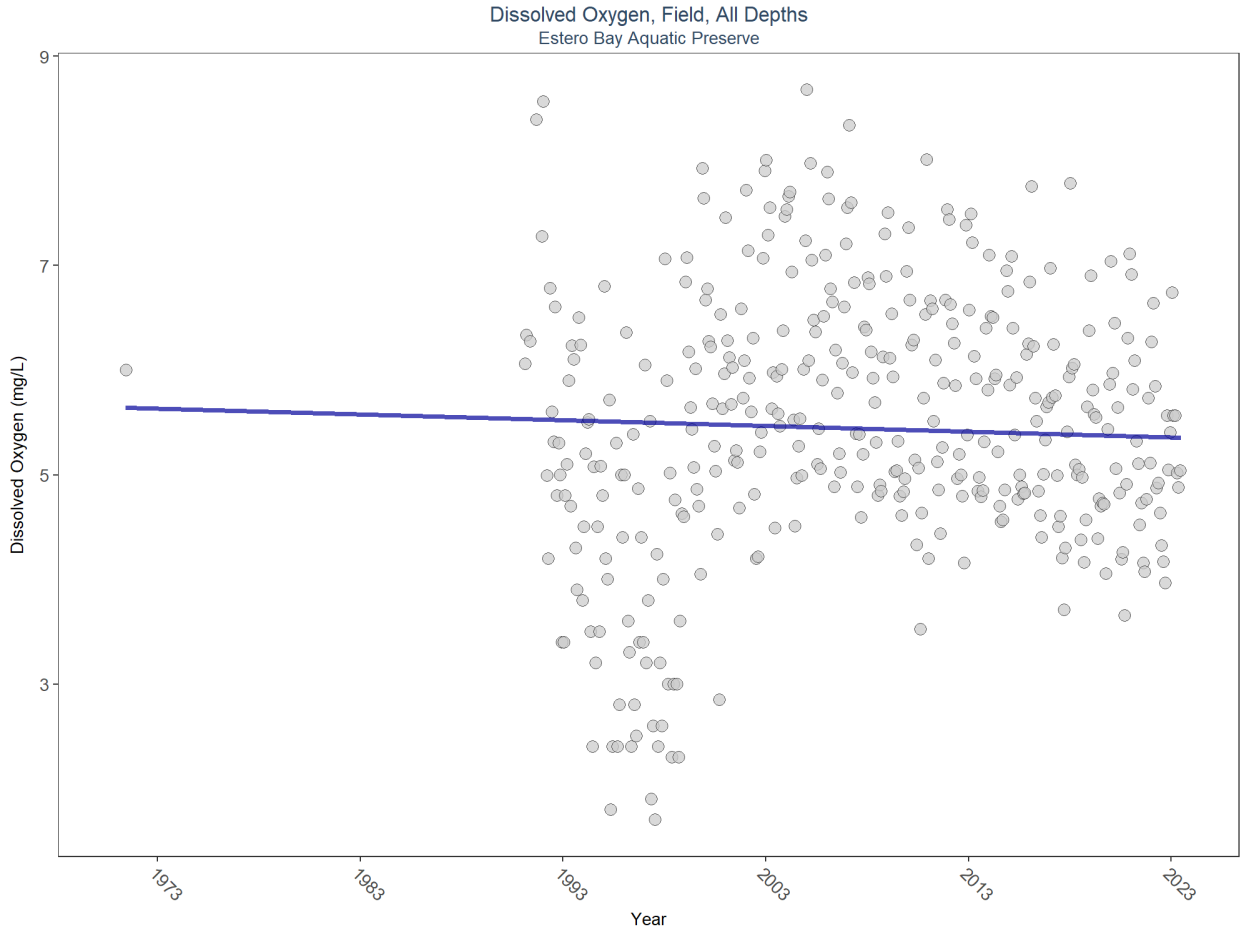
I - The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

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 10: 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

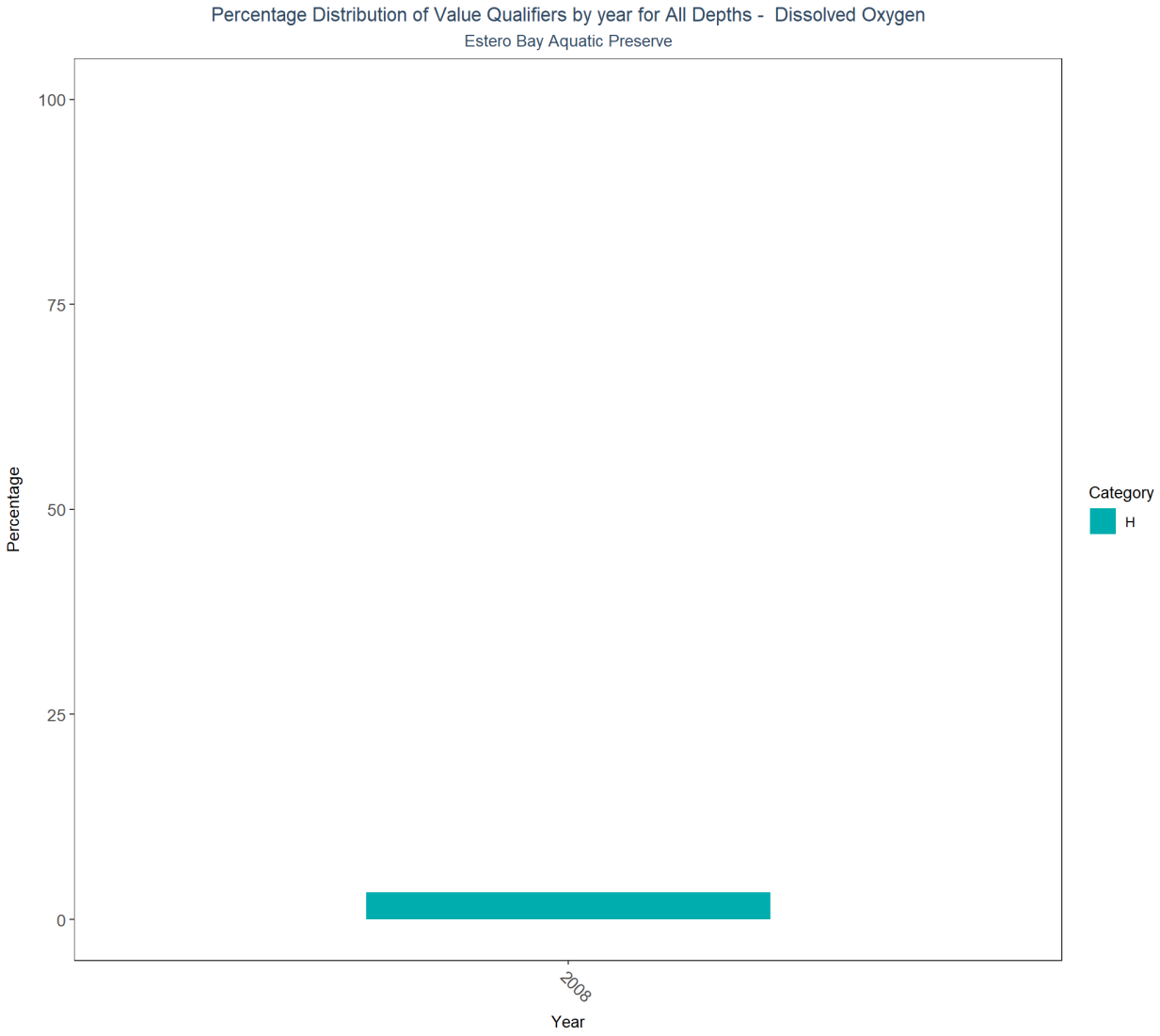


Table 11: Value Qualifiers for Dissolved Oxygen

	Year	N_Total	N_H	perc_H
19	2008	301	10	3.3

Programs containing Value Qualified data:

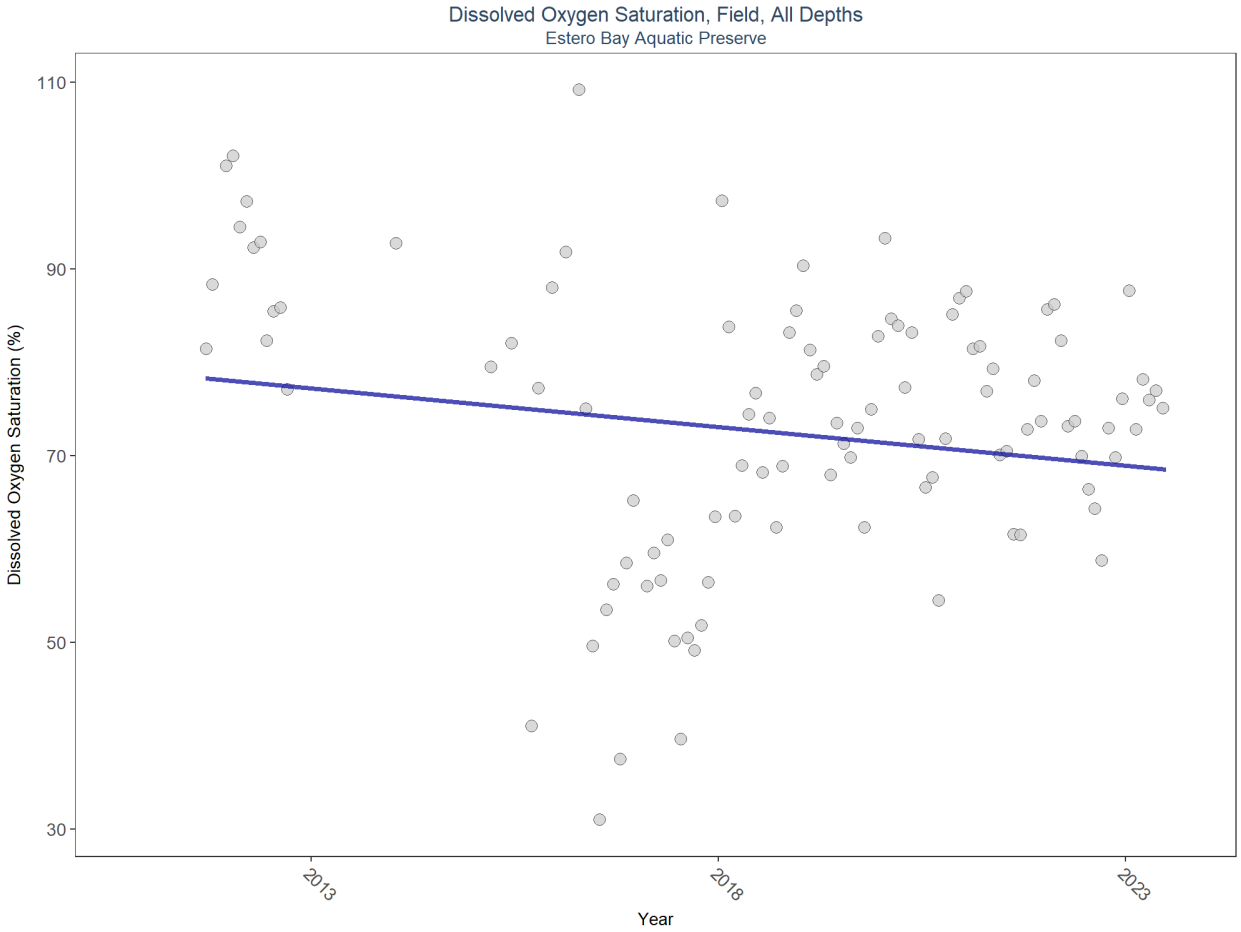
476 - Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network

Value Qualifiers

H - Value based on field kit 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.

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 12: 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:

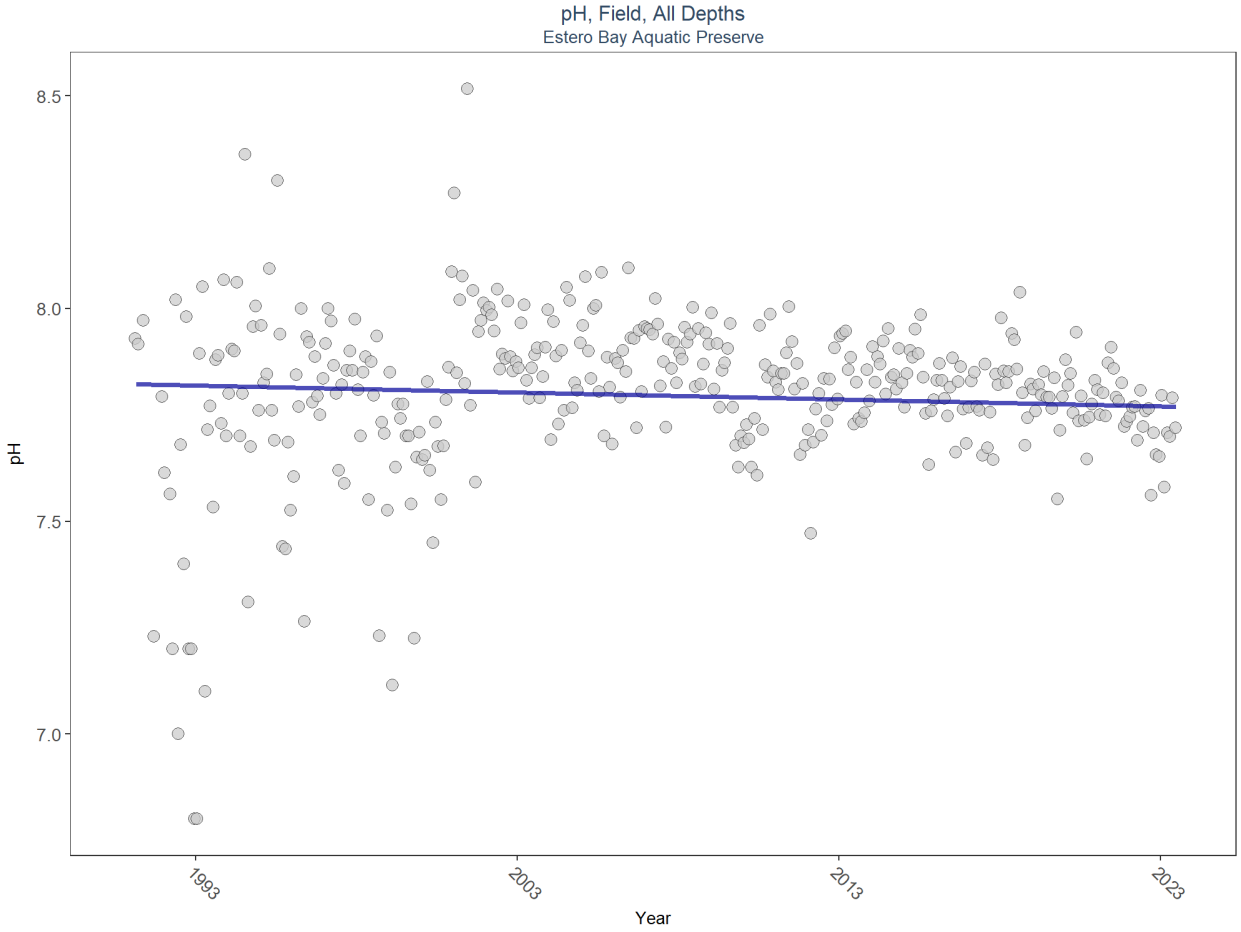
5002 - Florida STORET / WIN
4064 - A spatial model to improve site selection for seagrass restoration in shallow boating environments

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



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	9762	33	7.9	TRUE	-0.0703	0.0515	-0.00163549	7.822415	12.1625	0.3516	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Table 13: 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

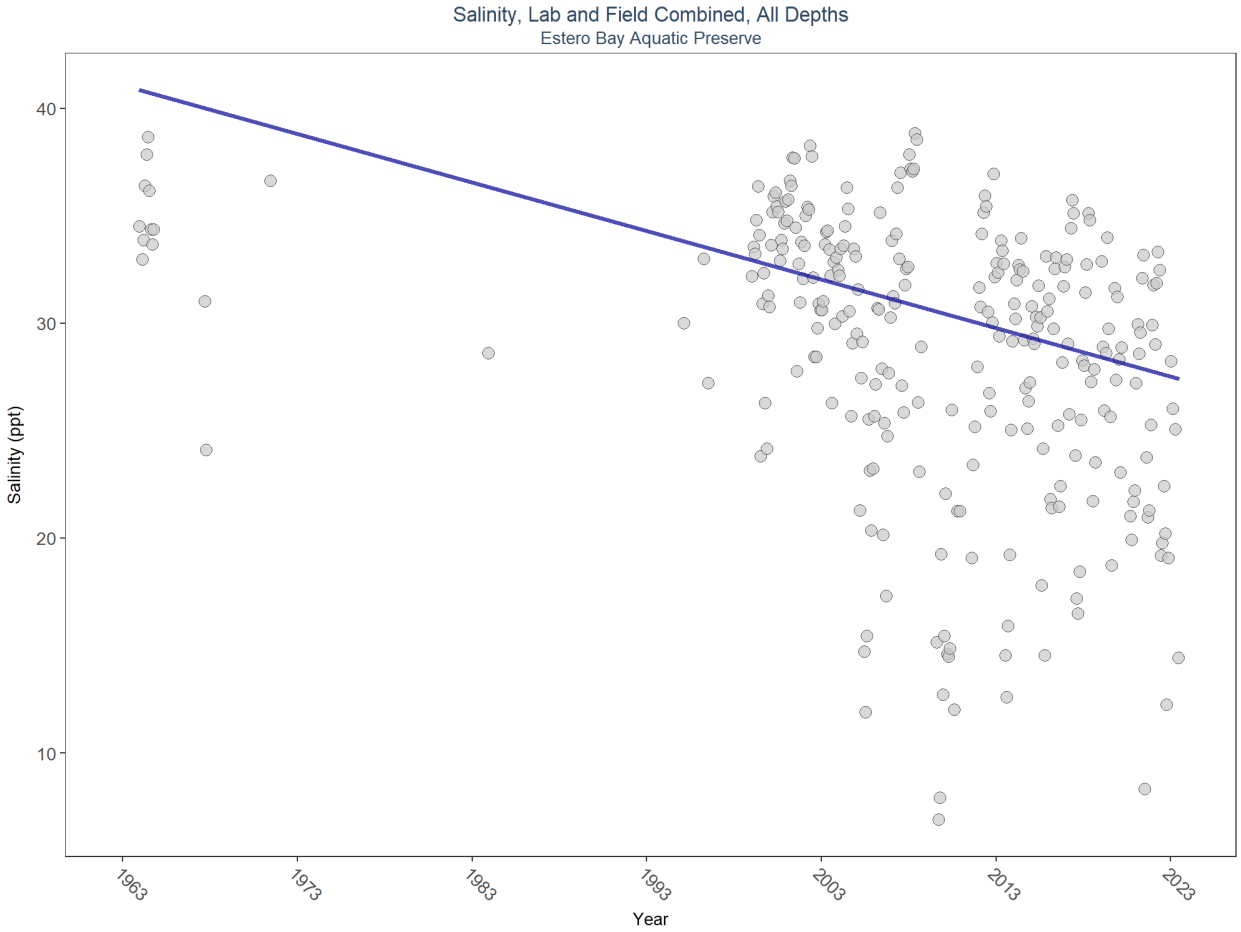
Program names:

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



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 14: 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

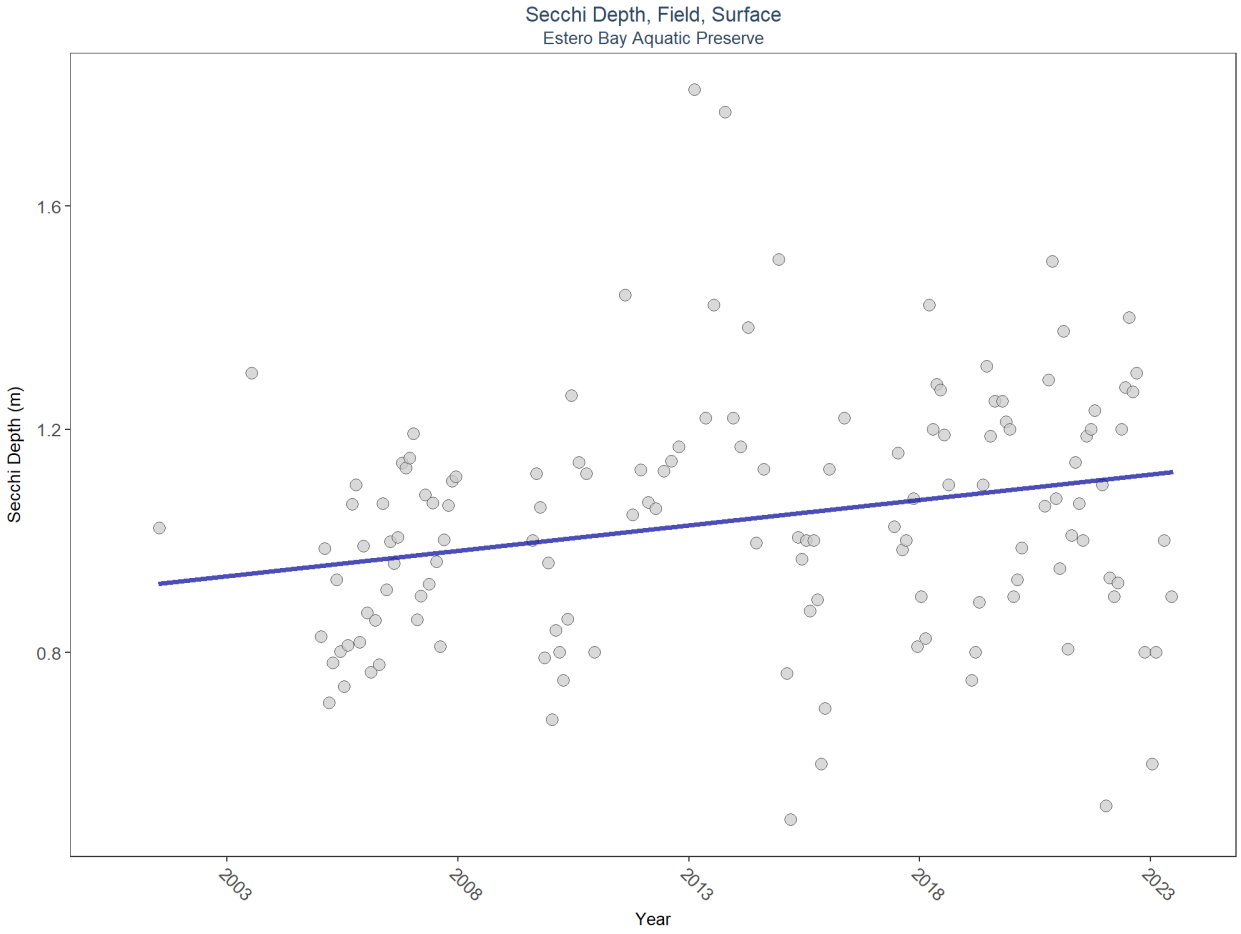
Program names:

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



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
Surface	2735	20	0.9	TRUE	0.1848	0.0045	0.009129699	0.9184377	7.3386	0.771	1

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 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)

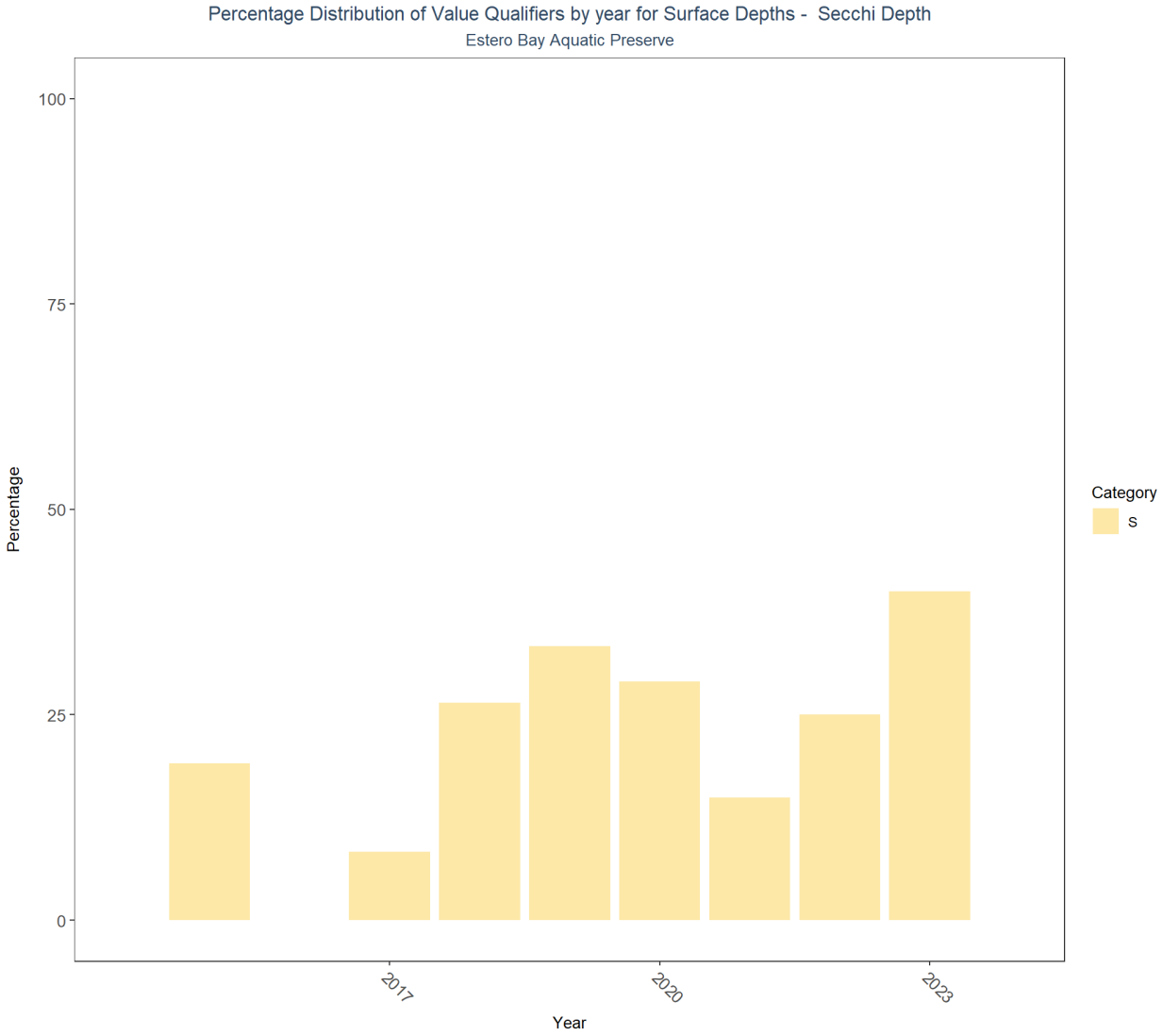


Table 16: Value Qualifiers for Secchi Depth

	Year	N_Total	N_S	perc_S
12	2015	21	4	19.0
14	2017	24	2	8.3
15	2018	34	9	26.5
16	2019	42	14	33.3
17	2020	31	9	29.0
18	2021	94	14	14.9
19	2022	32	8	25.0
20	2023	5	2	40.0

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:

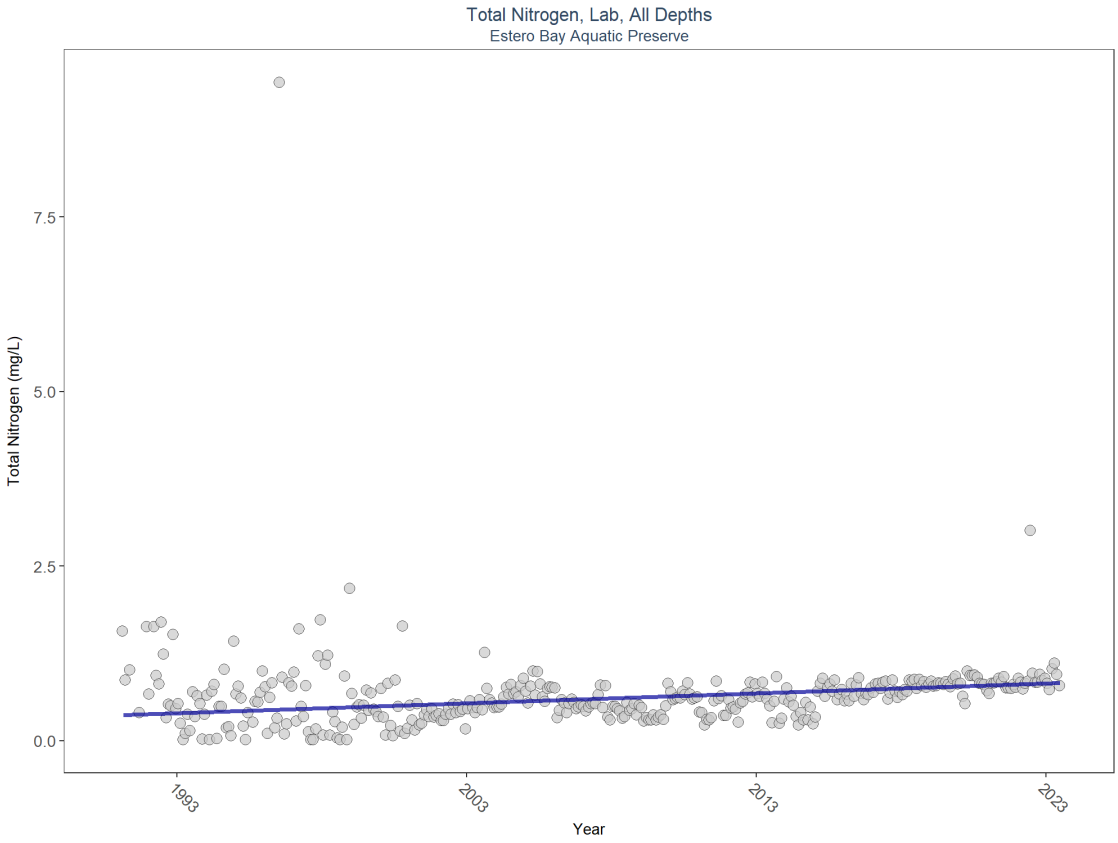
The logic for calculated Total Nitrogen was provided by Kevin O'Donnell and colleagues at FDEP (with the help of Jay Silvanima, Watershed Monitoring Section). The following logic is used, in this order, based on the availability of specific nitrogen components.

1) TN = TKN + 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"

Discrete Seasonal Kendall-Tau Trend Analysis



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 17: 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

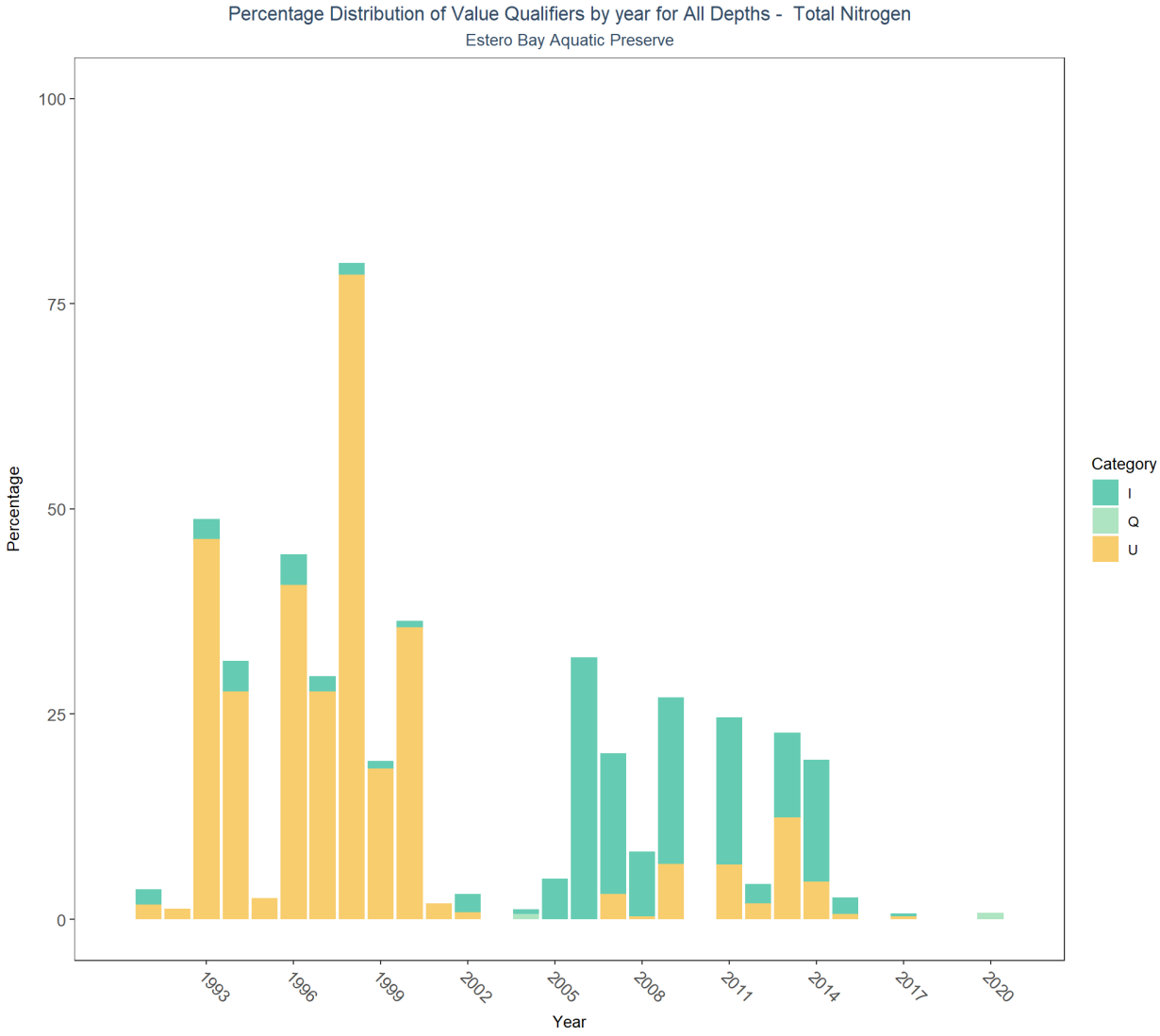


Table 18: Value Qualifiers for Total Nitrogen

	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

	Year	N_Total	N_I	perc_I	N_Q	perc_Q	N_U	perc_U
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

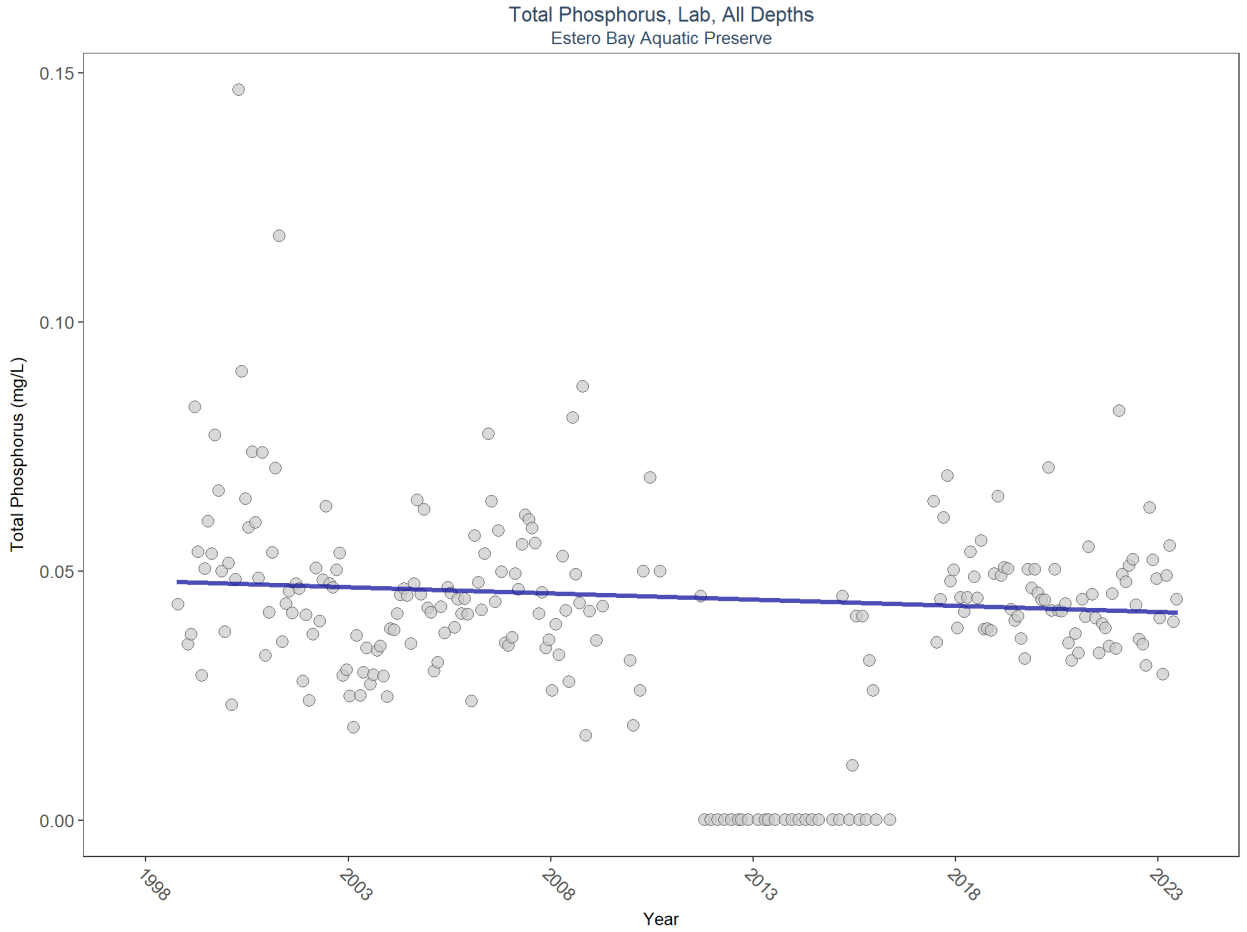
I - The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

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 19: 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

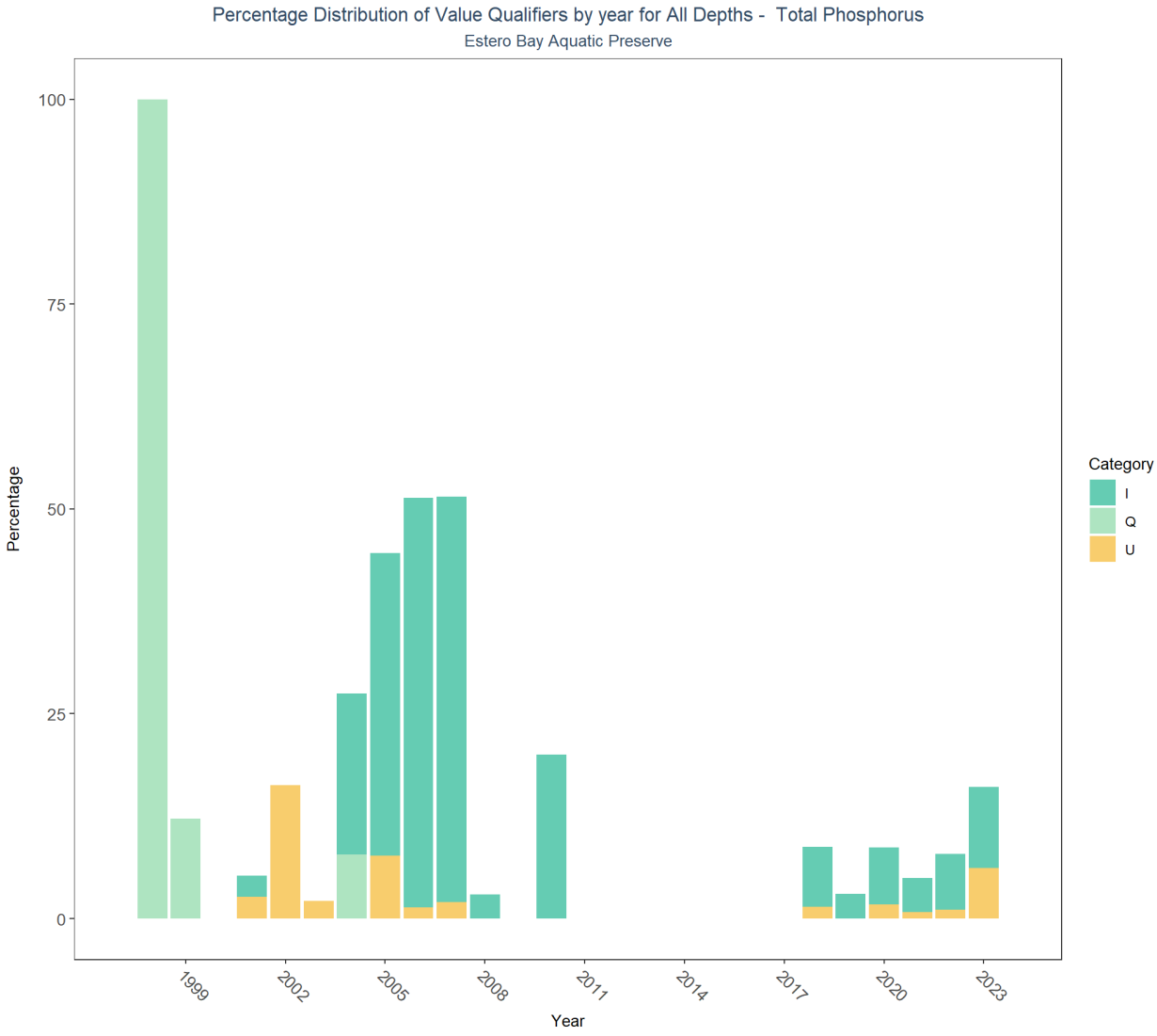


Table 20: Value Qualifiers for Total Phosphorus

	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		

	Year	N_Total	N_I	perc_I	N_Q	perc_Q	N_U	perc_U
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

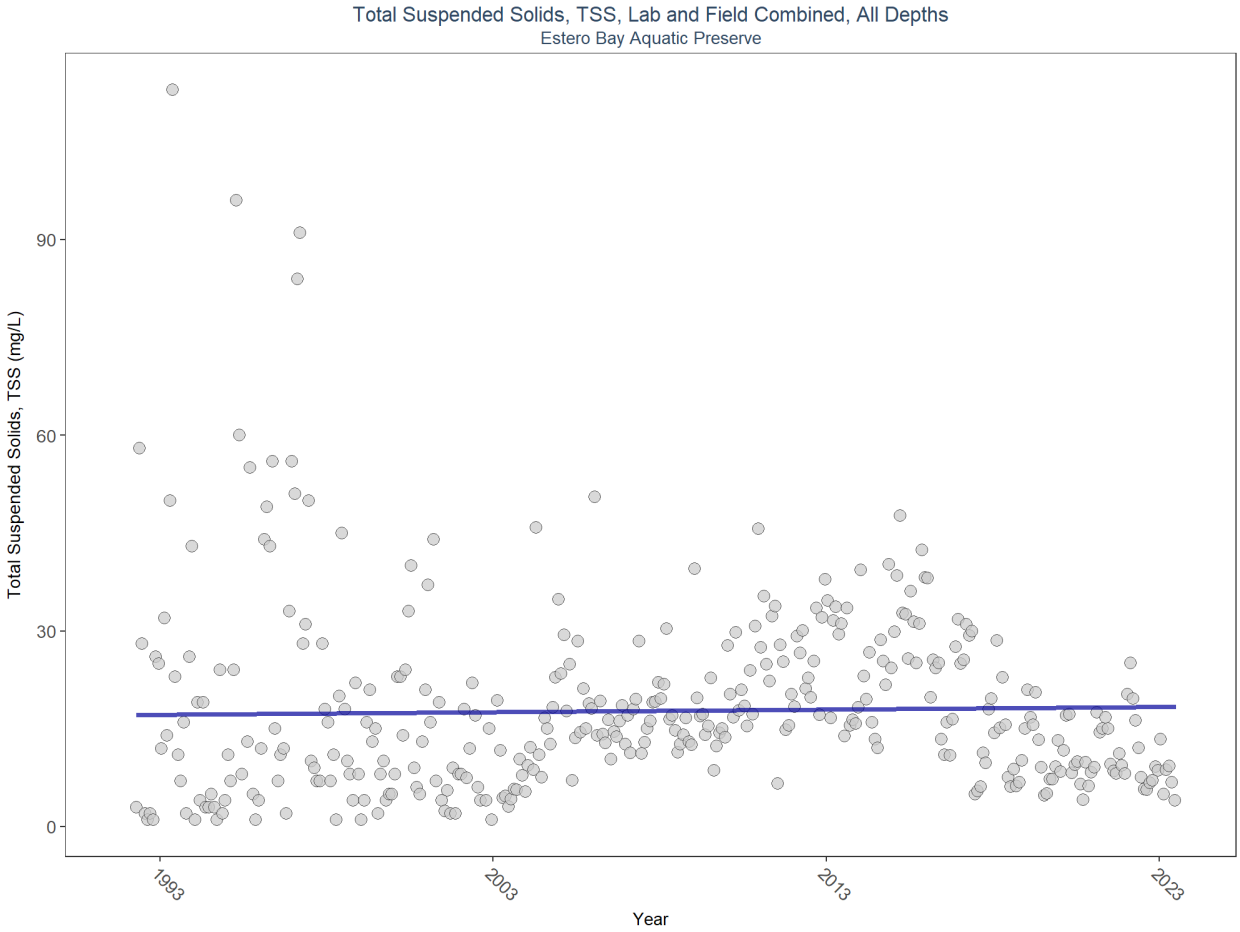
I - The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

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



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 21: 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

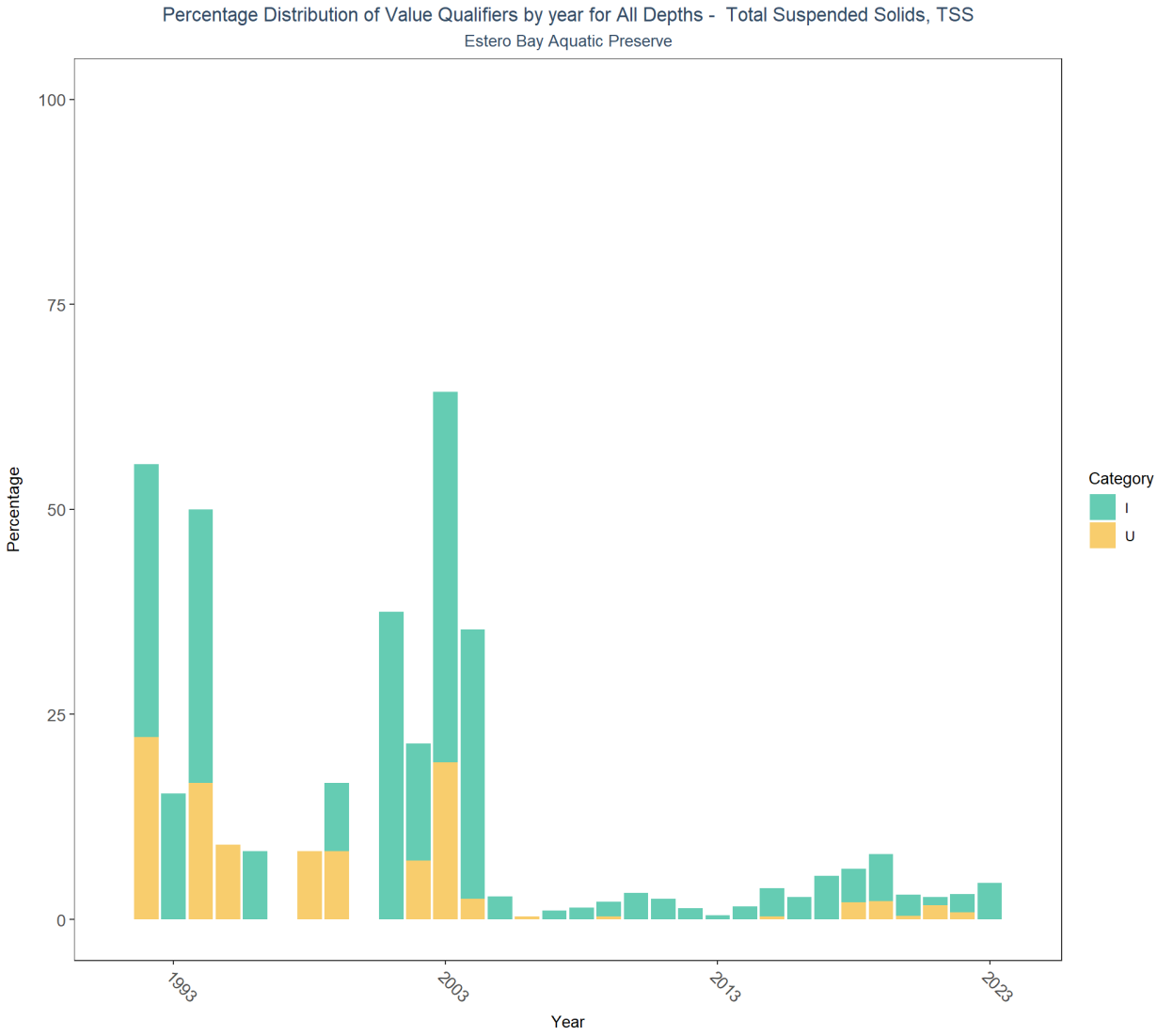


Table 22: Value Qualifiers for Total Suspended Solids, TSS

	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		

	Year	N_Total	N_I	perc_I	N_U	perc_U
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

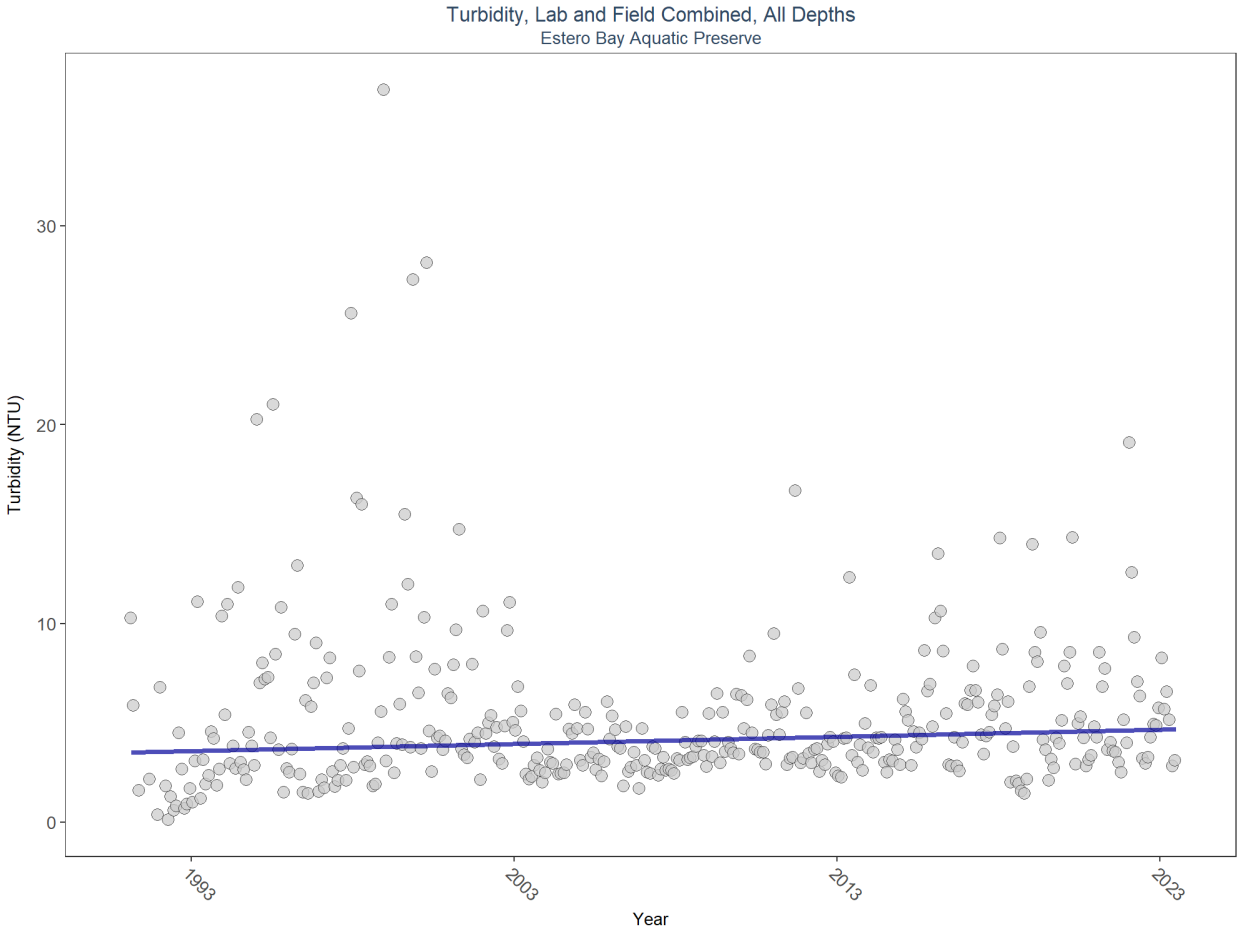
Value Qualifiers

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



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 23: 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

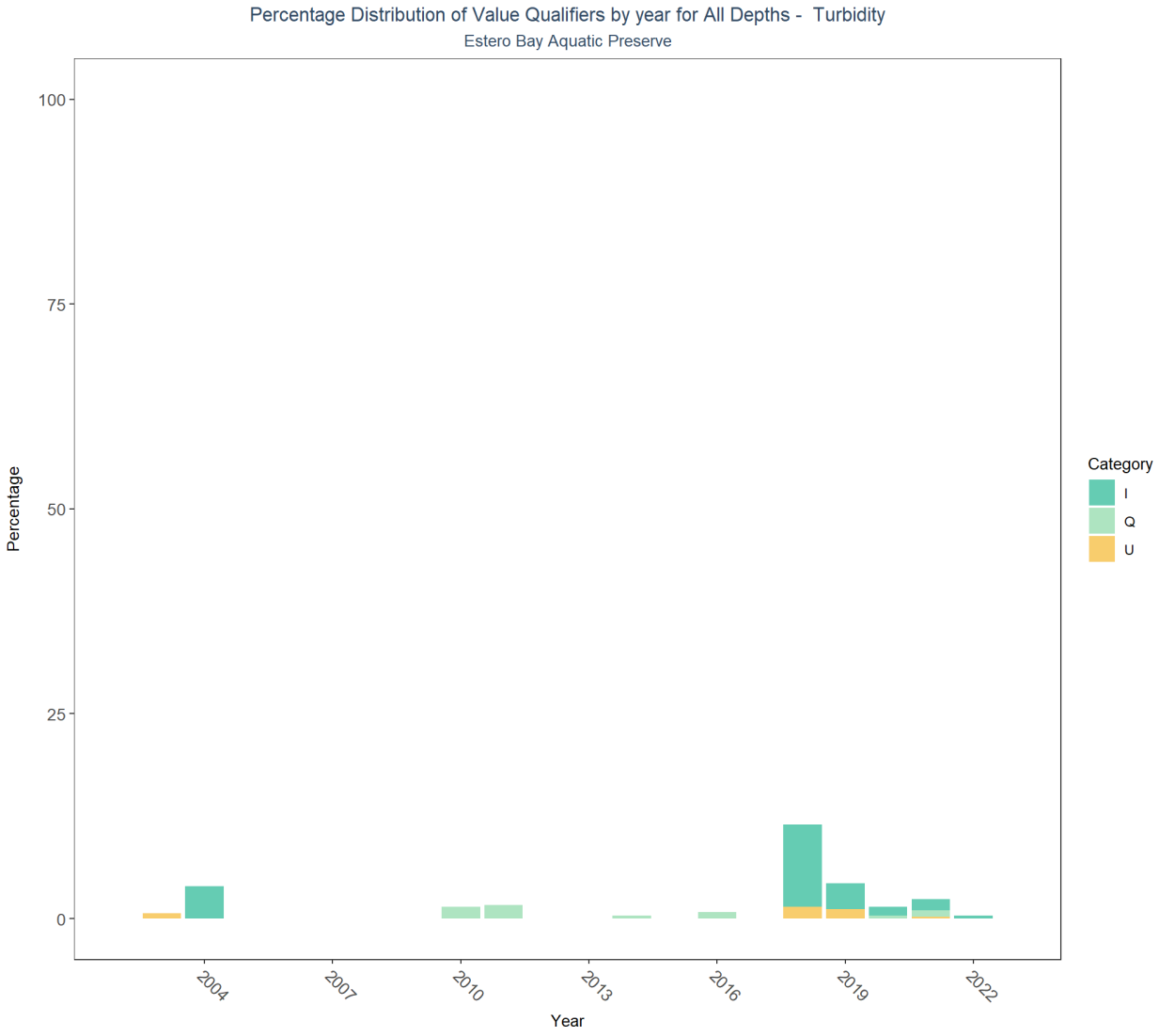


Table 24: Value Qualifiers for Turbidity

	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

	Year	N_Total	N_I	perc_I	N_Q	perc_Q	N_U	perc_U
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

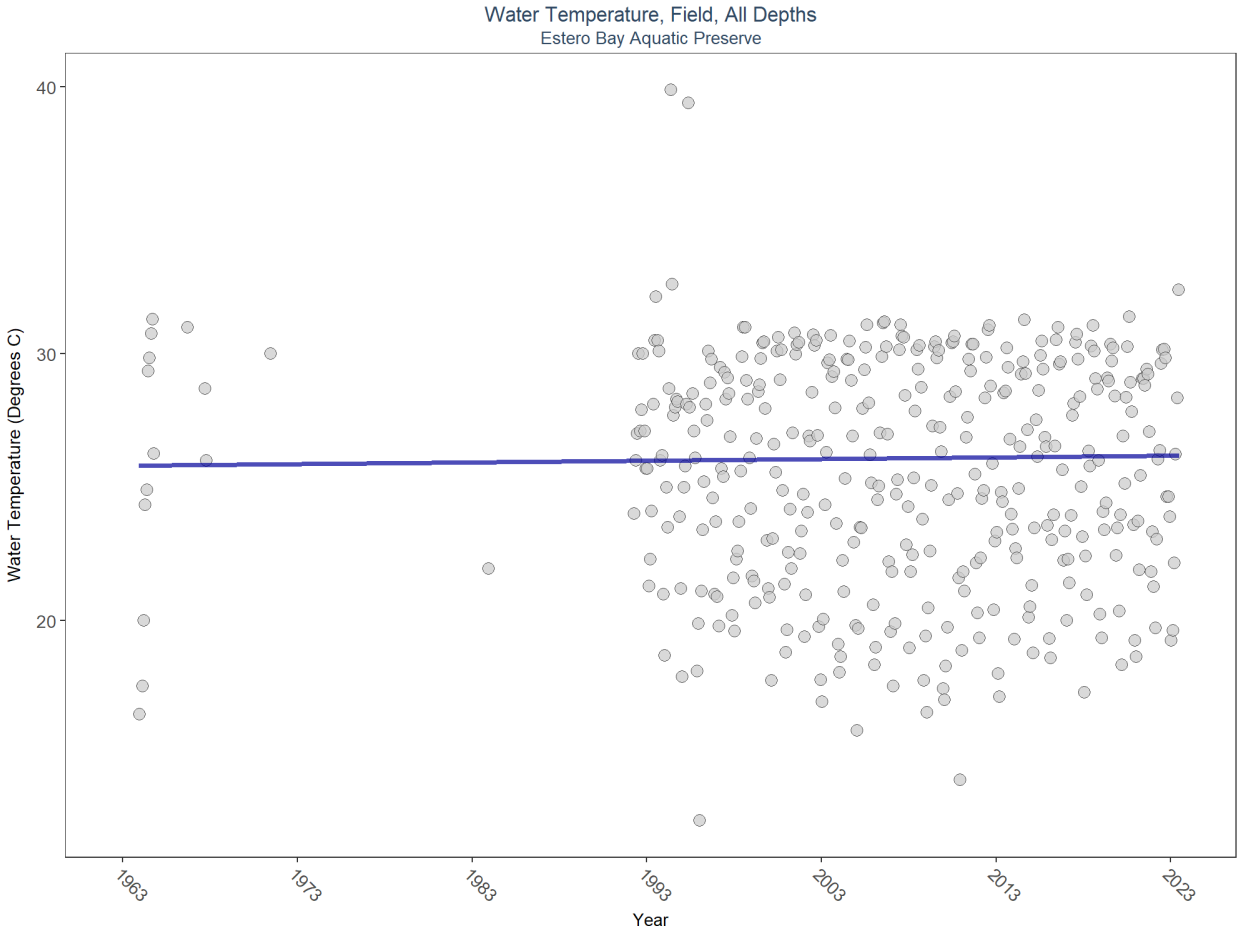
I - The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

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



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
All	9912	38	26.1	TRUE	0.0235	0.5090	0.006515152	25.80441	5.6659	0.8947	0

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 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:

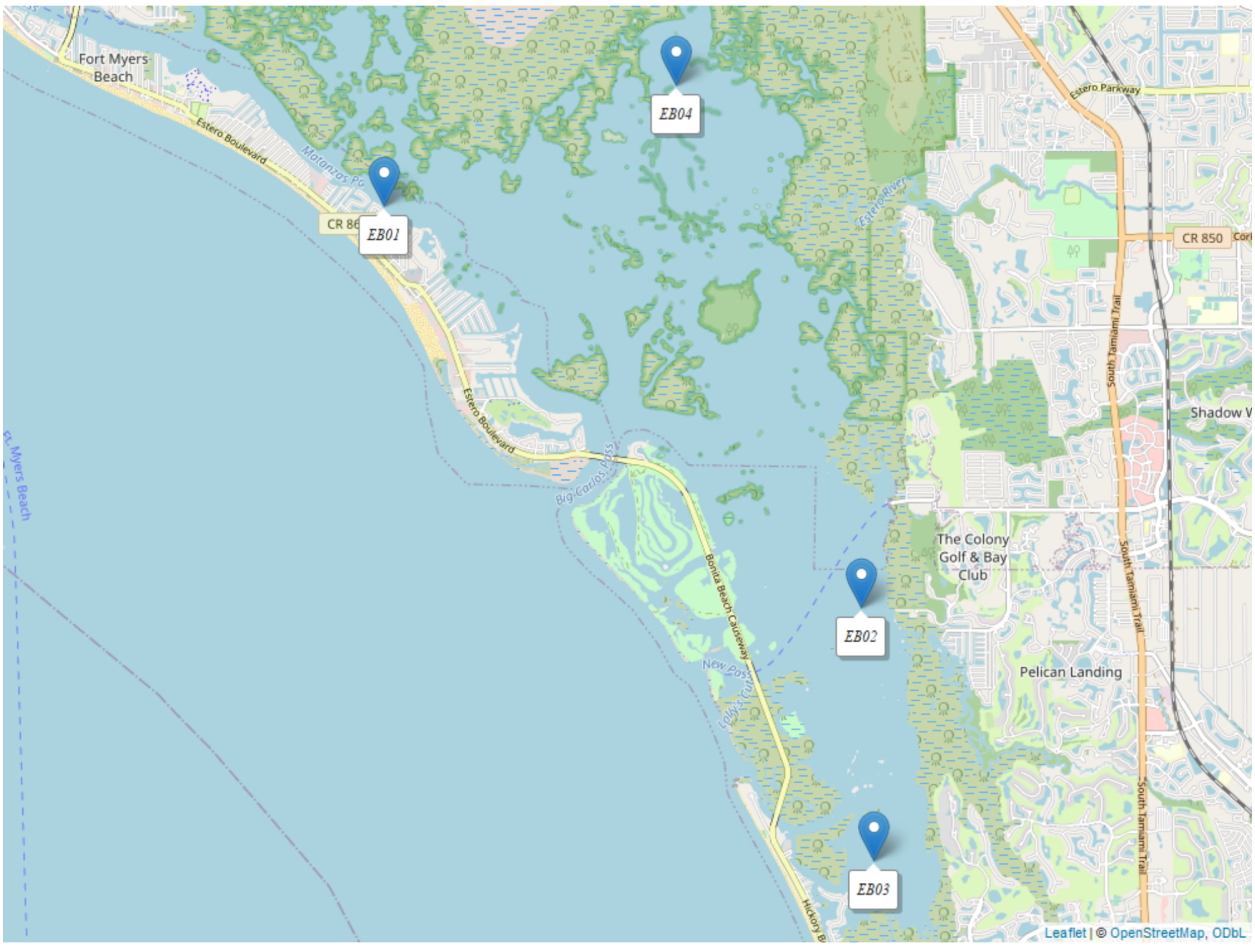
- Combined_WQ_WC_NUT_cont_Water_Temperature_SW-2023-Jul-14.txt

Table 26: Number of Continuous Stations in Estero Bay Aquatic Preserve

ProgramLocationID	ProgramName	Use_In_Analysis
EB01	Estero Bay Aquatic Preserve Continuous Water Quality Monitoring	TRUE
EB02	Estero Bay Aquatic Preserve Continuous Water Quality Monitoring	TRUE
EB03	Estero Bay Aquatic Preserve Continuous Water Quality Monitoring	TRUE
EB04	Estero Bay Aquatic Preserve Continuous Water Quality Monitoring	FALSE

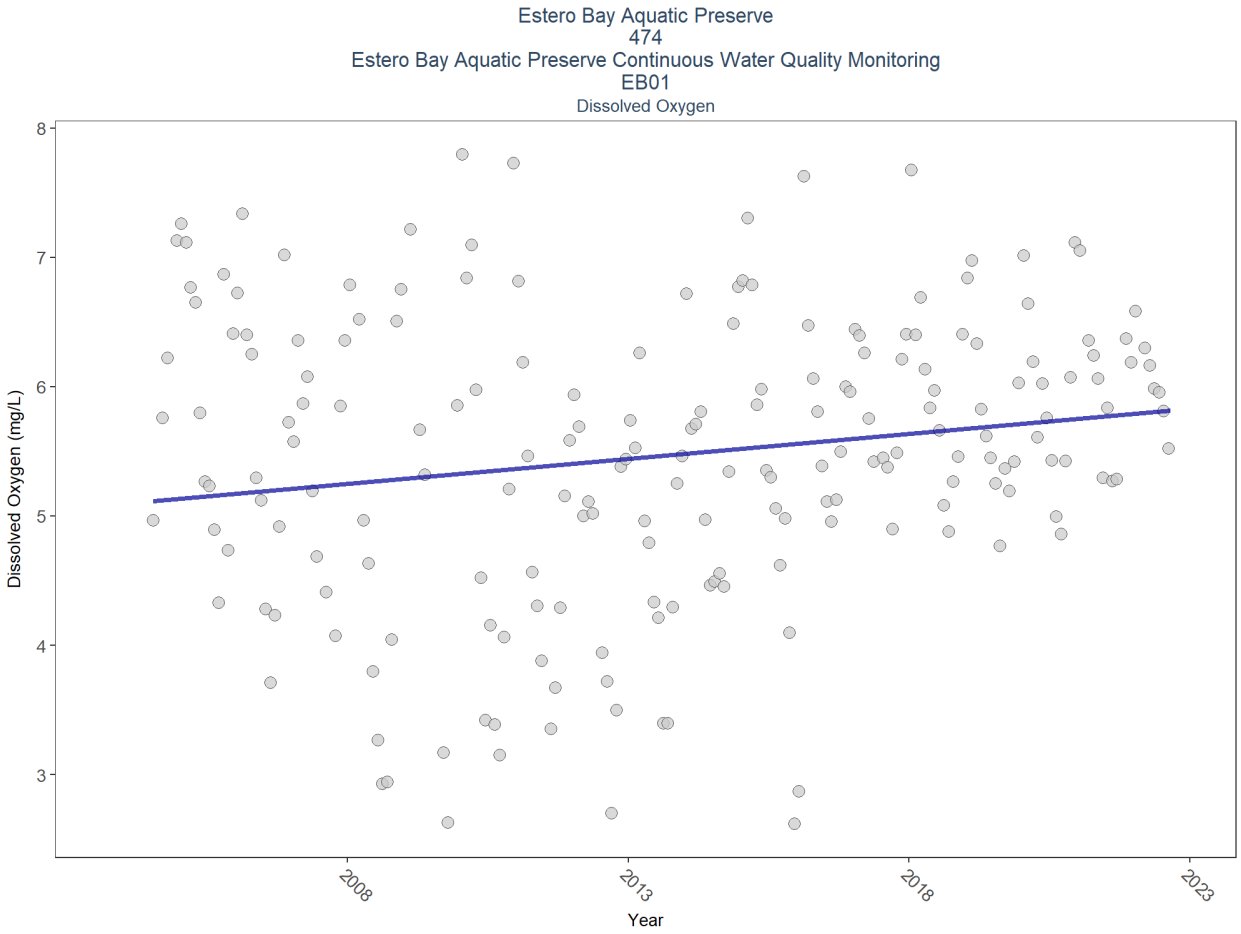
There are 4 stations in Estero Bay Aquatic Preserve.

3 out of 4 are included in this report.



Dissolved Oxygen

EB01

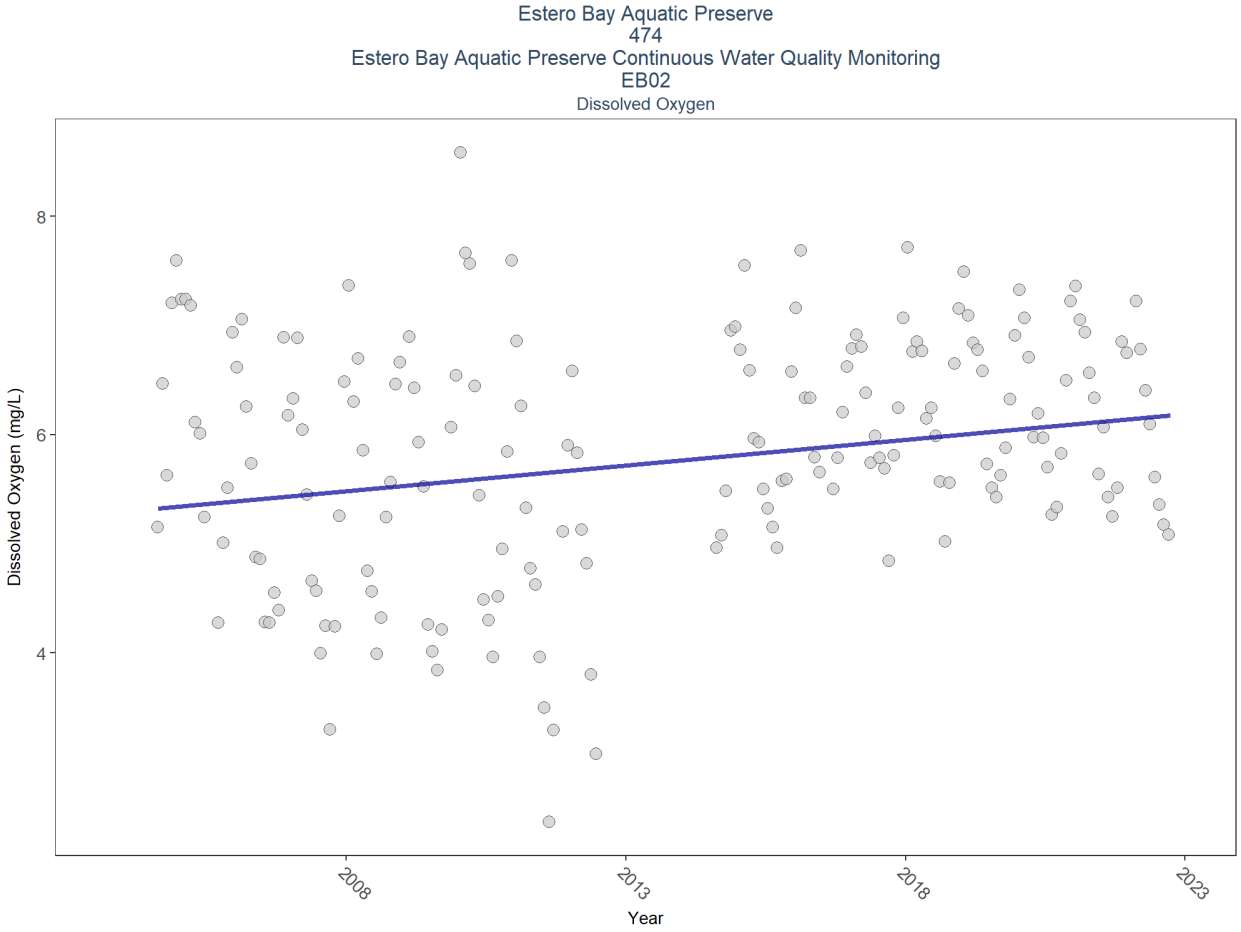


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	478415	19	5.6	TRUE	0.2196	0.0000	0.03869549	5.095745	20.9159	0.0343	1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB02

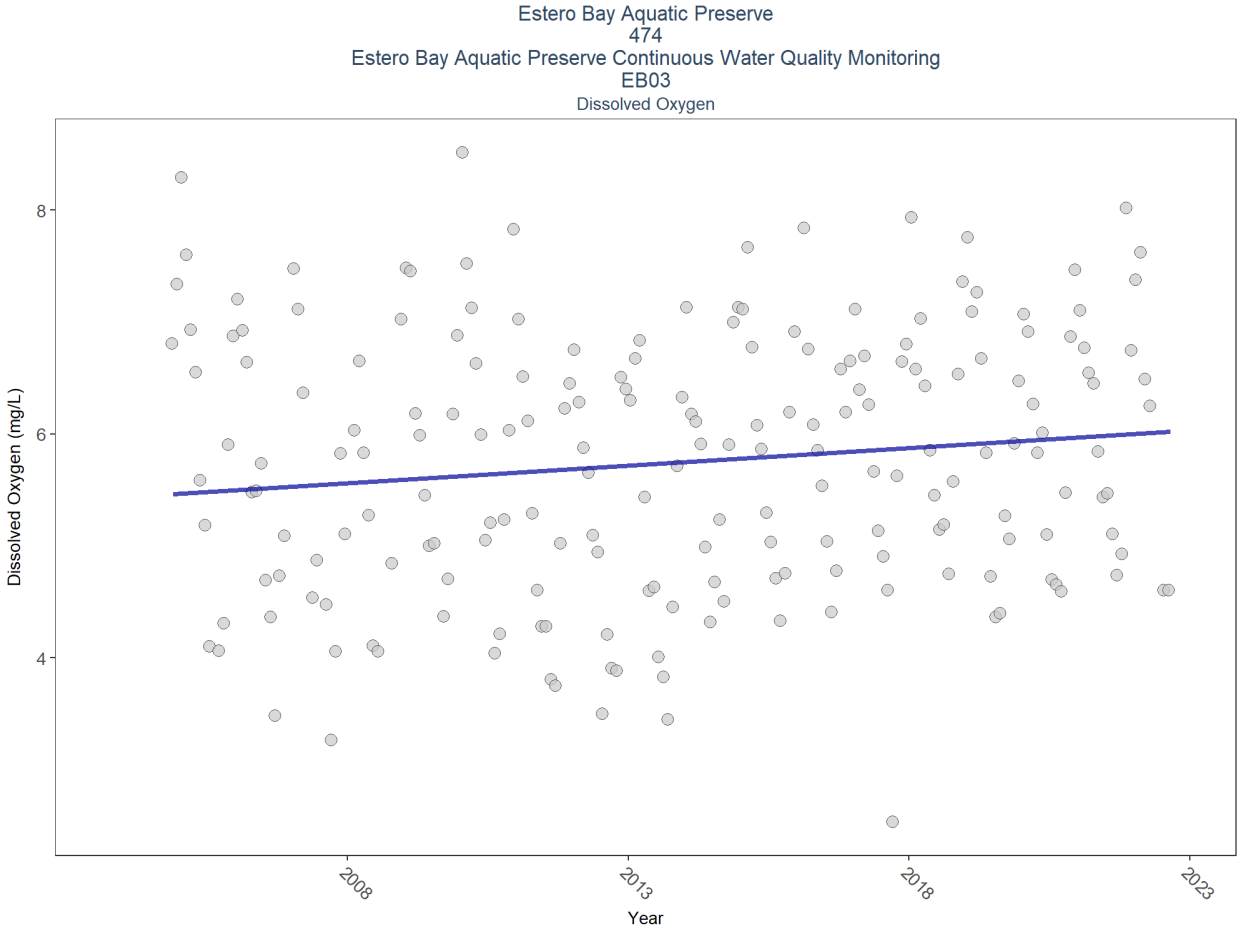


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	416255	18	6	TRUE	0.2991	0.0000	0.04707587	5.292665	5.2778	0.917	1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB03



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

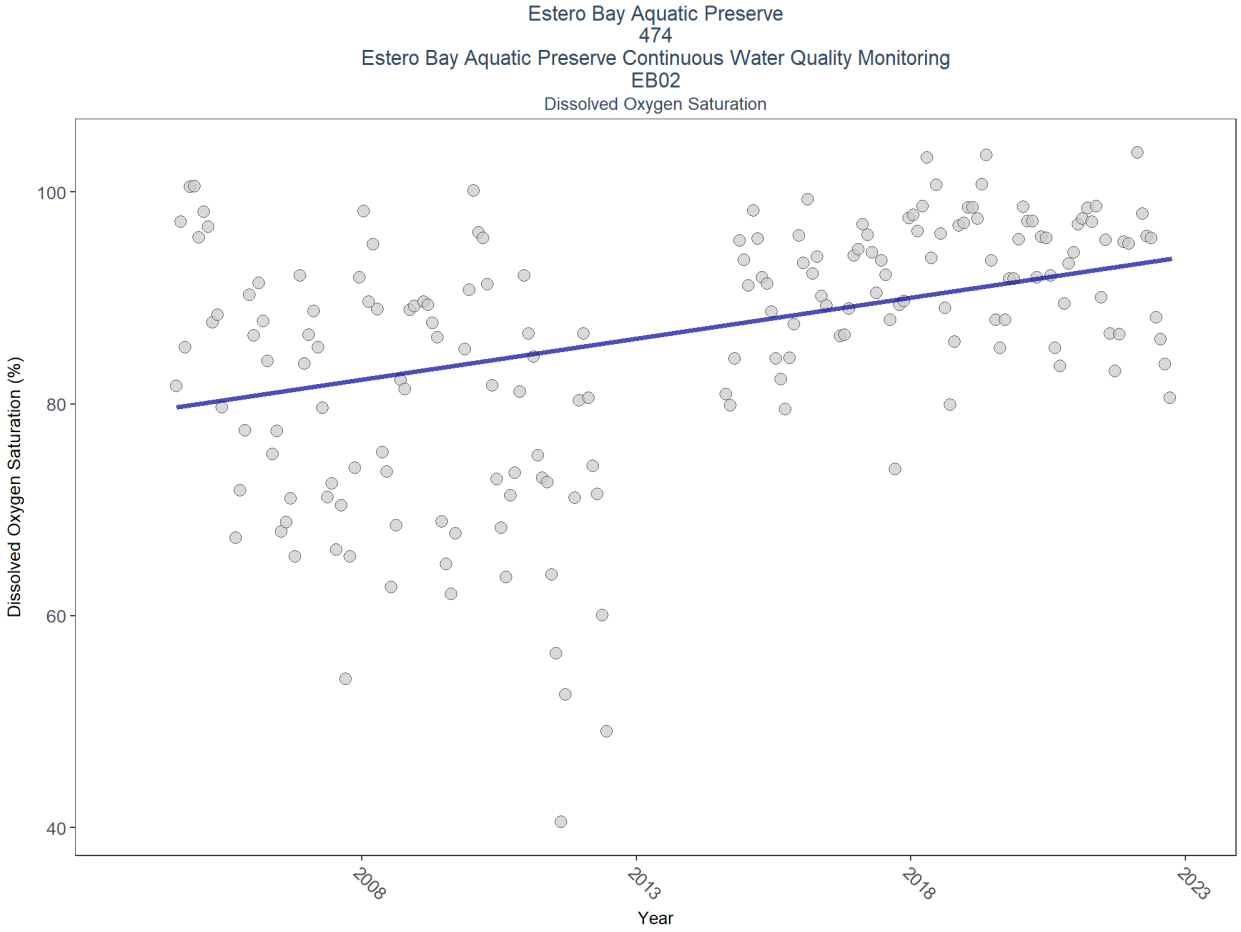
EB01

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

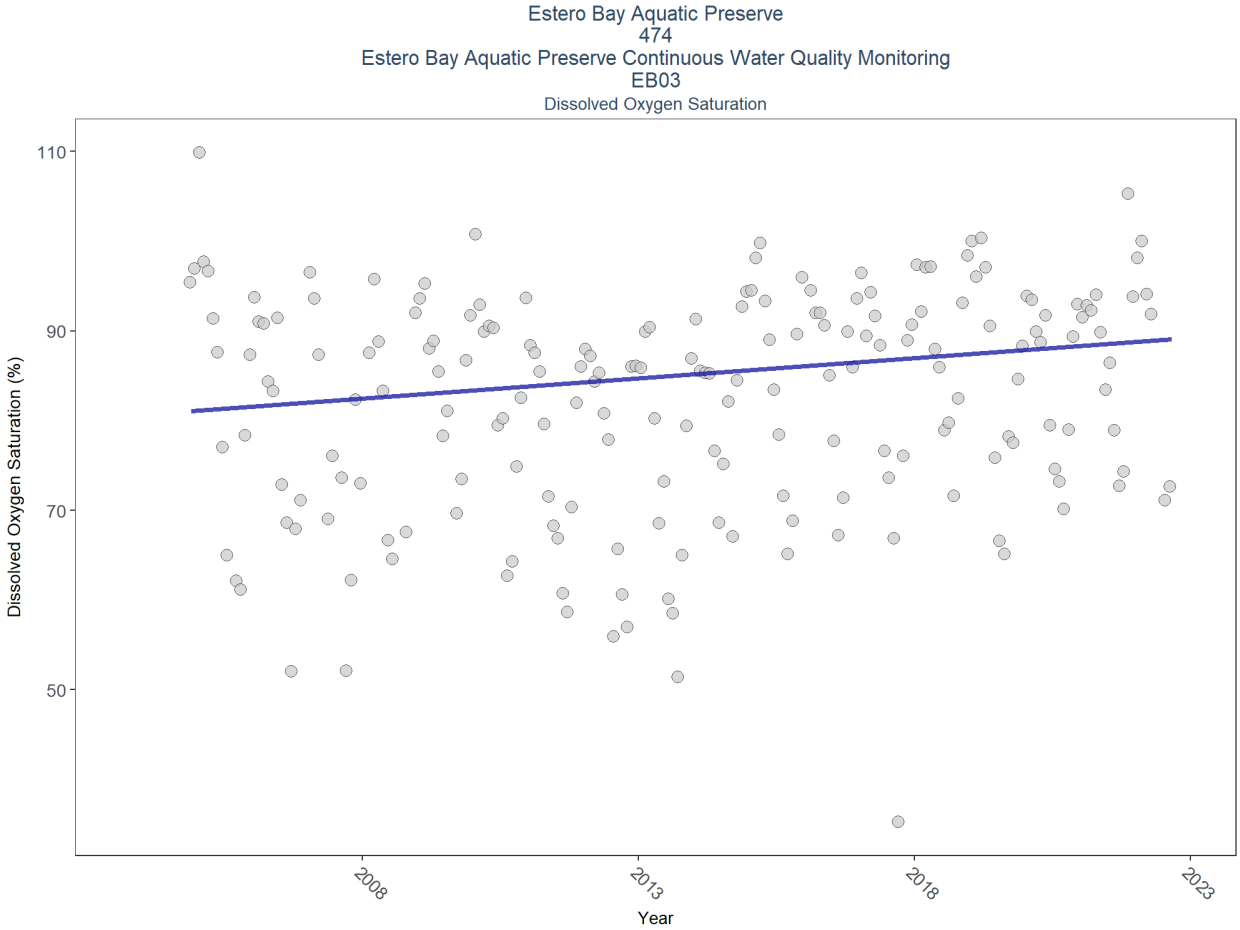


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	416492	18	87.5	TRUE	0.4277	0.0000	0.7768762	79.15597	3.1342	0.9888	1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB03



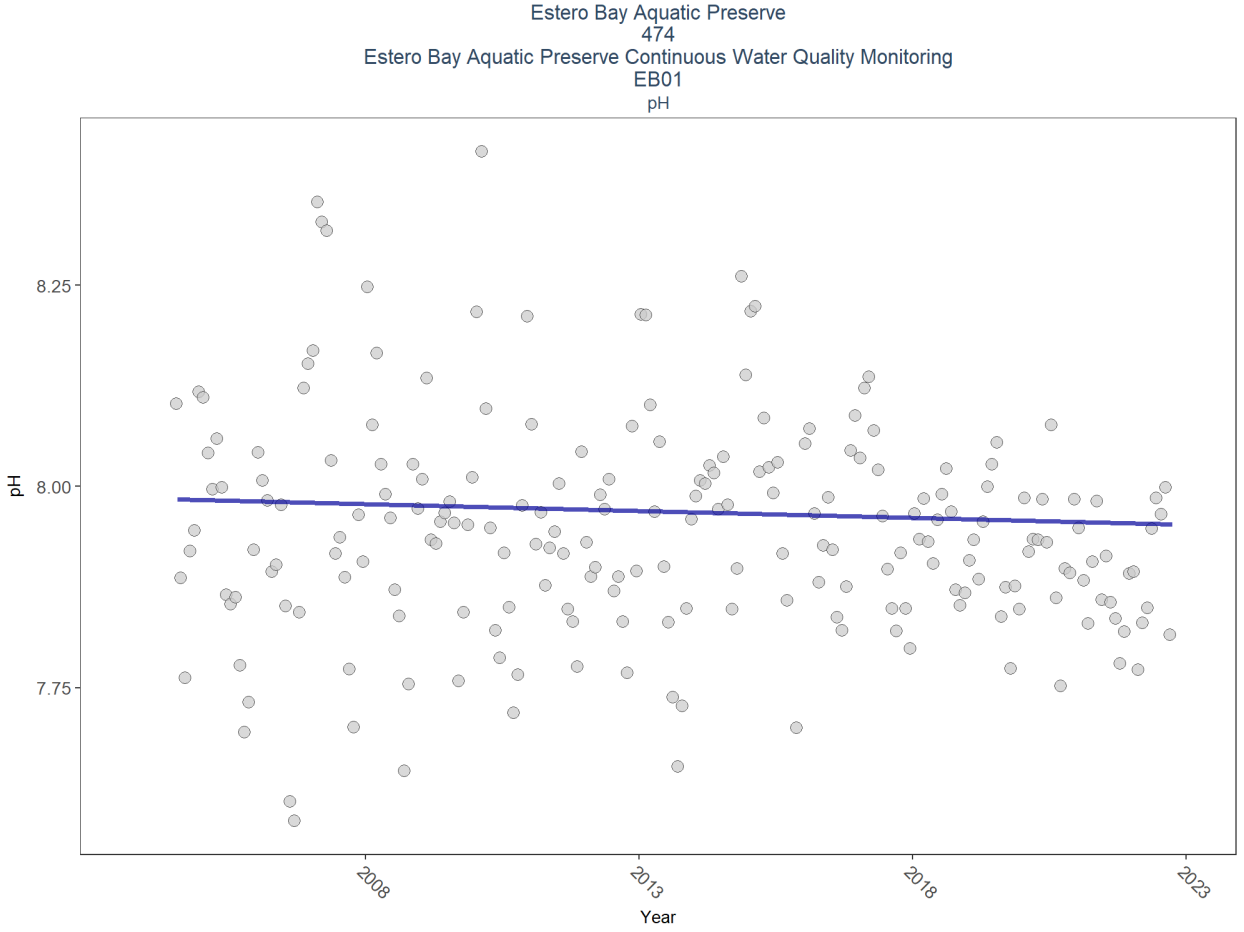
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	441227	19	83.7	TRUE	0.2531	0.0000	0.4503603	80.68982	6.4615	0.8409	1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

pH

EB01

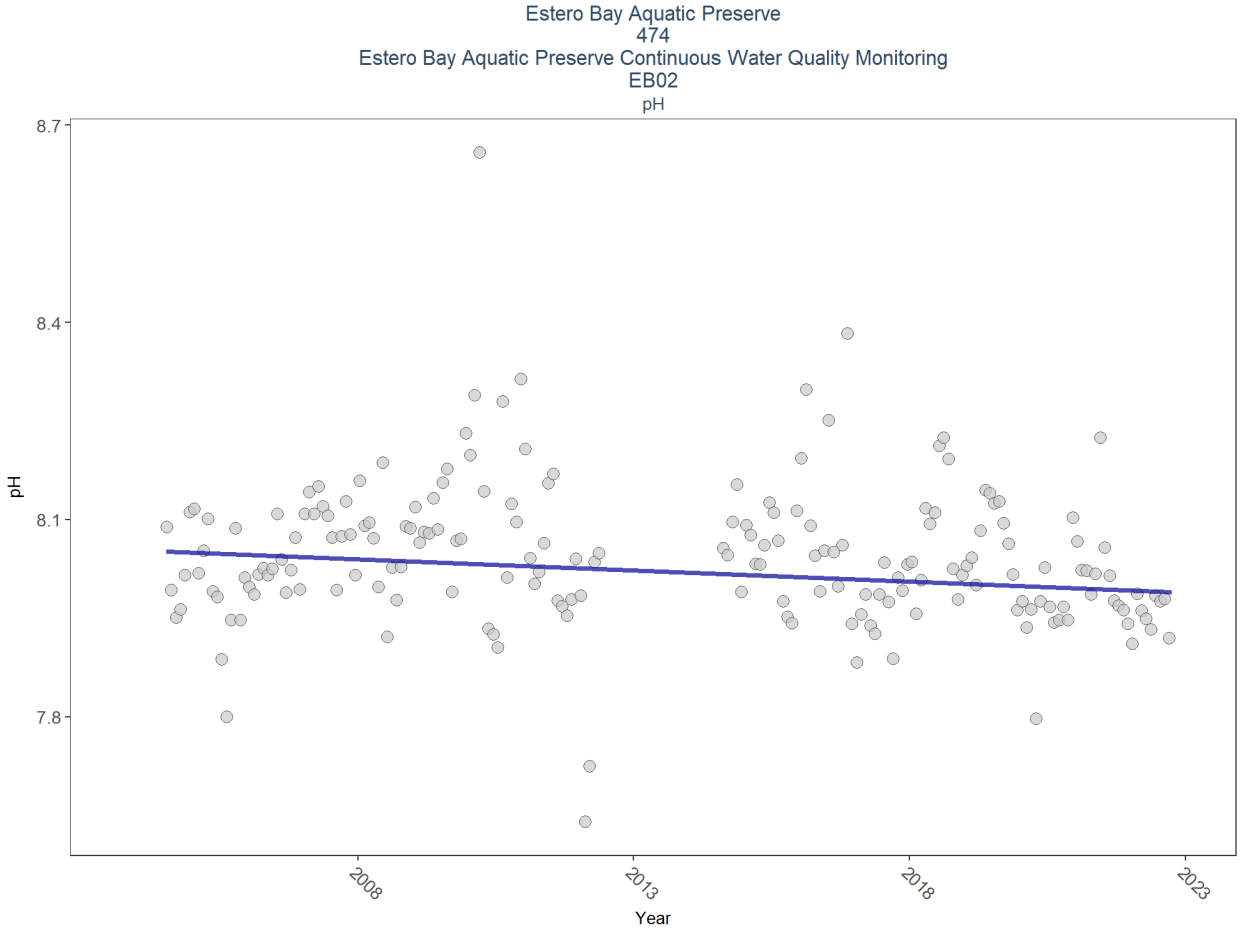


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	561177	19	7.9	TRUE	-0.0742	0.1620	-0.001714161	7.985223	29.3817	0.002	0

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB02

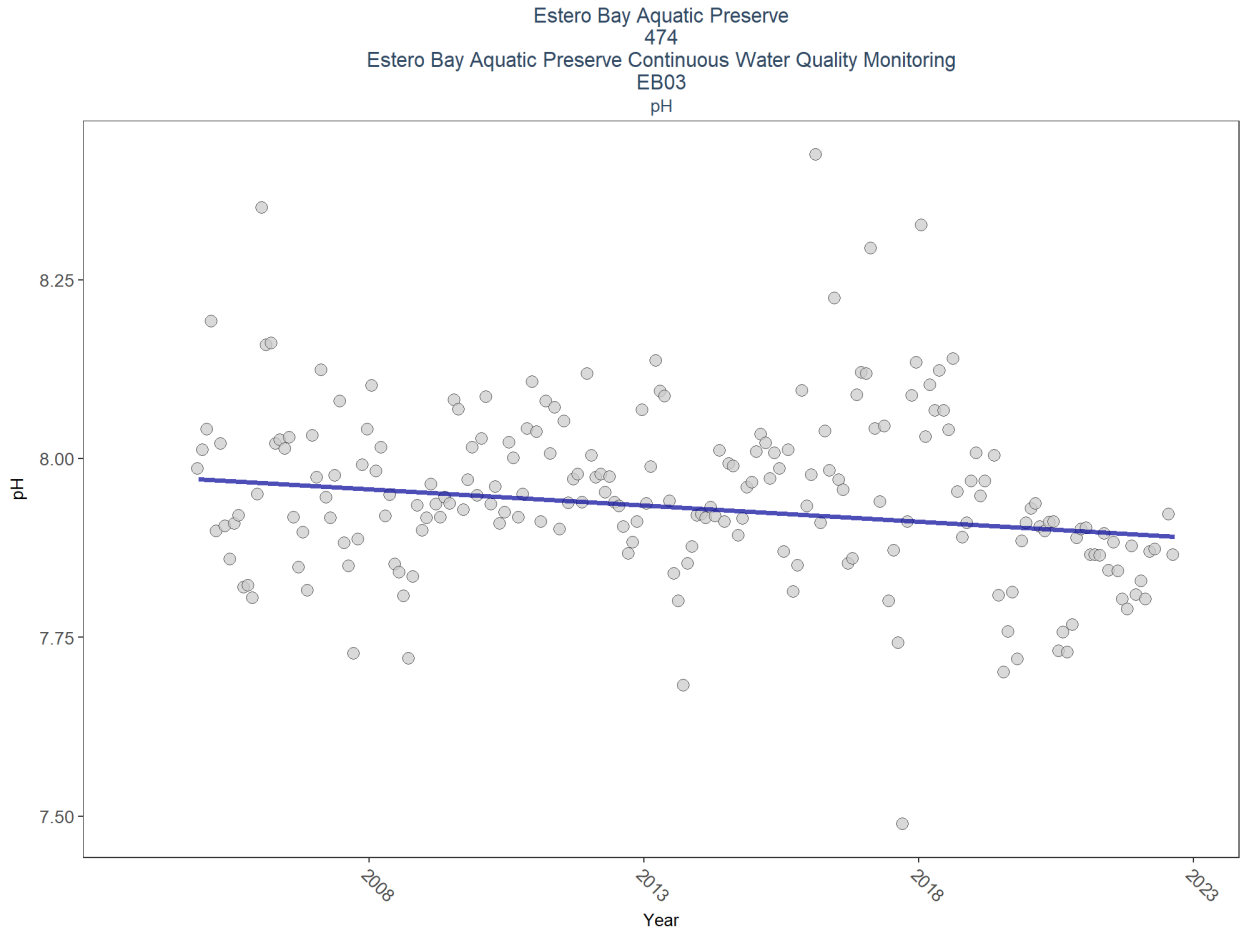


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	477038	18	8	TRUE	-0.1413	0.0086	-0.003392557	8.053129	9.7501	0.553	-1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB03



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

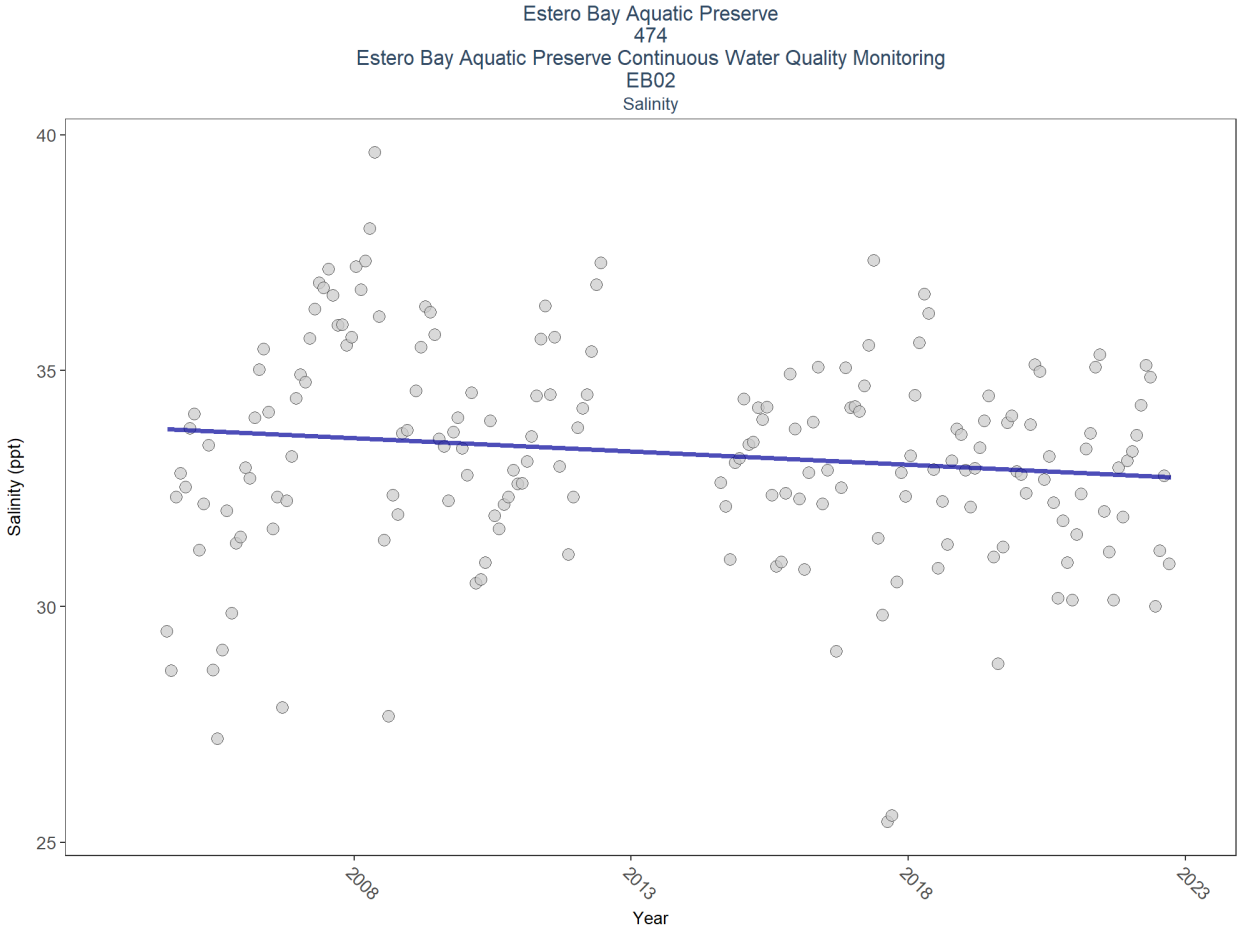
EB01

RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	566152	19	30.7	TRUE	-0.1226	0.0182	-0.09197087	32.17017	5.8375	0.884	-1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB02

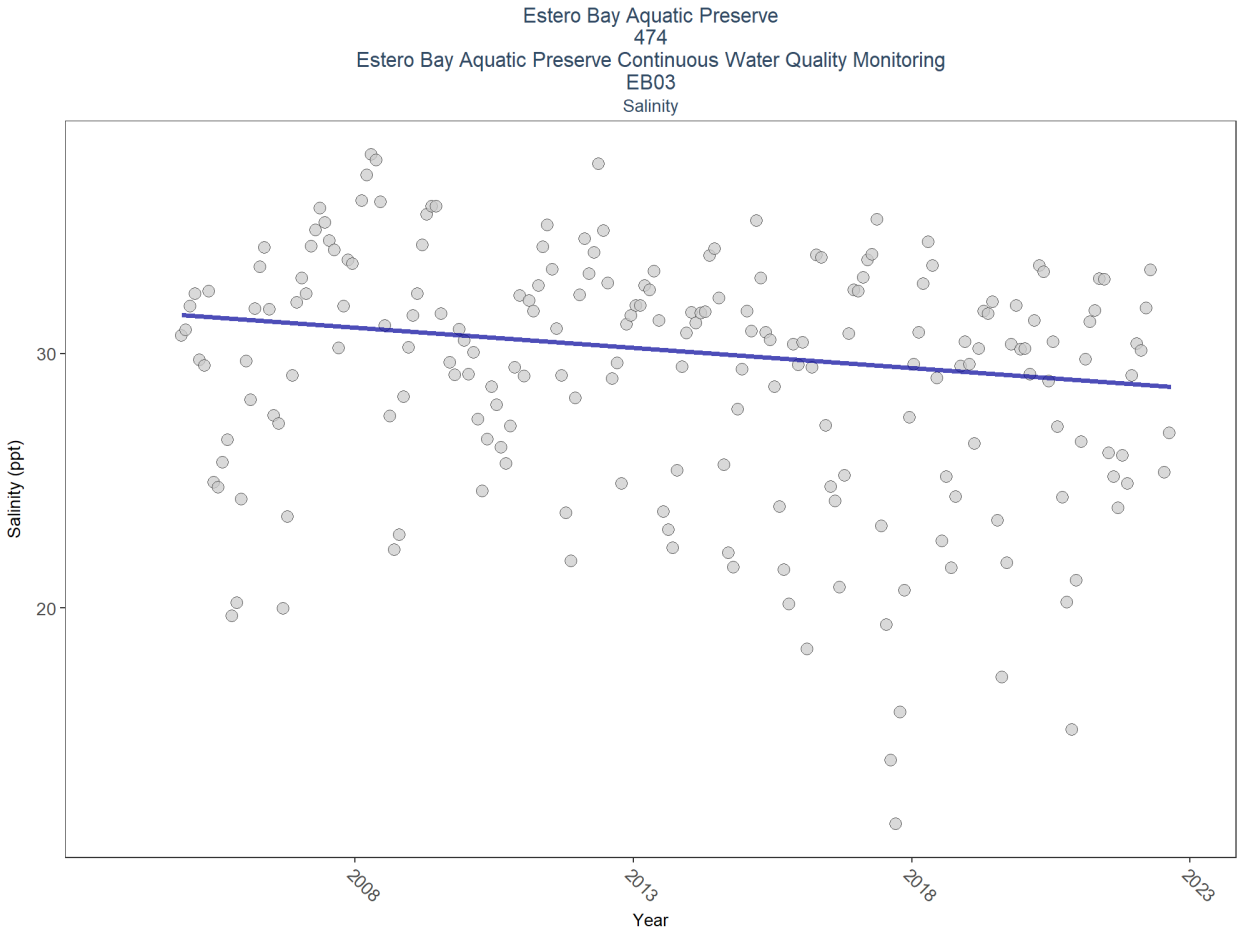


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	501373	18	33.6	TRUE	-0.1193	0.0251	-0.05580053	33.79427	6.2243	0.858	-1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB03



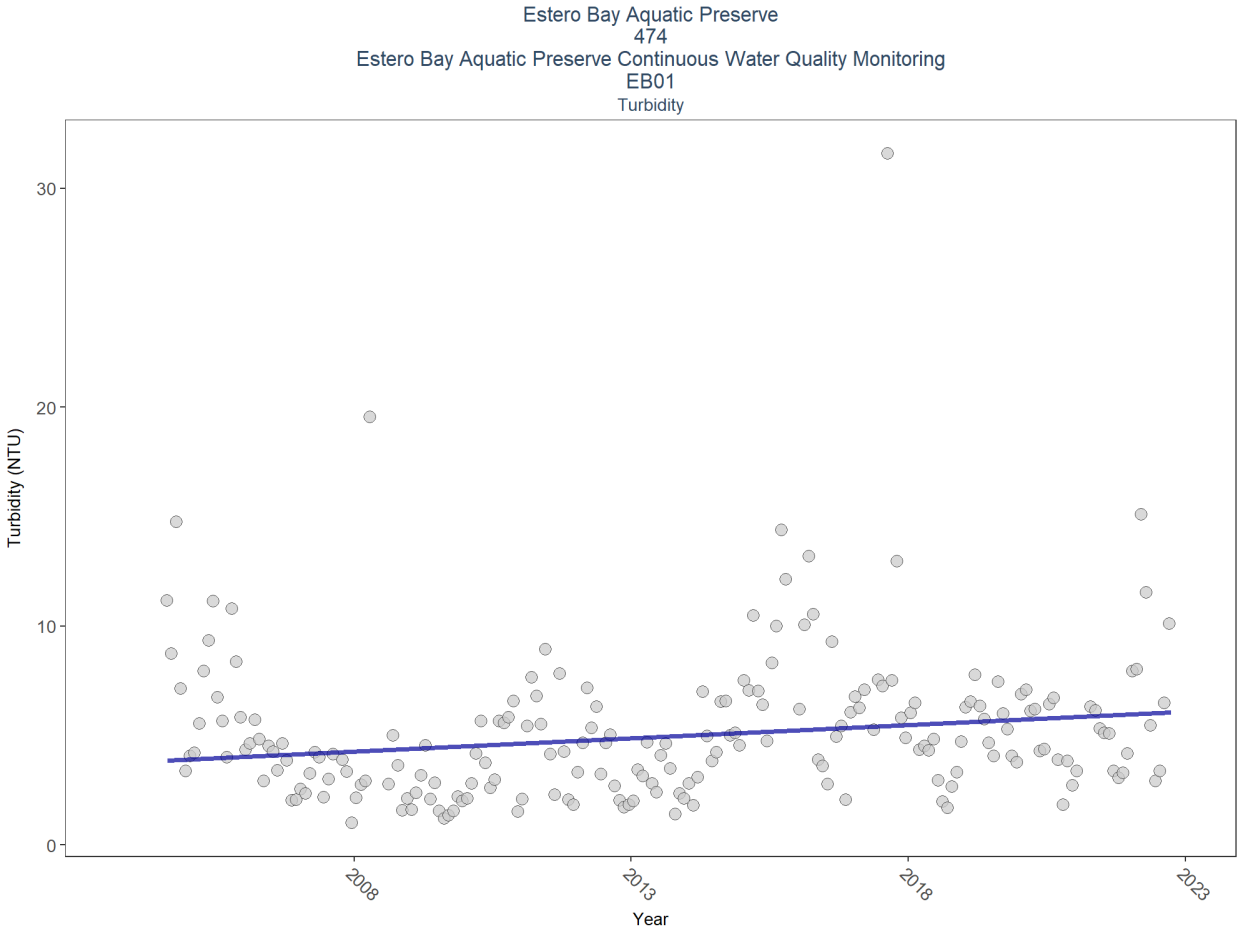
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	533169	19	30.9	TRUE	-0.2138	0.0000	-0.1580336	31.65294	4.2465	0.9621	-1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Turbidity

EB01

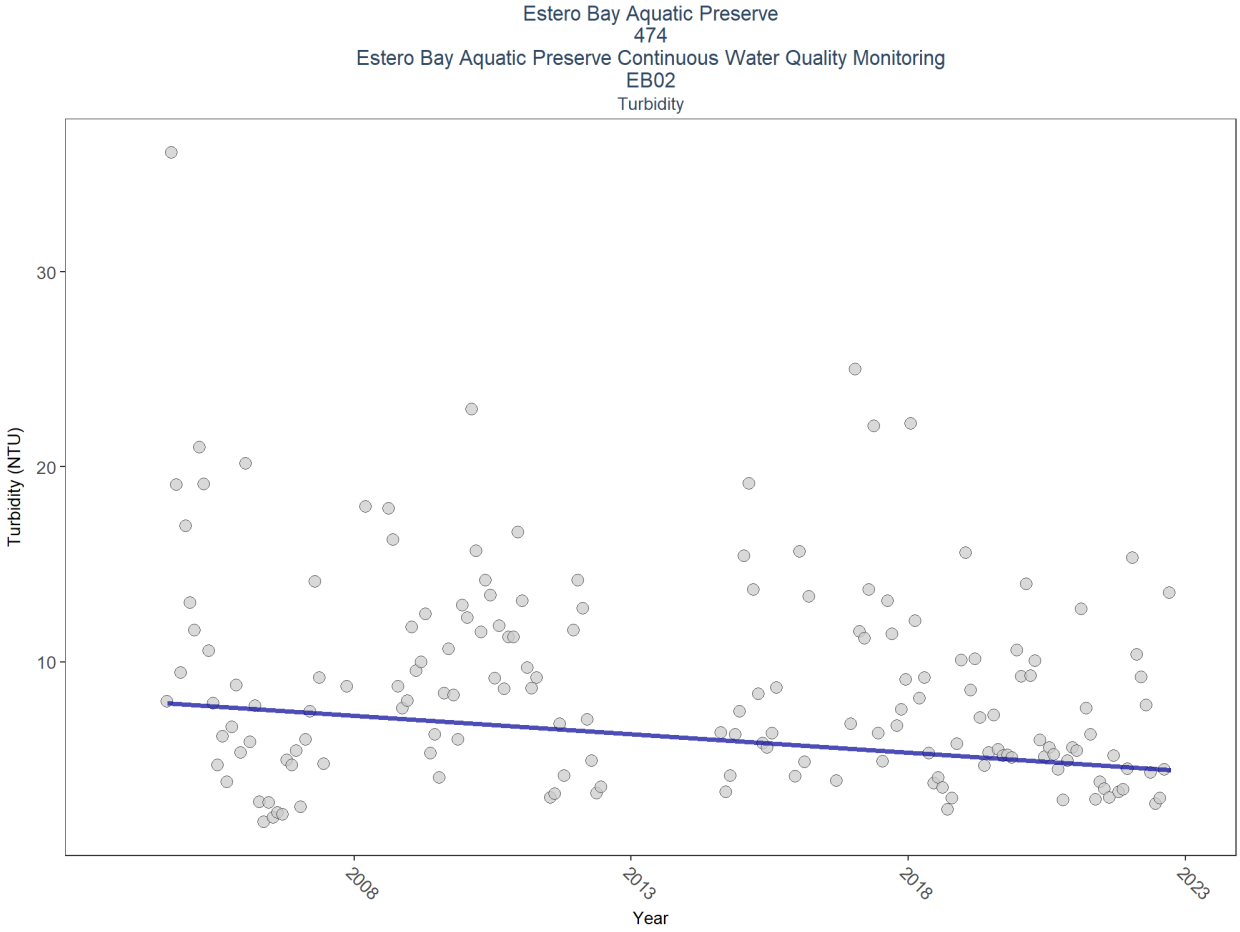


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	509980	19	4	TRUE	0.1746	0.0007	0.1209662	3.788219	12.3991	0.3344	1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB02

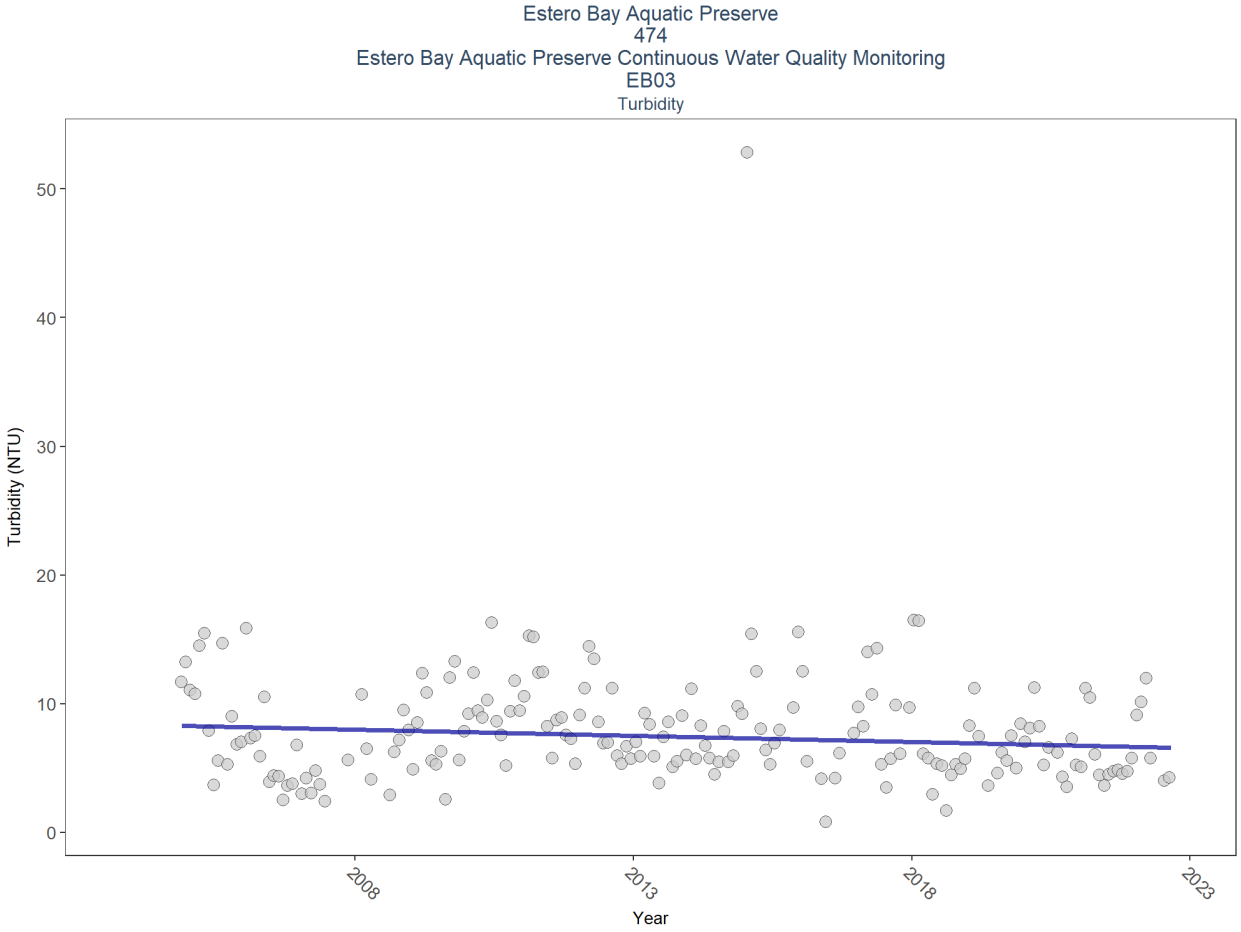


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	396630	18	5	TRUE	-0.1814	0.0028	-0.1889955	7.995252	13.1711	0.2823	-1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB03



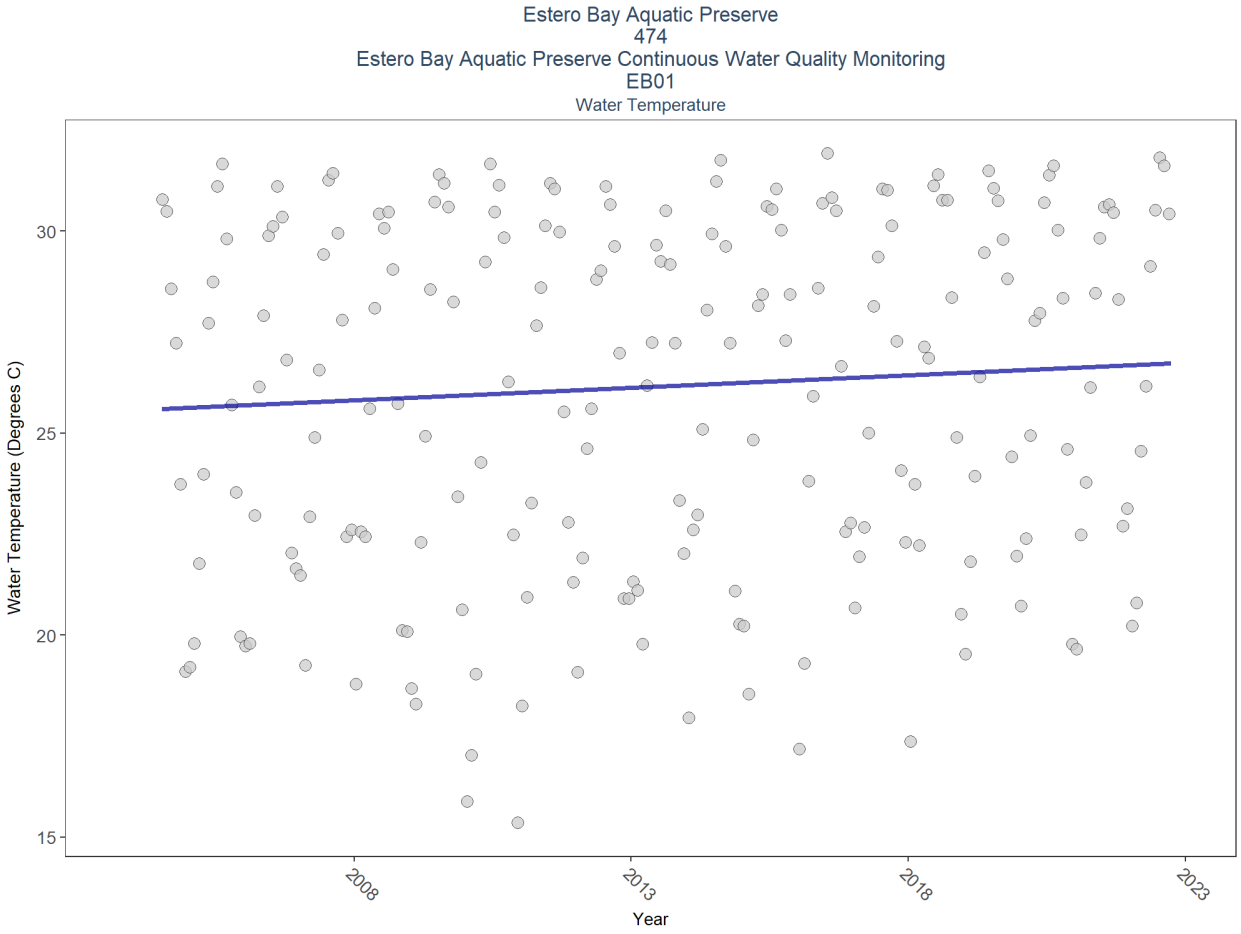
RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	413599	19	5	TRUE	-0.1336	0.0190	-0.09501454	8.373902	7.8047	0.7307	-1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

Water Temperature

EB01

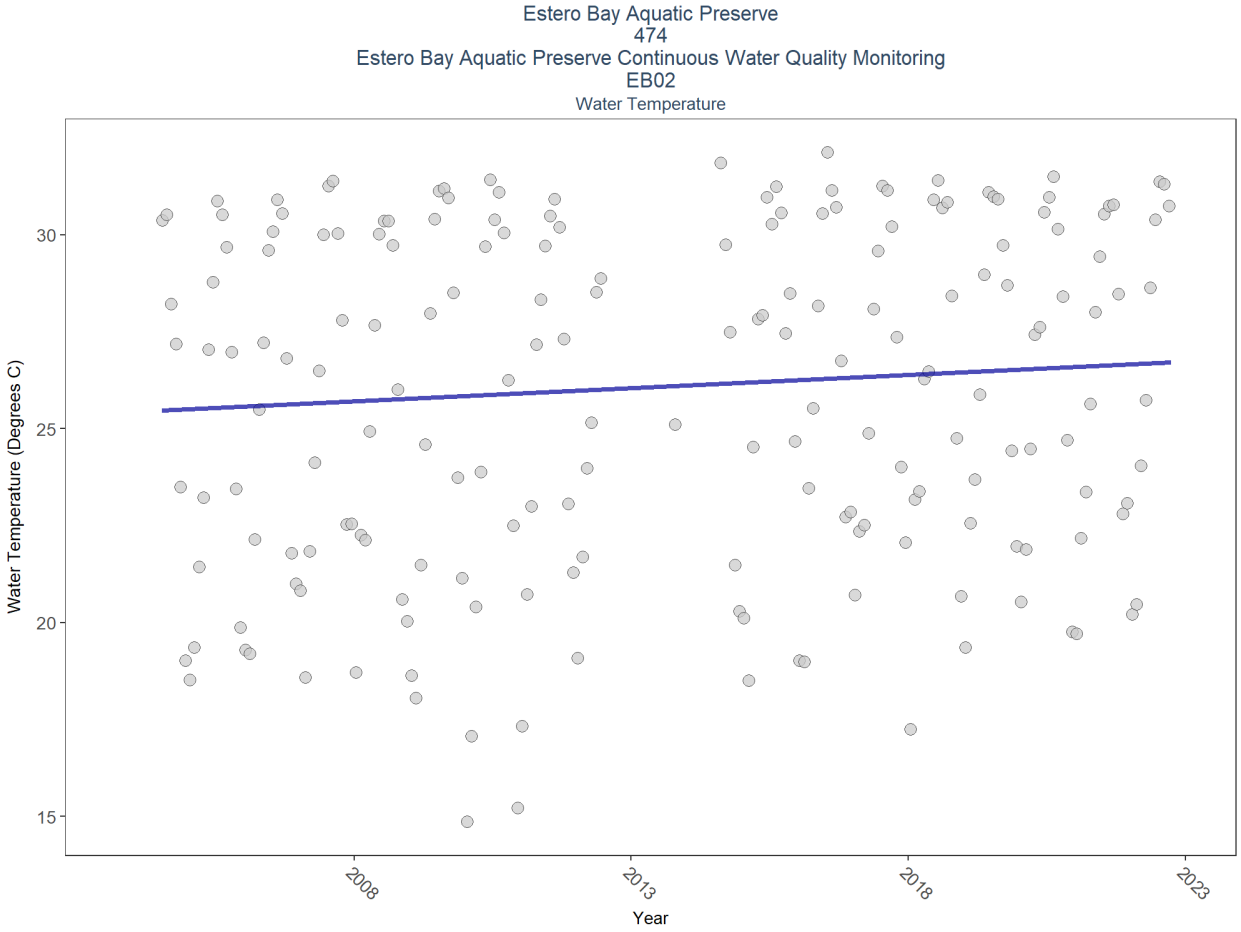


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	616625	19	26.8	TRUE	0.2539	0.0000	0.06213652	25.56719	6.9882	0.8	1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB02

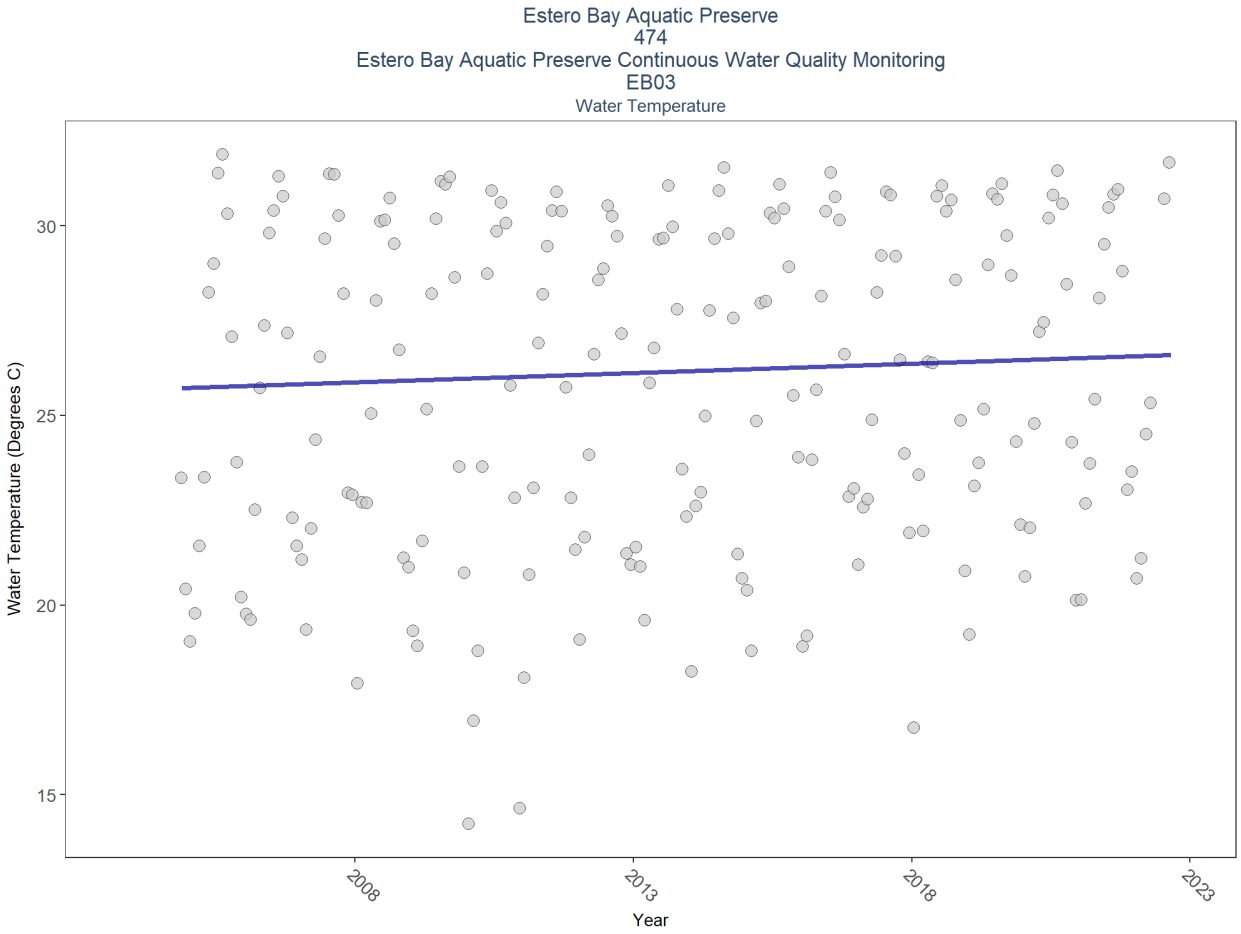


RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	539688	19	26.6	TRUE	0.3158	0.0000	0.06842195	25.43307	2.4759	0.996	1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location

EB03



RelativeDepth	N_Data	N_Years	Median	Independent	tau	p	SennSlope	SennIntercept	ChiSquared	pChiSquared	Trend
bottom	572084	19	26.5	TRUE	0.1722	0.0006	0.04927919	25.67835	7.636	0.7455	1

p < 0.00005 appear as 0 due to rounding.

SennIntercept is intercept value at beginning of record for monitoring location