

**LAKEWATCH Report for Bal Harbor in Charlotte County
Estuary and Estuary Segment: Charlotte Harbor/Estero Bay Charlotte Harbor Proper
Using Data Downloaded 12/9/2022**

Introduction for Estuaries

This report summarizes data collected on systems that have been part of the LAKEWATCH program. Data are from the period of record for individual systems. The first part of this summary lists background data for each system, the second part lists the long-term data averages and ranges and the final part are trend plots for nutrients, chlorophyll, and Secchi depth. **Plots were only made for systems with five or more years of data.**

The near shore Florida coastline is separated into estuary and estuary segments within the estuary. Deeper coastal waters are separated into coastal nutrient regions and coastal nutrient segments within the regions. Numeric nutrient criteria are established for all estuary segments, including criteria for total nitrogen, total phosphorus, and chlorophyll *a*. For open ocean coastal waters, numeric criteria are established for chlorophyll *a*, that is derived from satellite remote sensing techniques. For those locations without defined segments there are narrative nutrient criteria (e.g., Florida Keys Halo Zone).

The maps defining individual estuaries and coastal segments can be found at the following link:
<https://www.flrules.org/Gateway/reference.asp?No=Ref-05420>

The individual nutrient criteria can be found at the following link:
<https://www.flrules.org/gateway/RuleNo.asp?title=SURFACE%20WATER%20QUALITY%20STANDARDS&ID=62-302.532>

Base File Data for Estuaries: Definitions:

- **County:** Name of county adjacent to the system.
- **Name:** System name that LAKEWATCH uses for the station.
- **GNIS Number:** Number created by USGS's Geographic Names Information System.
- **Water Body Type:** Four different types of systems; lakes, estuaries, river/streams and springs.
- **Period of Record (years):** Number of years a system has been in the LAKEWATCH program.
- **Latitude and Longitude:** Coordinates identifying the exact location of station 1 for each system.

Table 1. Base File Data.

County	Charlotte
Name	Bal Harbor
GNIS Number	
Water Body Type	Estuary
Period of Record (years, range)	11 (2009 to 2019)
Latitude	26.8911
Longitude	-82.0661

Long-Term Data for Estuaries: Definitions

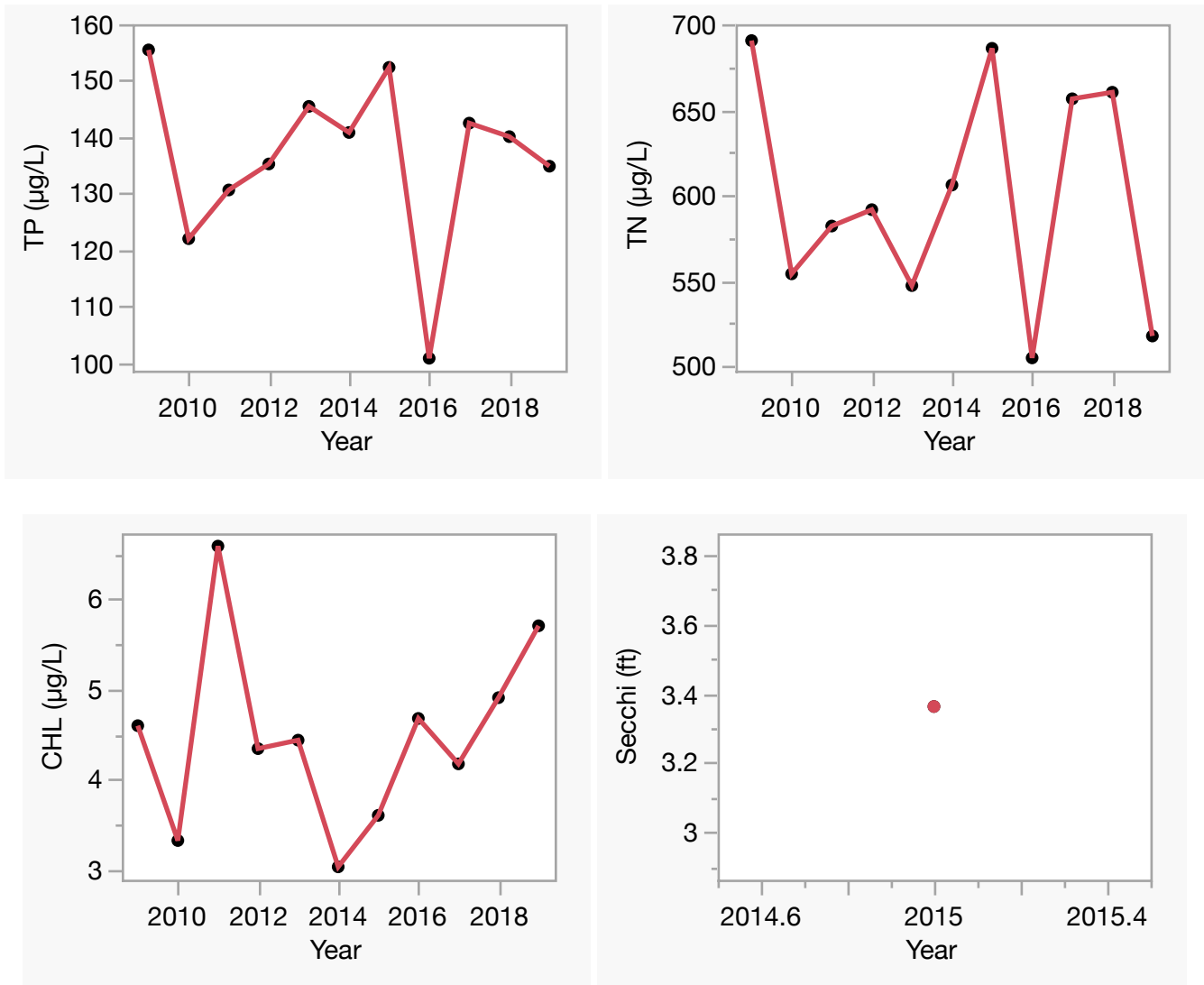
The following long-term data are the primary trophic state parameters collected by LAKEWATCH volunteers and classification variables color and specific conductance (LAKEWATCH recently began analyzing samples quarterly for color and specific conductance):

- **Total Phosphorus ($\mu\text{g/L}$):** Nutrient most often limiting growth of plant/algae.
- **Total Nitrogen ($\mu\text{g/L}$):** Nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10 (by mass).
- **Chlorophyll-uncorrected ($\mu\text{g/L}$):** Chlorophyll concentrations are used to measure relative abundances of open water algae.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filtered out.
- **Specific Conductance ($\mu\text{S/cm@25}^\circ\text{C}$), Salinity (ppt):** Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.

Table 2. Long-term trophic state data collected monthly by LAKEWATCH volunteers and color and specific conductance/salinity (collected quarterly).

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus ($\mu\text{g/L}$)	101 - 155	136 (11)
Total Nitrogen ($\mu\text{g/L}$)	505 - 690	596 (11)
Chlorophyll- uncorrected ($\mu\text{g/L}$)	3 - 7	4 (11)
Secchi (ft)	3.4 - 3.4	3.4 (1)
Secchi (m)	1.0 - 1.0	1.0 (1)
Color (Pt-Co Units)	10 - 28	20 (10)
Specific Conductance ($\mu\text{S/cm@25 C}$)	17000 - 35934	29278 (7)
Salinity (ppt)	10 - 22	18 (7)

Figure 2. Bal Harbor trend plots of year by average. The R^2 value indicates the strength of the relations (ranges from 0.0 to 1.0; higher the R^2 the stronger the relation) and the p value indicates if the relation is significant ($p < 0.05$ is significant). Total phosphorus (TP No Trend, $R^2 = 0.01$, $p = 0.74$), total nitrogen (TN No Trend, $R^2 = 0.01$, $p = 0.74$), chlorophyll (CHL No Trend, $R^2 = 0.02$, $p = 0.70$) and Secchi depth (Secchi No Trend, $R^2 = , p =)$.



**LAKEWATCH Report for Bass in Charlotte County
Estuary and Estuary Segment: Charlotte Harbor/Estero Bay Tidal Peace River
Using Data Downloaded 12/9/2022**

Introduction for Estuaries

This report summarizes data collected on systems that have been part of the LAKEWATCH program. Data are from the period of record for individual systems. The first part of this summary lists background data for each system, the second part lists the long-term data averages and ranges and the final part are trend plots for nutrients, chlorophyll, and Secchi depth. **Plots were only made for systems with five or more years of data.**

The near shore Florida coastline is separated into estuary and estuary segments within the estuary. Deeper coastal waters are separated into coastal nutrient regions and coastal nutrient segments within the regions. Numeric nutrient criteria are established for all estuary segments, including criteria for total nitrogen, total phosphorus, and chlorophyll *a*. For open ocean coastal waters, numeric criteria are established for chlorophyll *a*, that is derived from satellite remote sensing techniques. For those locations without defined segments there are narrative nutrient criteria (e.g., Florida Keys Halo Zone).

The maps defining individual estuaries and coastal segments can be found at the following link: <https://www.flrules.org/Gateway/reference.asp?No=Ref-05420>

The individual nutrient criteria can be found at the following link: <https://www.flrules.org/gateway/RuleNo.asp?title=SURFACE%20WATER%20QUALITY%20STANDARDS&ID=62-302.532>

Base File Data for Estuaries: Definitions:

- **County:** Name of county adjacent to the system.
- **Name:** System name that LAKEWATCH uses for the station.
- **GNIS Number:** Number created by USGS's Geographic Names Information System.
- **Water Body Type:** Four different types of systems; lakes, estuaries, river/streams and springs.
- **Period of Record (years):** Number of years a system has been in the LAKEWATCH program.
- **Latitude and Longitude:** Coordinates identifying the exact location of station 1 for each system.

Table 1. Base File Data.

County	Charlotte
Name	Bass
GNIS Number	
Water Body Type	Estuary
Period of Record (years, range)	1 (2017 to 2017)
Latitude	26.9191
Longitude	-82.0791

Long-Term Data for Estuaries: Definitions

The following long-term data are the primary trophic state parameters collected by LAKEWATCH volunteers and classification variables color and specific conductance (LAKEWATCH recently began analyzing samples quarterly for color and specific conductance):

- **Total Phosphorus ($\mu\text{g/L}$):** Nutrient most often limiting growth of plant/algae.
- **Total Nitrogen ($\mu\text{g/L}$):** Nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10 (by mass).
- **Chlorophyll-uncorrected ($\mu\text{g/L}$):** Chlorophyll concentrations are used to measure relative abundances of open water algae.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filtered out.
- **Specific Conductance ($\mu\text{S/cm@25}^\circ\text{C}$), Salinity (ppt):** Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.

Table 2. Long-term trophic state data collected monthly by LAKEWATCH volunteers and color and specific conductance/salinity (collected quarterly).

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus ($\mu\text{g/L}$)	175 - 175	175 (1)
Total Nitrogen ($\mu\text{g/L}$)	926 - 926	926 (1)
Chlorophyll- uncorrected ($\mu\text{g/L}$)	13 - 13	13 (1)
Secchi (ft)	6.6 - 6.6	6.6 (1)
Secchi (m)	2.0 - 2.0	2.0 (1)
Color (Pt-Co Units)	77 - 77	77 (1)
Specific Conductance ($\mu\text{S/cm@25 C}$)	14000 - 14000	14000 (1)
Salinity (ppt)	8 - 8	8 (1)

**LAKEWATCH Report for Breakers in Charlotte County
Estuary and Estuary Segment: Charlotte Harbor/Estero Bay Tidal Peace River
Using Data Downloaded 12/9/2022**

Introduction for Estuaries

This report summarizes data collected on systems that have been part of the LAKEWATCH program. Data are from the period of record for individual systems. The first part of this summary lists background data for each system, the second part lists the long-term data averages and ranges and the final part are trend plots for nutrients, chlorophyll, and Secchi depth. **Plots were only made for systems with five or more years of data.**

The near shore Florida coastline is separated into estuary and estuary segments within the estuary. Deeper coastal waters are separated into coastal nutrient regions and coastal nutrient segments within the regions. Numeric nutrient criteria are established for all estuary segments, including criteria for total nitrogen, total phosphorus, and chlorophyll *a*. For open ocean coastal waters, numeric criteria are established for chlorophyll *a*, that is derived from satellite remote sensing techniques. For those locations without defined segments there are narrative nutrient criteria (e.g., Florida Keys Halo Zone).

The maps defining individual estuaries and coastal segments can be found at the following link:
<https://www.flrules.org/Gateway/reference.asp?No=Ref-05420>

The individual nutrient criteria can be found at the following link:
<https://www.flrules.org/gateway/RuleNo.asp?title=SURFACE%20WATER%20QUALITY%20STANDARDS&ID=62-302.532>

Base File Data for Estuaries: Definitions:

- **County:** Name of county adjacent to the system.
- **Name:** System name that LAKEWATCH uses for the station.
- **GNIS Number:** Number created by USGS's Geographic Names Information System.
- **Water Body Type:** Four different types of systems; lakes, estuaries, river/streams and springs.
- **Period of Record (years):** Number of years a system has been in the LAKEWATCH program.
- **Latitude and Longitude:** Coordinates identifying the exact location of station 1 for each system.

Table 1. Base File Data.

County	Charlotte
Name	Breakers
GNIS Number	
Water Body Type	Estuary
Period of Record (years, range)	9 (2009 to 2017)
Latitude	26.9249
Longitude	-82.0646

Long-Term Data for Estuaries: Definitions

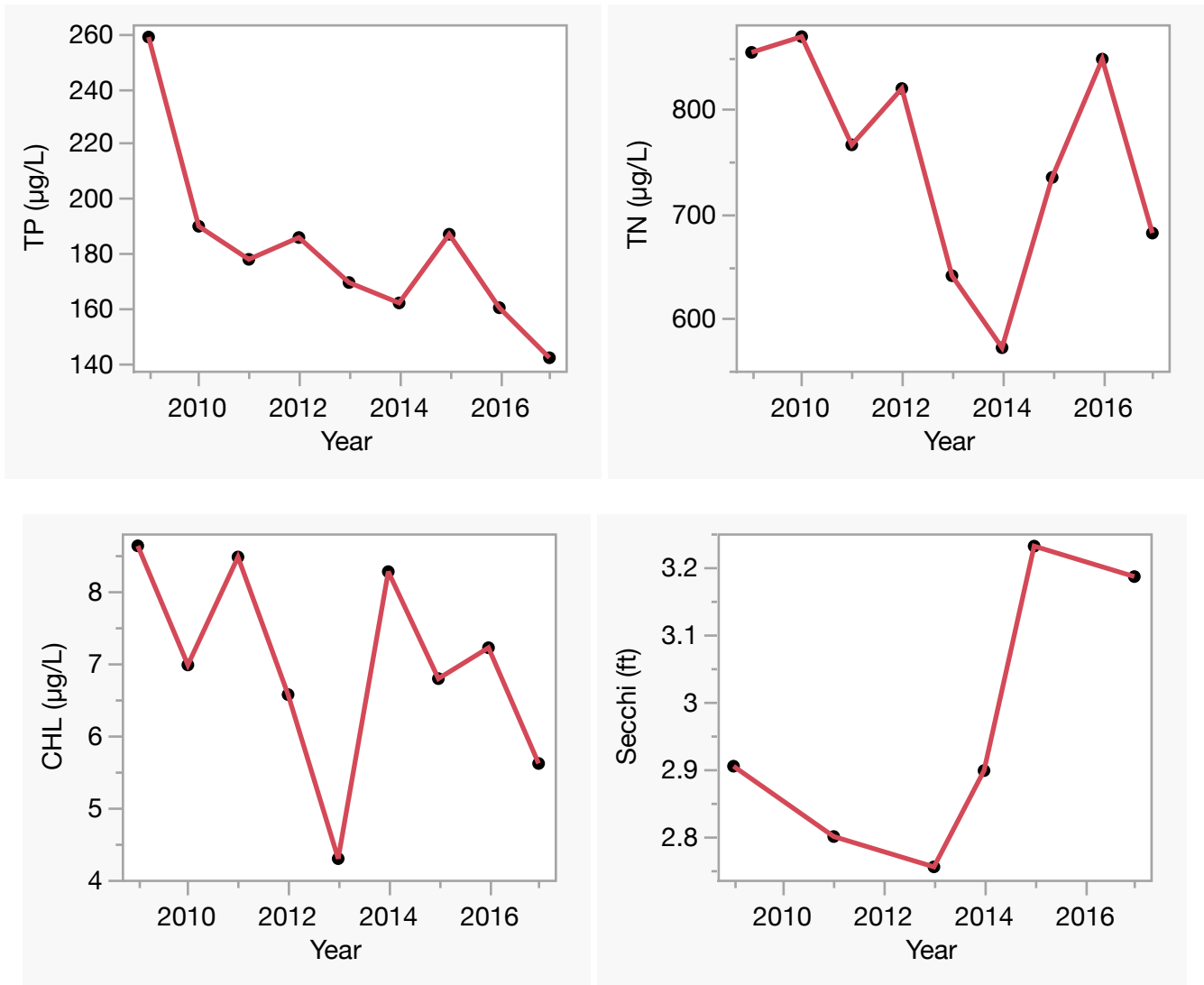
The following long-term data are the primary trophic state parameters collected by LAKEWATCH volunteers and classification variables color and specific conductance (LAKEWATCH recently began analyzing samples quarterly for color and specific conductance):

- **Total Phosphorus ($\mu\text{g/L}$):** Nutrient most often limiting growth of plant/algae.
- **Total Nitrogen ($\mu\text{g/L}$):** Nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10 (by mass).
- **Chlorophyll-uncorrected ($\mu\text{g/L}$):** Chlorophyll concentrations are used to measure relative abundances of open water algae.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filtered out.
- **Specific Conductance ($\mu\text{S/cm@25}^\circ\text{C}$), Salinity (ppt):** Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.

Table 2. Long-term trophic state data collected monthly by LAKEWATCH volunteers and color and specific conductance/salinity (collected quarterly).

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus ($\mu\text{g/L}$)	142 - 259	179 (9)
Total Nitrogen ($\mu\text{g/L}$)	572 - 869	747 (9)
Chlorophyll- uncorrected ($\mu\text{g/L}$)	4 - 9	7 (9)
Secchi (ft)	2.8 - 3.2	3.0 (6)
Secchi (m)	0.8 - 1.0	0.9 (6)
Color (Pt-Co Units)	12 - 44	24 (8)
Specific Conductance ($\mu\text{S/cm@25 C}$)	10000 - 38105	22532 (5)
Salinity (ppt)	6 - 24	14 (5)

Figure 2. Breakers trend plots of year by average. The R^2 value indicates the strength of the relations (ranges from 0.0 to 1.0; higher the R^2 the stronger the relation) and the p value indicates if the relation is significant ($p < 0.05$ is significant). Total phosphorus (TP Decreasing, $R^2 = 0.61$, $p = 0.01$), total nitrogen (TN No Trend, $R^2 = 0.21$, $p = 0.21$), chlorophyll (CHL No Trend, $R^2 = 0.18$, $p = 0.26$) and Secchi depth (Secchi No Trend, $R^2 = 0.46$, $p = 0.14$).



LAKEWATCH Report for Candia in Charlotte County
Estuary and Estuary Segment: Charlotte Harbor/Estero Bay Charlotte Harbor Proper
Using Data Downloaded 12/9/2022

Introduction for Estuaries

This report summarizes data collected on systems that have been part of the LAKEWATCH program. Data are from the period of record for individual systems. The first part of this summary lists background data for each system, the second part lists the long-term data averages and ranges and the final part are trend plots for nutrients, chlorophyll, and Secchi depth. **Plots were only made for systems with five or more years of data.**

The near shore Florida coastline is separated into estuary and estuary segments within the estuary. Deeper coastal waters are separated into coastal nutrient regions and coastal nutrient segments within the regions. Numeric nutrient criteria are established for all estuary segments, including criteria for total nitrogen, total phosphorus, and chlorophyll *a*. For open ocean coastal waters, numeric criteria are established for chlorophyll *a*, that is derived from satellite remote sensing techniques. For those locations without defined segments there are narrative nutrient criteria (e.g., Florida Keys Halo Zone).

The maps defining individual estuaries and coastal segments can be found at the following link:
<https://www.flrules.org/Gateway/reference.asp?No=Ref-05420>

The individual nutrient criteria can be found at the following link:
<https://www.flrules.org/gateway/RuleNo.asp?title=SURFACE%20WATER%20QUALITY%20STANDARDS&ID=62-302.532>

Base File Data for Estuaries: Definitions:

- **County:** Name of county adjacent to the system.
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- **GNIS Number:** Number created by USGS's Geographic Names Information System.
- **Water Body Type:** Four different types of systems; lakes, estuaries, river/streams and springs.
- **Period of Record (years):** Number of years a system has been in the LAKEWATCH program.
- **Latitude and Longitude:** Coordinates identifying the exact location of station 1 for each system.

Table 1. Base File Data.

County	Charlotte
Name	Candia
GNIS Number	
Water Body Type	Estuary
Period of Record (years, range)	11 (2009 to 2019)
Latitude	26.8969
Longitude	-82.0443

Long-Term Data for Estuaries: Definitions

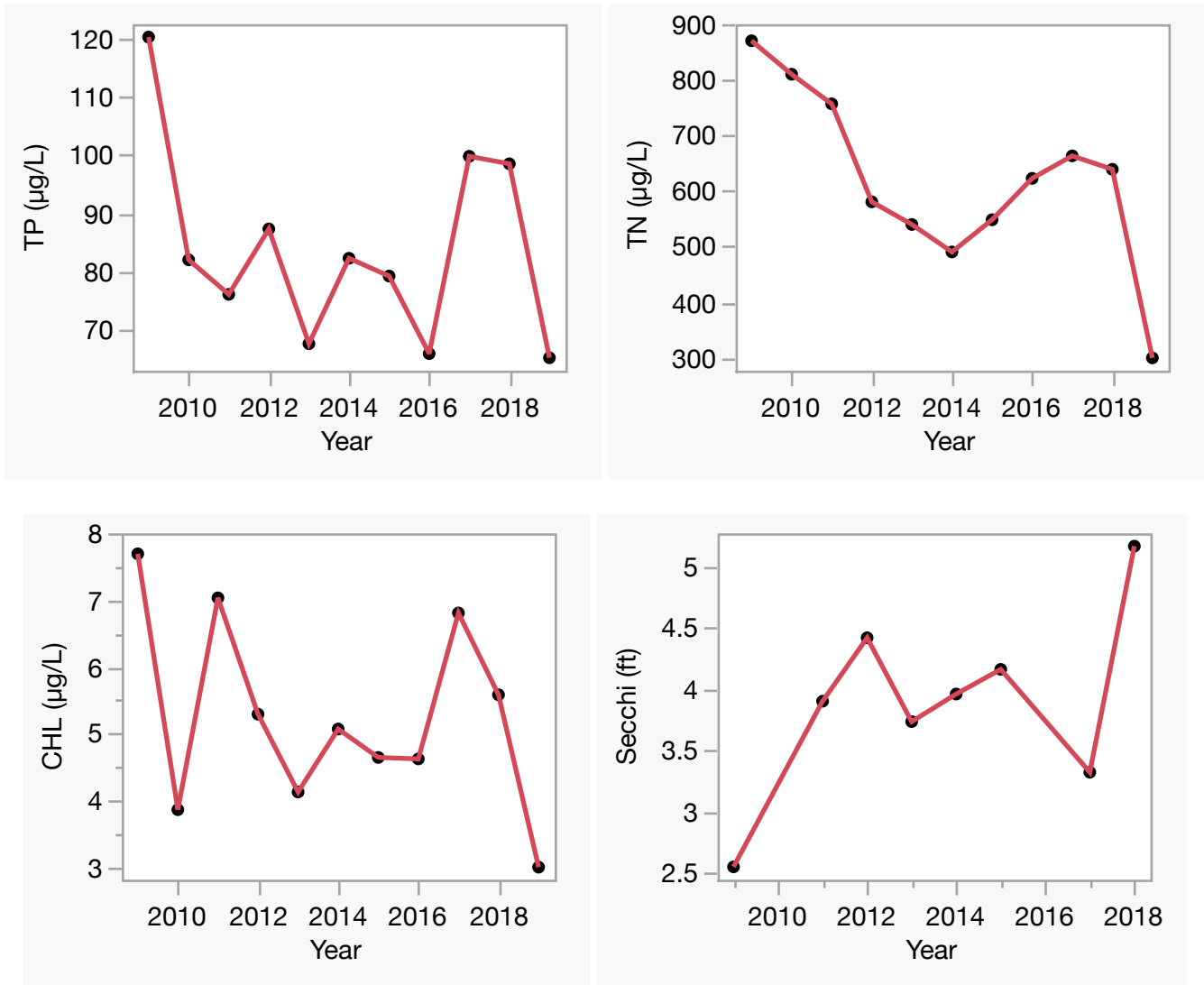
The following long-term data are the primary trophic state parameters collected by LAKEWATCH volunteers and classification variables color and specific conductance (LAKEWATCH recently began analyzing samples quarterly for color and specific conductance):

- **Total Phosphorus ($\mu\text{g/L}$):** Nutrient most often limiting growth of plant/algae.
- **Total Nitrogen ($\mu\text{g/L}$):** Nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10 (by mass).
- **Chlorophyll-uncorrected ($\mu\text{g/L}$):** Chlorophyll concentrations are used to measure relative abundances of open water algae.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filtered out.
- **Specific Conductance ($\mu\text{S/cm@25}^\circ\text{C}$), Salinity (ppt):** Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.

Table 2. Long-term trophic state data collected monthly by LAKEWATCH volunteers and color and specific conductance/salinity (collected quarterly).

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus ($\mu\text{g/L}$)	65 - 120	82 (11)
Total Nitrogen ($\mu\text{g/L}$)	300 - 870	599 (11)
Chlorophyll- uncorrected ($\mu\text{g/L}$)	3 - 8	5 (11)
Secchi (ft)	2.5 - 5.2	3.8 (8)
Secchi (m)	0.8 - 1.6	1.2 (8)
Color (Pt-Co Units)	11 - 41	24 (10)
Specific Conductance ($\mu\text{S/cm@25 C}$)	2843 - 25303	16015 (7)
Salinity (ppt)	1 - 15	10 (7)

Figure 2. Candia trend plots of year by average. The R^2 value indicates the strength of the relations (ranges from 0.0 to 1.0; higher the R^2 the stronger the relation) and the p value indicates if the relation is significant ($p < 0.05$ is significant). Total phosphorus (TP No Trend, $R^2 = 0.09$, $p = 0.36$), total nitrogen (TN Decreasing, $R^2 = 0.50$, $p = 0.01$), chlorophyll (CHL No Trend, $R^2 = 0.14$, $p = 0.25$) and Secchi depth (Secchi No Trend, $R^2 = 0.34$, $p = 0.13$).



**LAKEWATCH Report for Colony Point in Charlotte County
Estuary and Estuary Segment: Charlotte Harbor/Estero Bay Charlotte Harbor Proper
Using Data Downloaded 12/9/2022**

Introduction for Estuaries

This report summarizes data collected on systems that have been part of the LAKEWATCH program. Data are from the period of record for individual systems. The first part of this summary lists background data for each system, the second part lists the long-term data averages and ranges and the final part are trend plots for nutrients, chlorophyll, and Secchi depth. **Plots were only made for systems with five or more years of data.**

The near shore Florida coastline is separated into estuary and estuary segments within the estuary. Deeper coastal waters are separated into coastal nutrient regions and coastal nutrient segments within the regions. Numeric nutrient criteria are established for all estuary segments, including criteria for total nitrogen, total phosphorus, and chlorophyll *a*. For open ocean coastal waters, numeric criteria are established for chlorophyll *a*, that is derived from satellite remote sensing techniques. For those locations without defined segments there are narrative nutrient criteria (e.g., Florida Keys Halo Zone).

The maps defining individual estuaries and coastal segments can be found at the following link:
<https://www.flrules.org/Gateway/reference.asp?No=Ref-05420>

The individual nutrient criteria can be found at the following link:
<https://www.flrules.org/gateway/RuleNo.asp?title=SURFACE%20WATER%20QUALITY%20STANDARDS&ID=62-302.532>

Base File Data for Estuaries: Definitions:

- **County:** Name of county adjacent to the system.
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- **GNIS Number:** Number created by USGS's Geographic Names Information System.
- **Water Body Type:** Four different types of systems; lakes, estuaries, river/streams and springs.
- **Period of Record (years):** Number of years a system has been in the LAKEWATCH program.
- **Latitude and Longitude:** Coordinates identifying the exact location of station 1 for each system.

Table 1. Base File Data.

County	Charlotte
Name	Colony Point
GNIS Number	
Water Body Type	Estuary
Period of Record (years, range)	6 (2009 to 2014)
Latitude	26.9098
Longitude	-82.0868

Long-Term Data for Estuaries: Definitions

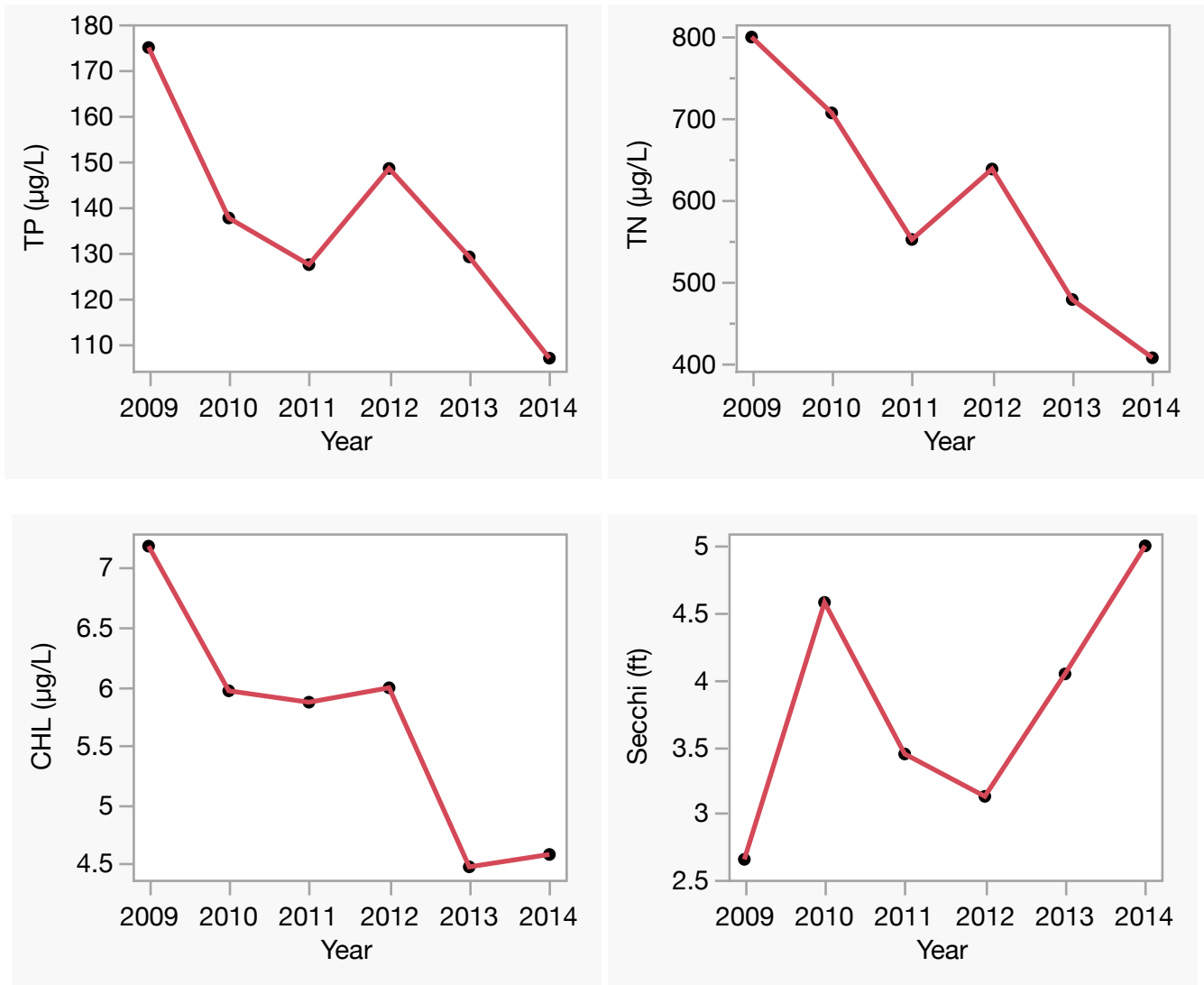
The following long-term data are the primary trophic state parameters collected by LAKEWATCH volunteers and classification variables color and specific conductance (LAKEWATCH recently began analyzing samples quarterly for color and specific conductance):

- **Total Phosphorus ($\mu\text{g/L}$):** Nutrient most often limiting growth of plant/algae.
- **Total Nitrogen ($\mu\text{g/L}$):** Nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10 (by mass).
- **Chlorophyll-uncorrected ($\mu\text{g/L}$):** Chlorophyll concentrations are used to measure relative abundances of open water algae.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filtered out.
- **Specific Conductance ($\mu\text{S/cm@25}^\circ\text{C}$), Salinity (ppt):** Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.

Table 2. Long-term trophic state data collected monthly by LAKEWATCH volunteers and color and specific conductance/salinity (collected quarterly).

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus ($\mu\text{g/L}$)	107 - 175	136 (6)
Total Nitrogen ($\mu\text{g/L}$)	408 - 798	581 (6)
Chlorophyll- uncorrected ($\mu\text{g/L}$)	4 - 7	6 (6)
Secchi (ft)	2.7 - 5.0	3.7 (6)
Secchi (m)	0.8 - 1.5	1.1 (6)
Color (Pt-Co Units)	15 - 42	25 (5)
Specific Conductance ($\mu\text{S/cm@25 C}$)	31572 - 31572	31572 (1)
Salinity (ppt)	20 - 20	20 (1)

Figure 2. Colony Point trend plots of year by average. The R^2 value indicates the strength of the relations (ranges from 0.0 to 1.0; higher the R^2 the stronger the relation) and the p value indicates if the relation is significant ($p < 0.05$ is significant). Total phosphorus (TP No Trend, $R^2 = 0.65$, $p = 0.05$), total nitrogen (TN Decreasing, $R^2 = 0.88$, $p = 0.01$), chlorophyll (CHL Decreasing, $R^2 = 0.84$, $p = 0.01$) and Secchi depth (Secchi No Trend, $R^2 = 0.34$, $p = 0.22$).



LAKEWATCH Report for LC-1 in Charlotte County
Estuary and Estuary Segment: Charlotte Harbor/Estero Bay Lower Lemon Bay
Using Data Downloaded 12/9/2022

Introduction for Estuaries

This report summarizes data collected on systems that have been part of the LAKEWATCH program. Data are from the period of record for individual systems. The first part of this summary lists background data for each system, the second part lists the long-term data averages and ranges and the final part are trend plots for nutrients, chlorophyll, and Secchi depth. **Plots were only made for systems with five or more years of data.**

The near shore Florida coastline is separated into estuary and estuary segments within the estuary. Deeper coastal waters are separated into coastal nutrient regions and coastal nutrient segments within the regions. Numeric nutrient criteria are established for all estuary segments, including criteria for total nitrogen, total phosphorus, and chlorophyll *a*. For open ocean coastal waters, numeric criteria are established for chlorophyll *a*, that is derived from satellite remote sensing techniques. For those locations without defined segments there are narrative nutrient criteria (e.g., Florida Keys Halo Zone).

The maps defining individual estuaries and coastal segments can be found at the following link:
<https://www.flrules.org/Gateway/reference.asp?No=Ref-05420>

The individual nutrient criteria can be found at the following link:
<https://www.flrules.org/gateway/RuleNo.asp?title=SURFACE%20WATER%20QUALITY%20STANDARDS&ID=62-302.532>

Base File Data for Estuaries: Definitions:

- **County:** Name of county adjacent to the system.
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- **GNIS Number:** Number created by USGS's Geographic Names Information System.
- **Water Body Type:** Four different types of systems; lakes, estuaries, river/streams and springs.
- **Period of Record (years):** Number of years a system has been in the LAKEWATCH program.
- **Latitude and Longitude:** Coordinates identifying the exact location of station 1 for each system.

Table 1. Base File Data.

County	Charlotte
Name	LC-1
GNIS Number	
Water Body Type	Estuary
Period of Record (years, range)	12 (2011 to 2022)
Latitude	26.8806
Longitude	-82.3081

Long-Term Data for Estuaries: Definitions

The following long-term data are the primary trophic state parameters collected by LAKEWATCH volunteers and classification variables color and specific conductance (LAKEWATCH recently began analyzing samples quarterly for color and specific conductance):

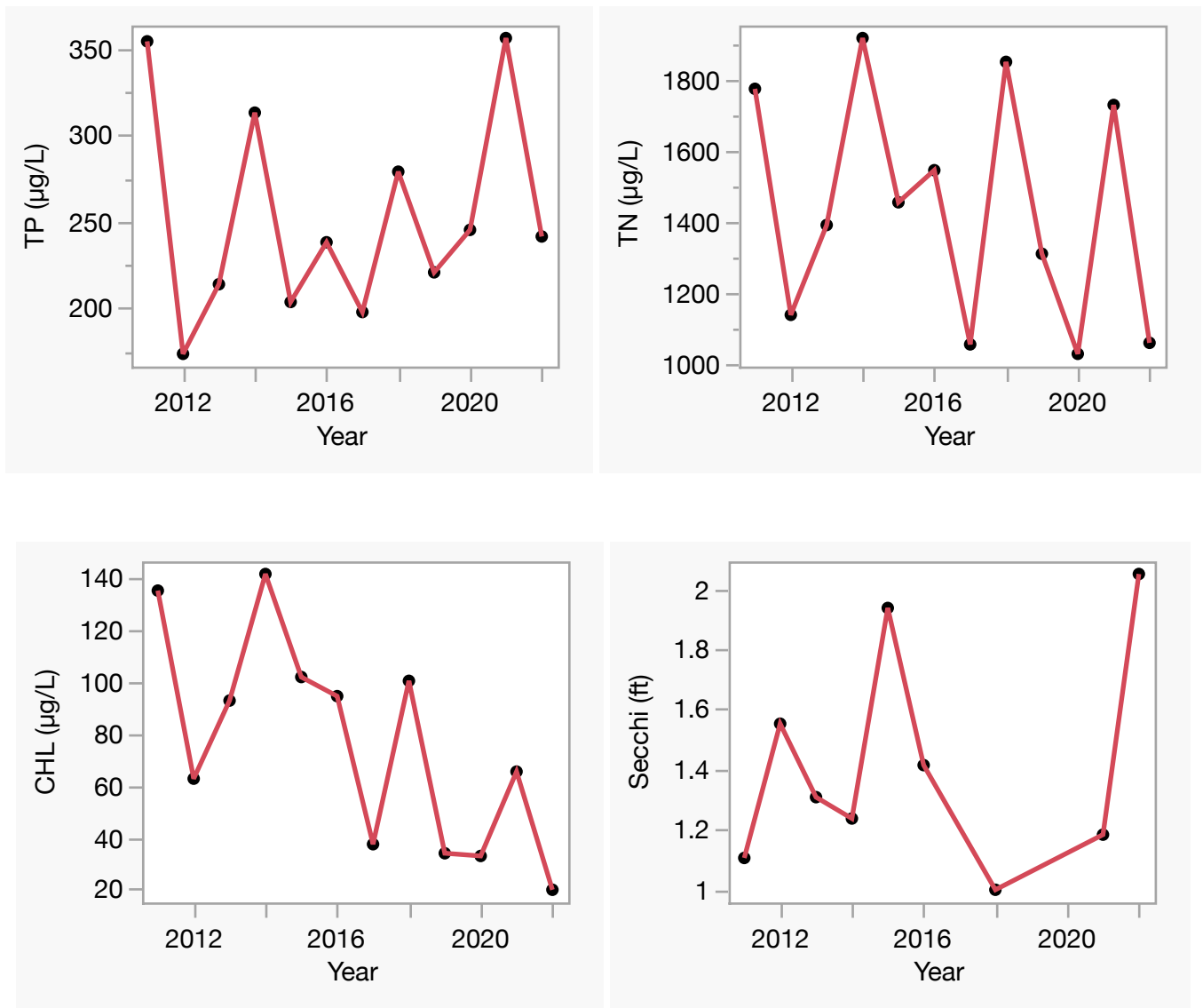
- **Total Phosphorus (µg/L):** Nutrient most often limiting growth of plant/algae.

- **Total Nitrogen ($\mu\text{g/L}$):** Nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10 (by mass).
- **Chlorophyll-uncorrected ($\mu\text{g/L}$):** Chlorophyll concentrations are used to measure relative abundances of open water algae.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filtered out.
- **Specific Conductance ($\mu\text{S/cm@25}^\circ\text{C}$), Salinity (ppt):** Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.

Table 2. Long-term trophic state data collected monthly by LAKEWATCH volunteers and color and specific conductance/salinity (collected quarterly).

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus ($\mu\text{g/L}$)	174 - 356	247 (12)
Total Nitrogen ($\mu\text{g/L}$)	1030 - 1920	1406 (12)
Chlorophyll- uncorrected ($\mu\text{g/L}$)	20 - 142	65 (12)
Secchi (ft)	1.0 - 2.0	1.4 (9)
Secchi (m)	0.3 - 0.6	0.4 (9)
Color (Pt-Co Units)	54 - 109	68 (10)
Specific Conductance ($\mu\text{S/cm@25 C}$)	2540 - 37938	17667 (10)
Salinity (ppt)	1 - 24	10 (10)

Figure 2. LC-1 trend plots of year by average. The R^2 value indicates the strength of the relations (ranges from 0.0 to 1.0; higher the R^2 the stronger the relation) and the p value indicates if the relation is significant ($p < 0.05$ is significant). Total phosphorus (TP No Trend, $R^2 = 0.01$, $p = 0.82$), total nitrogen (TN No Trend, $R^2 = 0.08$, $p = 0.37$), chlorophyll (CHL Decreasing, $R^2 = 0.49$, $p = 0.01$) and Secchi depth (Secchi No Trend, $R^2 = 0.07$, $p = 0.49$).



LAKEWATCH Report for LC-2 in Charlotte County
Estuary and Estuary Segment: Charlotte Harbor/Estero Bay Lower Lemon Bay
Using Data Downloaded 12/9/2022

Introduction for Estuaries

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The near shore Florida coastline is separated into estuary and estuary segments within the estuary. Deeper coastal waters are separated into coastal nutrient regions and coastal nutrient segments within the regions. Numeric nutrient criteria are established for all estuary segments, including criteria for total nitrogen, total phosphorus, and chlorophyll *a*. For open ocean coastal waters, numeric criteria are established for chlorophyll *a*, that is derived from satellite remote sensing techniques. For those locations without defined segments there are narrative nutrient criteria (e.g., Florida Keys Halo Zone).

The maps defining individual estuaries and coastal segments can be found at the following link:
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The individual nutrient criteria can be found at the following link:
<https://www.flrules.org/gateway/RuleNo.asp?title=SURFACE%20WATER%20QUALITY%20STANDARDS&ID=62-302.532>

Base File Data for Estuaries: Definitions:

- **County:** Name of county adjacent to the system.
- **Name:** System name that LAKEWATCH uses for the station.
- **GNIS Number:** Number created by USGS's Geographic Names Information System.
- **Water Body Type:** Four different types of systems; lakes, estuaries, river/streams and springs.
- **Period of Record (years):** Number of years a system has been in the LAKEWATCH program.
- **Latitude and Longitude:** Coordinates identifying the exact location of station 1 for each system.

Table 1. Base File Data.

County	Charlotte
Name	LC-2
GNIS Number	
Water Body Type	Estuary
Period of Record (years, range)	12 (2011 to 2022)
Latitude	26.8789
Longitude	-82.3084

Long-Term Data for Estuaries: Definitions

The following long-term data are the primary trophic state parameters collected by LAKEWATCH volunteers and classification variables color and specific conductance (LAKEWATCH recently began analyzing samples quarterly for color and specific conductance):

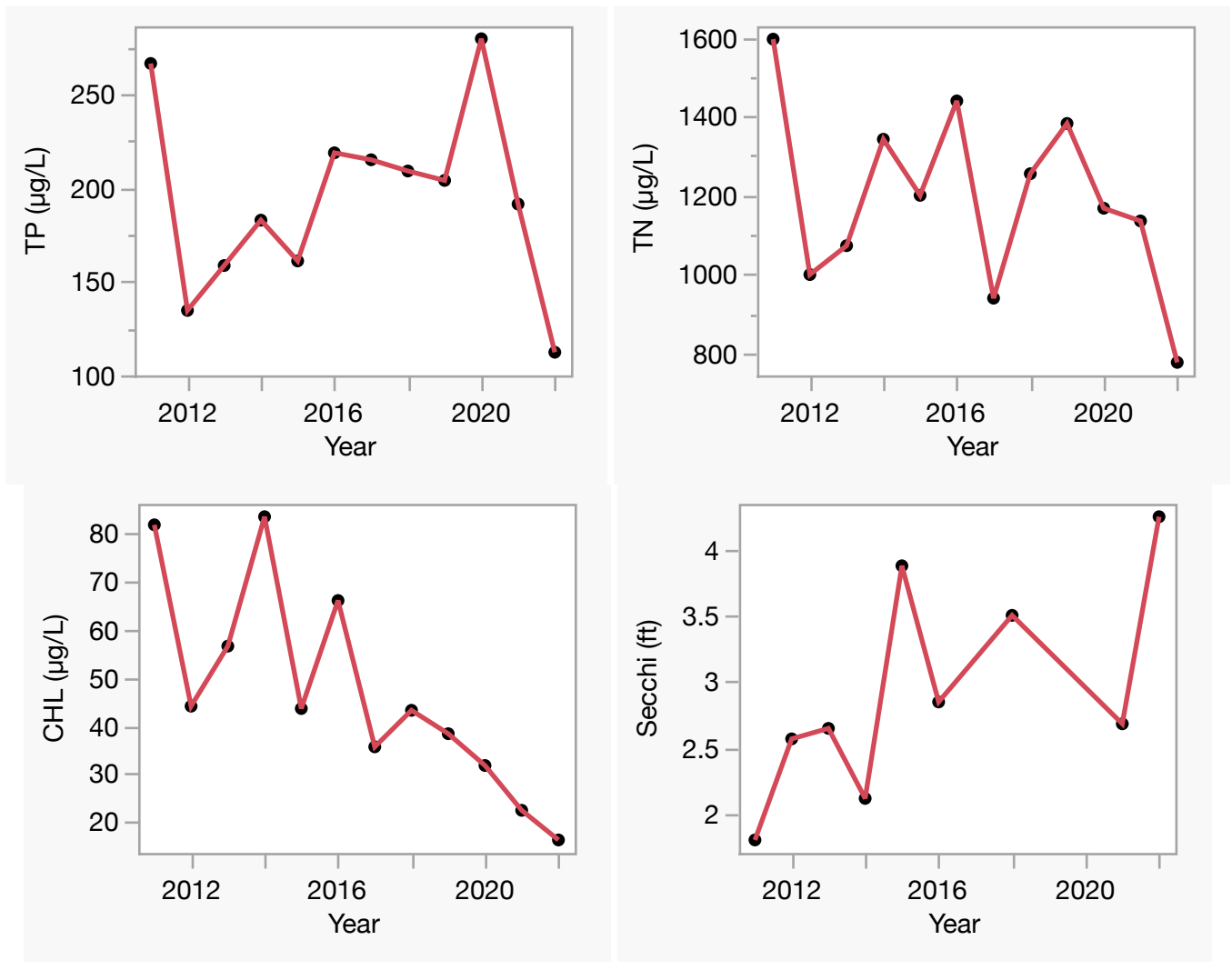
- **Total Phosphorus (µg/L):** Nutrient most often limiting growth of plant/algae.

- **Total Nitrogen ($\mu\text{g/L}$):** Nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10 (by mass).
- **Chlorophyll-uncorrected ($\mu\text{g/L}$):** Chlorophyll concentrations are used to measure relative abundances of open water algae.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filtered out.
- **Specific Conductance ($\mu\text{S/cm@25}^\circ\text{C}$), Salinity (ppt):** Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.

Table 2. Long-term trophic state data collected monthly by LAKEWATCH volunteers and color and specific conductance/salinity (collected quarterly).

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus ($\mu\text{g/L}$)	112 - 280	189 (12)
Total Nitrogen ($\mu\text{g/L}$)	777 - 1595	1171 (12)
Chlorophyll- uncorrected ($\mu\text{g/L}$)	16 - 84	42 (12)
Secchi (ft)	1.8 - 4.2	2.8 (9)
Secchi (m)	0.6 - 1.3	0.9 (9)
Color (Pt-Co Units)	46 - 147	65 (11)
Specific Conductance ($\mu\text{S/cm@25 C}$)	11000 - 41087	28683 (11)
Salinity (ppt)	7 - 26	18 (11)

Figure 2. LC-2 trend plots of year by average. The R^2 value indicates the strength of the relations (ranges from 0.0 to 1.0; higher the R^2 the stronger the relation) and the p value indicates if the relation is significant ($p < 0.05$ is significant). Total phosphorus (TP No Trend, $R^2 = 0.00$, $p = 0.94$), total nitrogen (TN No Trend, $R^2 = 0.16$, $p = 0.20$), chlorophyll (CHL Decreasing, $R^2 = 0.63$, $p = 0.00$) and Secchi depth (Secchi No Trend, $R^2 = 0.44$, $p = 0.05$).



LAKEWATCH Report for LC-3 in Charlotte County
Estuary and Estuary Segment: Charlotte Harbor/Estero Bay Lower Lemon Bay
Using Data Downloaded 12/9/2022

Introduction for Estuaries

This report summarizes data collected on systems that have been part of the LAKEWATCH program. Data are from the period of record for individual systems. The first part of this summary lists background data for each system, the second part lists the long-term data averages and ranges and the final part are trend plots for nutrients, chlorophyll, and Secchi depth. **Plots were only made for systems with five or more years of data.**

The near shore Florida coastline is separated into estuary and estuary segments within the estuary. Deeper coastal waters are separated into coastal nutrient regions and coastal nutrient segments within the regions. Numeric nutrient criteria are established for all estuary segments, including criteria for total nitrogen, total phosphorus, and chlorophyll *a*. For open ocean coastal waters, numeric criteria are established for chlorophyll *a*, that is derived from satellite remote sensing techniques. For those locations without defined segments there are narrative nutrient criteria (e.g., Florida Keys Halo Zone).

The maps defining individual estuaries and coastal segments can be found at the following link:
<https://www.flrules.org/Gateway/reference.asp?No=Ref-05420>

The individual nutrient criteria can be found at the following link:
<https://www.flrules.org/gateway/RuleNo.asp?title=SURFACE%20WATER%20QUALITY%20STANDARDS&ID=62-302.532>

Base File Data for Estuaries: Definitions:

- **County:** Name of county adjacent to the system.
- **Name:** System name that LAKEWATCH uses for the station.
- **GNIS Number:** Number created by USGS's Geographic Names Information System.
- **Water Body Type:** Four different types of systems; lakes, estuaries, river/streams and springs.
- **Period of Record (years):** Number of years a system has been in the LAKEWATCH program.
- **Latitude and Longitude:** Coordinates identifying the exact location of station 1 for each system.

Table 1. Base File Data.

County	Charlotte
Name	LC-3
GNIS Number	
Water Body Type	Estuary
Period of Record (years, range)	12 (2011 to 2022)
Latitude	26.8780
Longitude	-82.3080

Long-Term Data for Estuaries: Definitions

The following long-term data are the primary trophic state parameters collected by LAKEWATCH volunteers and classification variables color and specific conductance (LAKEWATCH recently began analyzing samples quarterly for color and specific conductance):

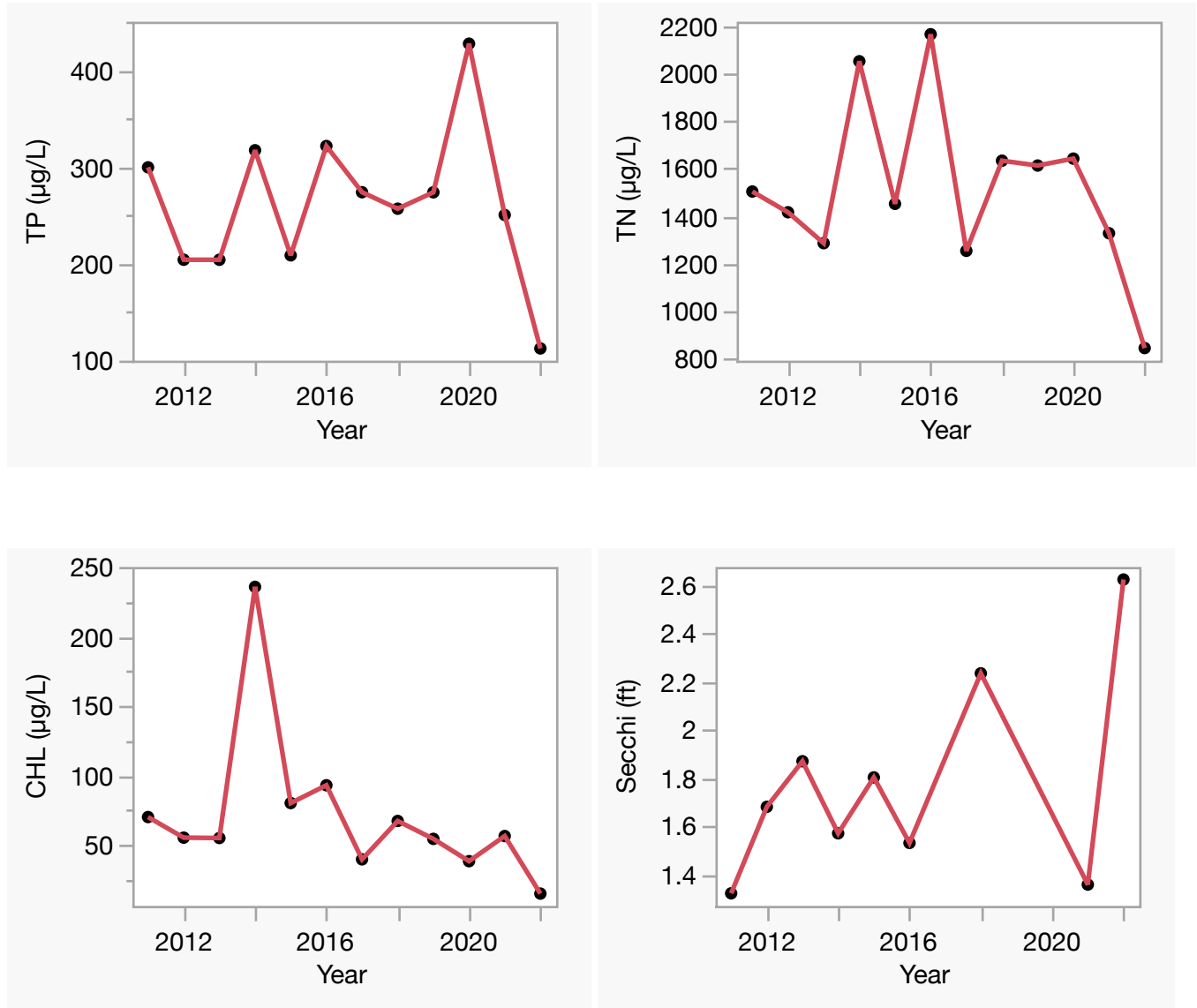
- **Total Phosphorus (µg/L):** Nutrient most often limiting growth of plant/algae.

- **Total Nitrogen ($\mu\text{g/L}$):** Nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10 (by mass).
- **Chlorophyll-uncorrected ($\mu\text{g/L}$):** Chlorophyll concentrations are used to measure relative abundances of open water algae.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filtered out.
- **Specific Conductance ($\mu\text{S/cm@25}^\circ\text{C}$), Salinity (ppt):** Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.

Table 2. Long-term trophic state data collected monthly by LAKEWATCH volunteers and color and specific conductance/salinity (collected quarterly).

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus ($\mu\text{g/L}$)	112 - 427	251 (12)
Total Nitrogen ($\mu\text{g/L}$)	841 - 2169	1476 (12)
Chlorophyll- uncorrected ($\mu\text{g/L}$)	15 - 236	59 (12)
Secchi (ft)	1.3 - 2.6	1.7 (9)
Secchi (m)	0.4 - 0.8	0.5 (9)
Color (Pt-Co Units)	58 - 357	80 (11)
Specific Conductance ($\mu\text{S/cm@25 C}$)	13000 - 38079	28000 (11)
Salinity (ppt)	8 - 24	17 (11)

Figure 2. LC-3 trend plots of year by average. The R^2 value indicates the strength of the relations (ranges from 0.0 to 1.0; higher the R^2 the stronger the relation) and the p value indicates if the relation is significant ($p < 0.05$ is significant). Total phosphorus (TP No Trend, $R^2 = 0.00$, $p = 0.92$), total nitrogen (TN No Trend, $R^2 = 0.08$, $p = 0.36$), chlorophyll (CHL No Trend, $R^2 = 0.15$, $p = 0.21$) and Secchi depth (Secchi No Trend, $R^2 = 0.26$, $p = 0.16$).



LAKEWATCH Report for Monaco in Charlotte County
Estuary and Estuary Segment: Charlotte Harbor/Estero Bay Charlotte Harbor Proper
Using Data Downloaded 12/9/2022

Introduction for Estuaries

This report summarizes data collected on systems that have been part of the LAKEWATCH program. Data are from the period of record for individual systems. The first part of this summary lists background data for each system, the second part lists the long-term data averages and ranges and the final part are trend plots for nutrients, chlorophyll, and Secchi depth. **Plots were only made for systems with five or more years of data.**

The near shore Florida coastline is separated into estuary and estuary segments within the estuary. Deeper coastal waters are separated into coastal nutrient regions and coastal nutrient segments within the regions. Numeric nutrient criteria are established for all estuary segments, including criteria for total nitrogen, total phosphorus, and chlorophyll *a*. For open ocean coastal waters, numeric criteria are established for chlorophyll *a*, that is derived from satellite remote sensing techniques. For those locations without defined segments there are narrative nutrient criteria (e.g., Florida Keys Halo Zone).

The maps defining individual estuaries and coastal segments can be found at the following link:
<https://www.flrules.org/Gateway/reference.asp?No=Ref-05420>

The individual nutrient criteria can be found at the following link:
<https://www.flrules.org/gateway/RuleNo.asp?title=SURFACE%20WATER%20QUALITY%20STANDARDS&ID=62-302.532>

Base File Data for Estuaries: Definitions:

- **County:** Name of county adjacent to the system.
- **Name:** System name that LAKEWATCH uses for the station.
- **GNIS Number:** Number created by USGS's Geographic Names Information System.
- **Water Body Type:** Four different types of systems; lakes, estuaries, river/streams and springs.
- **Period of Record (years):** Number of years a system has been in the LAKEWATCH program.
- **Latitude and Longitude:** Coordinates identifying the exact location of station 1 for each system.

Table 1. Base File Data.

County	Charlotte
Name	Monaco
GNIS Number	
Water Body Type	Estuary
Period of Record (years, range)	8 (2009 to 2018)
Latitude	26.8825
Longitude	-82.0286

Long-Term Data for Estuaries: Definitions

The following long-term data are the primary trophic state parameters collected by LAKEWATCH volunteers and classification variables color and specific conductance (LAKEWATCH recently began analyzing samples quarterly for color and specific conductance):

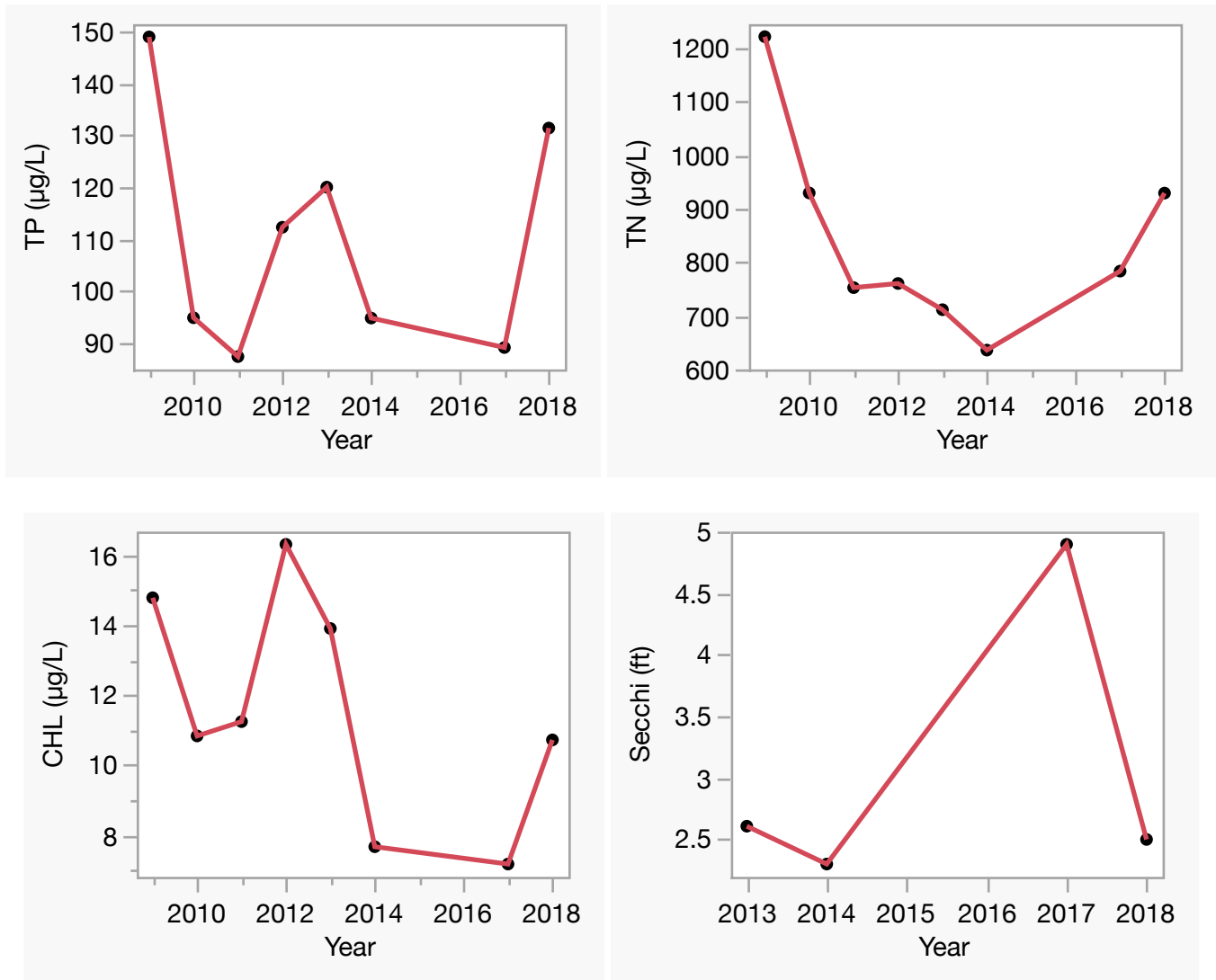
- **Total Phosphorus (µg/L):** Nutrient most often limiting growth of plant/algae.

- **Total Nitrogen ($\mu\text{g/L}$):** Nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10 (by mass).
- **Chlorophyll-uncorrected ($\mu\text{g/L}$):** Chlorophyll concentrations are used to measure relative abundances of open water algae.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filtered out.
- **Specific Conductance ($\mu\text{S/cm@25}^\circ\text{C}$), Salinity (ppt):** Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.

Table 2. Long-term trophic state data collected monthly by LAKEWATCH volunteers and color and specific conductance/salinity (collected quarterly).

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus ($\mu\text{g/L}$)	87 - 149	108 (8)
Total Nitrogen ($\mu\text{g/L}$)	636 - 1222	825 (8)
Chlorophyll- uncorrected ($\mu\text{g/L}$)	7 - 16	11 (8)
Secchi (ft)	2.3 - 4.9	2.9 (4)
Secchi (m)	0.7 - 1.5	0.9 (4)
Color (Pt-Co Units)	20 - 56	29 (7)
Specific Conductance ($\mu\text{S/cm@25 C}$)	3063 - 21228	10541 (4)
Salinity (ppt)	2 - 13	6 (4)

Figure 2. Monaco trend plots of year by average. The R^2 value indicates the strength of the relations (ranges from 0.0 to 1.0; higher the R^2 the stronger the relation) and the p value indicates if the relation is significant ($p < 0.05$ is significant). Total phosphorus (TP No Trend, $R^2 = 0.01$, $p = 0.78$), total nitrogen (TN No Trend, $R^2 = 0.14$, $p = 0.37$), chlorophyll (CHL No Trend, $R^2 = 0.31$, $p = 0.15$) and Secchi depth (Secchi No Trend, $R^2 = 0.17$, $p = 0.58$).



**LAKEWATCH Report for Nature Park in Charlotte County
Estuary and Estuary Segment: Charlotte Harbor/Estero Bay Charlotte Harbor Proper
Using Data Downloaded 12/9/2022**

Introduction for Estuaries

This report summarizes data collected on systems that have been part of the LAKEWATCH program. Data are from the period of record for individual systems. The first part of this summary lists background data for each system, the second part lists the long-term data averages and ranges and the final part are trend plots for nutrients, chlorophyll, and Secchi depth. **Plots were only made for systems with five or more years of data.**

The near shore Florida coastline is separated into estuary and estuary segments within the estuary. Deeper coastal waters are separated into coastal nutrient regions and coastal nutrient segments within the regions. Numeric nutrient criteria are established for all estuary segments, including criteria for total nitrogen, total phosphorus, and chlorophyll *a*. For open ocean coastal waters, numeric criteria are established for chlorophyll *a*, that is derived from satellite remote sensing techniques. For those locations without defined segments there are narrative nutrient criteria (e.g., Florida Keys Halo Zone).

The maps defining individual estuaries and coastal segments can be found at the following link:
<https://www.flrules.org/Gateway/reference.asp?No=Ref-05420>

The individual nutrient criteria can be found at the following link:
<https://www.flrules.org/gateway/RuleNo.asp?title=SURFACE%20WATER%20QUALITY%20STANDARDS&ID=62-302.532>

Base File Data for Estuaries: Definitions:

- **County:** Name of county adjacent to the system.
- **Name:** System name that LAKEWATCH uses for the station.
- **GNIS Number:** Number created by USGS's Geographic Names Information System.
- **Water Body Type:** Four different types of systems; lakes, estuaries, river/streams and springs.
- **Period of Record (years):** Number of years a system has been in the LAKEWATCH program.
- **Latitude and Longitude:** Coordinates identifying the exact location of station 1 for each system.

Table 1. Base File Data.

County	Charlotte
Name	Nature Park
GNIS Number	
Water Body Type	Estuary
Period of Record (years, range)	8 (2009 to 2016)
Latitude	26.9089
Longitude	-82.0667

Long-Term Data for Estuaries: Definitions

The following long-term data are the primary trophic state parameters collected by LAKEWATCH volunteers and classification variables color and specific conductance (LAKEWATCH recently began analyzing samples quarterly for color and specific conductance):

- **Total Phosphorus ($\mu\text{g/L}$):** Nutrient most often limiting growth of plant/algae.
- **Total Nitrogen ($\mu\text{g/L}$):** Nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10 (by mass).
- **Chlorophyll-uncorrected ($\mu\text{g/L}$):** Chlorophyll concentrations are used to measure relative abundances of open water algae.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filtered out.
- **Specific Conductance ($\mu\text{S/cm@25}^\circ\text{C}$), Salinity (ppt):** Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.

Table 2. Long-term trophic state data collected monthly by LAKEWATCH volunteers and color and specific conductance/salinity (collected quarterly).

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus ($\mu\text{g/L}$)	84 - 130	109 (8)
Total Nitrogen ($\mu\text{g/L}$)	525 - 734	614 (8)
Chlorophyll- uncorrected ($\mu\text{g/L}$)	2 - 5	3 (8)
Secchi (ft)	5.4 - 5.4	5.4 (1)
Secchi (m)	1.6 - 1.6	1.6 (1)
Color (Pt-Co Units)	15 - 34	23 (8)
Specific Conductance ($\mu\text{S/cm@25 C}$)	9000 - 29425	20086 (5)
Salinity (ppt)	5 - 18	12 (5)

Figure 2. Nature Park trend plots of year by average. The R^2 value indicates the strength of the relations (ranges from 0.0 to 1.0; higher the R^2 the stronger the relation) and the p value indicates if the relation is significant ($p < 0.05$ is significant). Total phosphorus (TP No Trend, $R^2 = 0.45$, $p = 0.07$), total nitrogen (TN No Trend, $R^2 = 0.03$, $p = 0.66$), chlorophyll (CHL No Trend, $R^2 = 0.05$, $p = 0.59$) and Secchi depth (Secchi No Trend, $R^2 = , p = .$).

