Florida LAKEWATCH Report for Albright in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	15 - 21	18 (2)
Total Nitrogen (µg/L)	905 - 1098	997 (2)
Chlorophyll- uncorrected (μ g/L)	3 - 4	4 (2)
Secchi (ft)	5.7 - 5.7	5.7 (1)
Secchi (m)	1.7 - 1.7	1.7 (1)
Color (Pt-Co Units)	53 - 59	56 (2)
Specific Conductance (µS/cm@25 C)	207 - 236	221 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Albright
GNIS Number	300090
Latitude	28.0895
Longitude	-82.4743
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2010 to 2011
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	18 (15 to 21)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	997 (905 to 1098)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Alice in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	1 - 14	6 (18)
Total Nitrogen (µg/L)	60 - 500	231 (18)
Chlorophyll- uncorrected (µg/L)	1 - 4	2 (18)
Secchi (ft)	10.7 - 21.0	13.8 (12)
Secchi (m)	3.3 - 6.4	4.2 (12)
Color (Pt-Co Units)	1 - 14	8 (9)
Specific Conductance (µS/cm@25 C)	122 - 141	132 (7)
Lake Classification	Clear Hardwater	

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- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
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- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Alice
GNIS Number	277746
Latitude	28.1351
Longitude	-82.6040
Water Body Type	Lake
Surface Area (ha and acre)	38 ha or 93 acre
Period of Record (year)	1990 to 2022
Lake Trophic Status (CHL)	Oligotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	6 (1 to 14)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	231 (60 to 500)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
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- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
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- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Alice 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 Increasing, $R^2 = 0.93$, p = 0.00), total nitrogen (TN Increasing, $R^2 = 0.97$, p = 0.00), chlorophyll (CHL Increasing, $R^2 = 0.64$, p = 0.00) and Secchi depth (Secchi Decreasing, $R^2 = 0.63$, p = 0.00).



Florida LAKEWATCH Report for Allen in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

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a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

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- Total Nitrogen (µg/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 (µg/L): Chlorophyll concentrations are used to measure relative abundances of open water algae.
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- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filtered out.
- Specific Conductance (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	19 - 21	20 (2)
Total Nitrogen (µg/L)	874 - 983	927 (2)
Chlorophyll- uncorrected (µg/L)	13 - 15	14 (2)
Secchi (ft)	4.3 - 4.7	4.5 (2)
Secchi (m)	1.3 - 1.4	1.4 (2)
Color (Pt-Co Units)	52 - 52	52 (1)
Specific Conductance (µS/cm@25 C)	213 - 213	213 (1)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Allen
GNIS Number	277759
Latitude	28.1579
Longitude	-82.4873
Water Body Type	Lake
Surface Area (ha and acre)	11 ha or 28 acre
Period of Record (year)	1996 to 2012
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	20 (19 to 21)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	927 (874 to 983)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Armistead in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	12 - 50	26 (31)
Total Nitrogen (µg/L)	552 - 1050	828 (31)
Chlorophyll- uncorrected (µg/L)	4 - 33	10 (31)
Secchi (ft)	2.7 - 6.8	4.1 (31)
Secchi (m)	0.8 - 2.1	1.3 (31)
Color (Pt-Co Units)	39 - 175	88 (18)
Specific Conductance (µS/cm@25 C)	53 - 239	171 (12)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Armistead
GNIS Number	277954
Latitude	28.1029
Longitude	-82.5587
Water Body Type	Lake
Surface Area (ha and acre)	14 ha or 35 acre
Period of Record (year)	1990 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP4
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	26 (12 to 50)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	828 (552 to 1050)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Armistead 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 Increasing, $R^2 = 0.16$, p = 0.03), total nitrogen (TN No Trend, $R^2 = 0.08$, p = 0.13), chlorophyll (CHL Increasing, $R^2 = 0.21$, p = 0.01) and Secchi depth (Secchi Decreasing, $R^2 = 0.30$, p = 0.00).



Florida LAKEWATCH Report for Avila in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	31 - 48	38 (5)
Total Nitrogen (µg/L)	905 - 1270	1002 (5)
Chlorophyll- uncorrected (µg/L)	10 - 22	14 (5)
Secchi (ft)	4.6 - 6.5	5.3 (5)
Secchi (m)	1.4 - 2.0	1.6 (5)
Color (Pt-Co Units)	38 - 55	43 (5)
Specific Conductance (µS/cm@25 C)	328 - 386	365 (5)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Avila
GNIS Number	
Latitude	28.1047
Longitude	-82.4738
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2012 to 2016
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	38 (31 to 48)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1002 (905 to 1270)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Avila 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, $R^2 = 0.41$, p = 0.24), total nitrogen (TN No Trend, $R^2 = 0.53$, p = 0.17), chlorophyll (CHL No Trend, $R^2 = 0.26$, p = 0.38) and Secchi depth (Secchi No Trend, $R^2 = 0.04$, p = 0.75).



Florida LAKEWATCH Report for Bay in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	17 - 27	22 (8)
Total Nitrogen (µg/L)	633 - 938	776 (8)
Chlorophyll- uncorrected (µg/L)	5 - 30	13 (8)
Secchi (ft)	2.3 - 8.0	4.4 (8)
Secchi (m)	0.7 - 2.4	1.3 (8)
Color (Pt-Co Units)	18 - 29	23 (5)
Specific Conductance (µS/cm@25 C)	145 - 185	169 (4)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Bay
GNIS Number	278212
Latitude	28.0720
Longitude	-82.5014
Water Body Type	Lake
Surface Area (ha and acre)	15 ha or 38 acre
Period of Record (year)	1998 to 2011
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	22 (17 to 27)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	776 (633 to 938)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Bay 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, $R^2 = 0.14$, p = 0.37), total nitrogen (TN No Trend, $R^2 = 0.02$, p = 0.75), chlorophyll (CHL No Trend, $R^2 = 0.09$, p = 0.47) and Secchi depth (Secchi No Trend, $R^2 = 0.19$, p = 0.28).



Florida LAKEWATCH Report for Belle Wildlife Pond in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department	of Environm	ental Protec	tion's Nun	neric Nutrier	nt Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	14 - 14	14 (1)
Total Nitrogen (µg/L)	589 - 589	589 (1)
Chlorophyll- uncorrected (µg/L)	7 - 7	7 (1)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Belle Wildlife Pond
GNIS Number	
Latitude	28.0702
Longitude	-82.4927
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1996 to 1996
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	14 (14 to 14)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	589 (589 to 589)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Boot in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	10 - 20	15 (23)	
Total Nitrogen (µg/L)	409 - 777	547 (23)	
Chlorophyll- uncorrected (µg/L)	3 - 13	5 (23)	
Secchi (ft)	4.5 - 12.2	7.8 (23)	
Secchi (m)	1.4 - 3.7	2.4 (23)	
Color (Pt-Co Units)	8 - 19	13 (19)	
Specific Conductance (µS/cm@25 C)	176 - 216	204 (13)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Boot
GNIS Number	279098
Latitude	28.0430
Longitude	-82.4831
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1996 to 2020
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	15 (10 to 20)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	547 (409 to 777)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration
Figure 2. Lake Boot 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, $R^2 = 0.03$, p = 0.42), total nitrogen (TN No Trend, $R^2 = 0.00$, p = 0.81), chlorophyll (CHL Decreasing, $R^2 = 0.18$, p = 0.04) and Secchi depth (Secchi No Trend, $R^2 = 0.04$, p = 0.36).



Florida LAKEWATCH Report for Brant in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	18 - 48	30 (33)	
Total Nitrogen (µg/L)	513 - 1520	920 (33)	
Chlorophyll- uncorrected (µg/L)	5 - 38	15 (33)	
Secchi (ft)	2.9 - 6.4	4.0 (33)	
Secchi (m)	0.9 - 2.0	1.2 (33)	
Color (Pt-Co Units)	15 - 107	54 (22)	
Specific Conductance (µS/cm@25 C)	144 - 229	182 (16)	
Lake Classification	Colored		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Brant
GNIS Number	279339
Latitude	28.1280
Longitude	-82.4716
Water Body Type	Lake
Surface Area (ha and acre)	24 ha or 60 acre
Period of Record (year)	1990 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	30 (18 to 48)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	920 (513 to 1520)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Brant 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, $R^2 = 0.02$, p = 0.43), total nitrogen (TN No Trend, $R^2 = 0.04$, p = 0.29), chlorophyll (CHL No Trend, $R^2 = 0.06$, p = 0.16) and Secchi depth (Secchi No Trend, $R^2 = 0.03$, p = 0.31).



Florida LAKEWATCH Report for Brooker in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	46 - 79	56 (3)
Total Nitrogen (µg/L)	1114 - 1146	1134 (3)
Chlorophyll- uncorrected (µg/L)	43 - 73	52 (3)
Secchi (ft)	2.3 - 2.9	2.5 (3)
Secchi (m)	0.7 - 0.9	0.8 (3)
Color (Pt-Co Units)	65 - 71	68 (2)
Specific Conductance (µS/cm@25 C)	169 - 177	173 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Brooker
GNIS Number	279436
Latitude	28.1601
Longitude	-82.4775
Water Body Type	Lake
Surface Area (ha and acre)	10.5 ha or 26 acre
Period of Record (year)	2017 to 2019
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	56 (46 to 79)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1134 (1114 to 1146)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Buck in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	33 - 116	71 (4)
Total Nitrogen (µg/L)	1134 - 1721	1406 (4)
Chlorophyll- uncorrected (μ g/L)	6 - 61	28 (4)
Secchi (ft)	2.3 - 3.2	2.6 (4)
Secchi (m)	0.7 - 1.0	0.8 (4)
Color (Pt-Co Units)	165 - 212	187 (2)
Specific Conductance (µS/cm@25 C)	47 - 80	62 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Buck
GNIS Number	279573
Latitude	28.1101
Longitude	-82.6206
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	71 (33 to 116)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1406 (1134 to 1721)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Burrell in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	10 - 28	17 (26)	
Total Nitrogen (µg/L)	358 - 858	565 (26)	
Chlorophyll- uncorrected (µg/L)	2 - 19	6 (26)	
Secchi (ft)	1.0 - 9.7	5.2 (26)	
Secchi (m)	0.3 - 3.0	1.6 (26)	
Color (Pt-Co Units)	15 - 49	26 (22)	
Specific Conductance (µS/cm@25 C)	105 - 175	151 (16)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Burrell
GNIS Number	279718
Latitude	28.0975
Longitude	-82.4478
Water Body Type	Lake
Surface Area (ha and acre)	10 ha or 25 acre
Period of Record (year)	1997 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	17 (10 to 28)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	565 (358 to 858)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Burrell 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, $R^2 = 0.06$, p = 0.21), total nitrogen (TN Decreasing, $R^2 = 0.44$, p = 0.00), chlorophyll (CHL No Trend, $R^2 = 0.10$, p = 0.12) and Secchi depth (Secchi Increasing, $R^2 = 0.50$, p = 0.00).



Florida LAKEWATCH Report for Byrd in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	28 - 49	34 (5)
Total Nitrogen (µg/L)	943 - 1290	1084 (5)
Chlorophyll- uncorrected (μ g/L)	14 - 18	15 (5)
Secchi (ft)	3.8 - 4.5	4.2 (5)
Secchi (m)	1.1 - 1.4	1.3 (5)
Color (Pt-Co Units)	56 - 148	89 (3)
Specific Conductance (µS/cm@25 C)	156 - 181	167 (3)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Byrd
GNIS Number	278824
Latitude	28.1025
Longitude	-82.4782
Water Body Type	Lake
Surface Area (ha and acre)	11 ha or 26 acre
Period of Record (year)	2000 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	34 (28 to 49)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1084 (943 to 1290)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Byrd 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, $R^2 = 0.10$, p = 0.60), total nitrogen (TN No Trend, $R^2 = 0.10$, p = 0.61), chlorophyll (CHL No Trend, $R^2 = 0.39$, p = 0.26) and Secchi depth (Secchi No Trend, $R^2 = 0.28$, p = 0.36).



Florida LAKEWATCH Report for Calm in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	5 - 15	9 (16)
Total Nitrogen (µg/L)	197 - 570	351 (16)
Chlorophyll- uncorrected (µg/L)	1 - 7	3 (16)
Secchi (ft)	5.6 - 11.7	9.0 (14)
Secchi (m)	1.7 - 3.6	2.8 (14)
Color (Pt-Co Units)	3 - 12	7 (8)
Specific Conductance (µS/cm@25 C)	124 - 131	129 (3)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Calm
GNIS Number	279847
Latitude	28.1445
Longitude	-82.5825
Water Body Type	Lake
Surface Area (ha and acre)	51 ha or 127 acre
Period of Record (year)	1992 to 2018
Lake Trophic Status (CHL)	Oligotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	9 (5 to 15)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	351 (197 to 570)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Calm 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 Increasing, $R^2 = 0.34$, p = 0.02), total nitrogen (TN Increasing, $R^2 = 0.66$, p = 0.00), chlorophyll (CHL Increasing, $R^2 = 0.44$, p = 0.00) and Secchi depth (Secchi No Trend, $R^2 = 0.03$, p = 0.53).



Florida LAKEWATCH Report for Carlton in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	50 - 62	56 (2)
Total Nitrogen (µg/L)	888 - 1173	1021 (2)
Chlorophyll- uncorrected (µg/L)	10 - 16	12 (2)
Secchi (ft)	1.9 - 2.4	2.2 (2)
Secchi (m)	0.6 - 0.7	0.7 (2)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Carlton
GNIS Number	292525
Latitude	28.1347
Longitude	-82.5396
Water Body Type	Lake
Surface Area (ha and acre)	14 ha or 35 acre
Period of Record (year)	1997 to 1998
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP4
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	56 (50 to 62)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1021 (888 to 1173)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Carlton 2 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	n's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	42 - 61	51 (2)
Total Nitrogen (µg/L)	1093 - 1278	1182 (2)
Chlorophyll- uncorrected (μ g/L)	17 - 28	22 (2)
Secchi (ft)	3.8 - 4.4	4.1 (2)
Secchi (m)	1.1 - 1.3	1.2 (2)
Color (Pt-Co Units)	48 - 48	48 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Carlton 2
GNIS Number	280043
Latitude	27.7142
Longitude	-82.2408
Water Body Type	Lake
Surface Area (ha and acre)	14 ha or 35 acre
Period of Record (year)	2000 to 2001
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP4
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	51 (42 to 61)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1182 (1093 to 1278)


- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Carroll in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	8 - 16	12 (31)
Total Nitrogen (µg/L)	362 - 481	423 (31)
Chlorophyll- uncorrected (µg/L)	1 - 5	3 (31)
Secchi (ft)	8.3 - 18.0	12.1 (31)
Secchi (m)	2.5 - 5.5	3.7 (31)
Color (Pt-Co Units)	7 - 13	10 (22)
Specific Conductance (µS/cm@25 C)	147 - 223	206 (16)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Carroll
GNIS Number	280076
Latitude	28.0484
Longitude	-82.4902
Water Body Type	Lake
Surface Area (ha and acre)	89 ha or 221 acre
Period of Record (year)	1992 to 2022
Lake Trophic Status (CHL)	Oligotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	12 (8 to 16)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	423 (362 to 481)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Carroll 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, $R^2 = 0.07$, p = 0.16), total nitrogen (TN No Trend, $R^2 = 0.01$, p = 0.54), chlorophyll (CHL No Trend, $R^2 = 0.01$, p = 0.59) and Secchi depth (Secchi No Trend, $R^2 = 0.05$, p = 0.22).



Florida LAKEWATCH Report for Carroll Cove in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	11 - 19	15 (4)	
Total Nitrogen (µg/L)	360 - 542	454 (4)	
Chlorophyll- uncorrected (µg/L)	4 - 8	6 (4)	
Secchi (ft)	7.6 - 10.5	9.2 (4)	
Secchi (m)	2.3 - 3.2	2.8 (4)	
Color (Pt-Co Units)	-	(0)	
Specific Conductance (µS/cm@25 C)	-	(0)	
Lake Classification			

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Carroll Cove
GNIS Number	280076
Latitude	28.0473
Longitude	-82.4859
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1996 to 1999
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	15 (11 to 19)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	454 (360 to 542)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Casey in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	9 - 30	21 (8)	
Total Nitrogen (µg/L)	405 - 1055	621 (8)	
Chlorophyll- uncorrected (µg/L)	1 - 24	10 (8)	
Secchi (ft)	0.9 - 7.0	4.0 (8)	
Secchi (m)	0.3 - 2.1	1.2 (8)	
Color (Pt-Co Units)	11 - 18	15 (4)	
Specific Conductance (µS/cm@25 C)	396 - 396	396 (1)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Casey
GNIS Number	
Latitude	28.0535
Longitude	-82.5136
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1996 to 2007
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	21 (9 to 30)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	621 (405 to 1055)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Casey 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, $R^2 = 0.11$, p = 0.43), total nitrogen (TN No Trend, $R^2 = 0.01$, p = 0.86), chlorophyll (CHL No Trend, $R^2 = 0.36$, p = 0.12) and Secchi depth (Secchi No Trend, $R^2 = 0.14$, p = 0.35).



Florida LAKEWATCH Report for Cedar East in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	15 - 66	19 (12)	
Total Nitrogen (µg/L)	472 - 1490	571 (12)	
Chlorophyll- uncorrected (µg/L)	4 - 6	5 (11)	
Secchi (ft)	5.4 - 7.8	6.6 (11)	
Secchi (m)	1.7 - 2.4	2.0 (11)	
Color (Pt-Co Units)	24 - 36	30 (11)	
Specific Conductance (µS/cm@25 C)	152 - 204	172 (9)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Cedar East
GNIS Number	
Latitude	28.0663
Longitude	-82.4707
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2005 to 2017
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	19 (15 to 66)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	571 (472 to 1490)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Cedar East 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, $R^2 = 0.25$, p = 0.09), total nitrogen (TN No Trend, $R^2 = 0.29$, p = 0.07), chlorophyll (CHL No Trend, $R^2 = 0.01$, p = 0.81) and Secchi depth (Secchi No Trend, $R^2 = 0.00$, p = 0.98).



Florida LAKEWATCH Report for Cedar West in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	21 - 58	35 (26)
Total Nitrogen (µg/L)	530 - 1268	848 (26)
Chlorophyll- uncorrected (µg/L)	4 - 36	14 (26)
Secchi (ft)	2.2 - 7.9	4.5 (25)
Secchi (m)	0.7 - 2.4	1.4 (25)
Color (Pt-Co Units)	21 - 31	25 (20)
Specific Conductance (µS/cm@25 C)	174 - 269	224 (16)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Cedar West
GNIS Number	280211
Latitude	28.0661
Longitude	-82.4724
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1996 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	35 (21 to 58)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	848 (530 to 1268)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Cedar West 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, $R^2 = 0.02$, p = 0.49), total nitrogen (TN No Trend, $R^2 = 0.00$, p = 0.76), chlorophyll (CHL No Trend, $R^2 = 0.04$, p = 0.30) and Secchi depth (Secchi Increasing, $R^2 = 0.59$, p = 0.00).



Florida LAKEWATCH Report for Chapman in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 μg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	13 - 57	34 (14)
Total Nitrogen (µg/L)	850 - 1361	1056 (14)
Chlorophyll- uncorrected (μ g/L)	3 - 30	11 (14)
Secchi (ft)	3.6 - 9.6	4.9 (13)
Secchi (m)	1.1 - 2.9	1.5 (13)
Color (Pt-Co Units)	29 - 91	45 (5)
Specific Conductance (µS/cm@25 C)	334 - 365	349 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Chapman
GNIS Number	280308
Latitude	28.1071
Longitude	-82.4646
Water Body Type	Lake
Surface Area (ha and acre)	17 ha or 43 acre
Period of Record (year)	1992 to 2017
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	34 (13 to 57)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1056 (850 to 1361)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Chapman 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, $R^2 = 0.13$, p = 0.20), total nitrogen (TN No Trend, $R^2 = 0.01$, p = 0.74), chlorophyll (CHL Increasing, $R^2 = 0.43$, p = 0.01) and Secchi depth (Secchi Decreasing, $R^2 = 0.33$, p = 0.04).



Florida LAKEWATCH Report for Chapman South in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 μg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	21 - 21	21 (1)
Total Nitrogen (µg/L)	783 - 783	783 (1)
Chlorophyll- uncorrected (µg/L)	3 - 3	3 (1)
Secchi (ft)	5.3 - 5.3	5.3 (1)
Secchi (m)	1.6 - 1.6	1.6 (1)
Color (Pt-Co Units)	32 - 32	32 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Chapman South
GNIS Number	280307
Latitude	27.9470
Longitude	-82.3141
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2003 to 2003
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	21 (21 to 21)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	783 (783 to 783)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Charles in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	36 - 36	<u>36 (1)</u>
Total Nitrogen (µg/L)	865 - 865	865 (1)
Chlorophyll- uncorrected (µg/L)	10 - 10	10 (1)
Secchi (ft)	5.4 - 5.4	5.4 (1)
Secchi (m)	1.6 - 1.6	1.6 (1)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		
The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Charles
GNIS Number	280315
Latitude	28.1165
Longitude	-82.4802
Water Body Type	Lake
Surface Area (ha and acre)	6 ha or 15 acre
Period of Record (year)	1998 to 1998
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	36 (36 to 36)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	865 (865 to 865)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Church in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	11 - 27	16 (26)
Total Nitrogen (µg/L)	443 - 1028	659 (26)
Chlorophyll- uncorrected (µg/L)	2 - 22	6 (26)
Secchi (ft)	3.3 - 10.7	6.3 (24)
Secchi (m)	1.0 - 3.3	1.9 (24)
Color (Pt-Co Units)	11 - 37	20 (15)
Specific Conductance (µS/cm@25 C)	129 - 2243	188 (14)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Church
GNIS Number	280452
Latitude	28.1058
Longitude	-82.6008
Water Body Type	Lake
Surface Area (ha and acre)	28 ha or 68 acre
Period of Record (year)	1990 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	16 (11 to 27)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	659 (443 to 1028)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Church 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, $R^2 = 0.13$, p = 0.07), total nitrogen (TN No Trend, $R^2 = 0.05$, p = 0.30), chlorophyll (CHL Increasing, $R^2 = 0.19$, p = 0.03) and Secchi depth (Secchi Decreasing, $R^2 = 0.44$, p = 0.00).



Florida LAKEWATCH Report for Colebrook in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	23 - 36	29 (2)
Total Nitrogen (µg/L)	1083 - 1244	1161 (2)
Chlorophyll- uncorrected (μ g/L)	3 - 18	7 (2)
Secchi (ft)	4.8 - 6.7	5.7 (2)
Secchi (m)	1.5 - 2.0	1.7 (2)
Color (Pt-Co Units)	49 - 49	49 (1)
Specific Conductance (µS/cm@25 C)	354 - 354	354 (1)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Colebrook
GNIS Number	
Latitude	28.0995
Longitude	-82.4515
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2009 to 2010
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	29 (23 to 36)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1161 (1083 to 1244)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Commiston in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	19 - 38	29 (11)
Total Nitrogen (µg/L)	835 - 1380	1059 (11)
Chlorophyll- uncorrected (µg/L)	8 - 30	13 (11)
Secchi (ft)	2.4 - 5.9	4.2 (11)
Secchi (m)	0.7 - 1.8	1.3 (11)
Color (Pt-Co Units)	32 - 137	70 (7)
Specific Conductance (µS/cm@25 C)	147 - 147	147 (1)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Commiston
GNIS Number	280681
Latitude	28.1478
Longitude	-82.4559
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 2007
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	29 (19 to 38)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1059 (835 to 1380)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Commiston 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, $R^2 = 0.14$, p = 0.27), total nitrogen (TN Increasing, $R^2 = 0.70$, p = 0.00), chlorophyll (CHL Increasing, $R^2 = 0.60$, p = 0.01) and Secchi depth (Secchi Decreasing, $R^2 = 0.82$, p = 0.00).



Florida LAKEWATCH Report for Cool Kell in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	18 - 18	18 (1)
Total Nitrogen (µg/L)	620 - 620	620 (1)
Chlorophyll- uncorrected (µg/L)	4 - 4	4 (1)
Secchi (ft)	9.3 - 9.3	9.3 (1)
Secchi (m)	2.8 - 2.8	2.8 (1)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Cool Kell
GNIS Number	
Latitude	28.1651
Longitude	-82.4504
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2021 to 2021
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	18 (18 to 18)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	620 (620 to 620)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Cooper in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	12 - 24	19 (13)
Total Nitrogen (µg/L)	547 - 1087	815 (13)
Chlorophyll- uncorrected (µg/L)	5 - 26	12 (13)
Secchi (ft)	3.7 - 8.6	5.4 (13)
Secchi (m)	1.1 - 2.6	1.6 (13)
Color (Pt-Co Units)	18 - 58	36 (8)
Specific Conductance (µS/cm@25 C)	170 - 242	194 (8)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Cooper
GNIS Number	280779
Latitude	28.1474
Longitude	-82.4714
Water Body Type	Lake
Surface Area (ha and acre)	33 ha or 82 acre
Period of Record (year)	1996 to 2021
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	19 (12 to 24)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	815 (547 to 1087)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Cooper 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 Increasing, $R^2 = 0.50$, p = 0.01), total nitrogen (TN Increasing, $R^2 = 0.58$, p = 0.00), chlorophyll (CHL Increasing, $R^2 = 0.46$, p = 0.01) and Secchi depth (Secchi Decreasing, $R^2 = 0.38$, p = 0.02).



Florida LAKEWATCH Report for Cory in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	112 - 143	128 (4)
Total Nitrogen (µg/L)	885 - 1072	999 (4)
Chlorophyll- uncorrected (µg/L)	10 - 16	13 (4)
Secchi (ft)	2.8 - 3.4	3.0 (4)
Secchi (m)	0.8 - 1.0	0.9 (4)
Color (Pt-Co Units)	90 - 149	116 (4)
Specific Conductance (µS/cm@25 C)	92 - 120	107 (4)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Cory
GNIS Number	
Latitude	28.1356
Longitude	-82.2980
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2016 to 2019
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	128 (112 to 143)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	999 (885 to 1072)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Country Lakes Pond in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	n's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 μg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	54 - 87	66 (6)
Total Nitrogen (µg/L)	1419 - 2038	1660 (6)
Chlorophyll- uncorrected (μ g/L)	25 - 62	35 (6)
Secchi (ft)	2.5 - 3.9	3.3 (6)
Secchi (m)	0.8 - 1.2	1.0 (6)
Color (Pt-Co Units)	43 - 61	52 (6)
Specific Conductance (µS/cm@25 C)	172 - 205	186 (6)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Country Lakes Pond
GNIS Number	
Latitude	28.0904
Longitude	-82.4671
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2017 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	66 (54 to 87)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1660 (1419 to 2038)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Country Lakes Pond 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, $R^2 = 0.02$, p = 0.79), total nitrogen (TN No Trend, $R^2 = 0.27$, p = 0.29), chlorophyll (CHL No Trend, $R^2 = 0.31$, p = 0.25) and Secchi depth (Secchi Increasing, $R^2 = 0.71$, p = 0.04).



Florida LAKEWATCH Report for Cove in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	37 - 77	50 (22)
Total Nitrogen (µg/L)	887 - 1232	1075 (22)
Chlorophyll- uncorrected (µg/L)	5 - 34	19 (22)
Secchi (ft)	2.7 - 8.3	3.3 (22)
Secchi (m)	0.8 - 2.5	1.0 (22)
Color (Pt-Co Units)	13 - 26	19 (18)
Specific Conductance (µS/cm@25 C)	230 - 334	277 (12)
Lake Classification	Clear Hardwater	
The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Cove
GNIS Number	
Latitude	28.0106
Longitude	-82.6040
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 2019
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP4
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	50 (37 to 77)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1075 (887 to 1232)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Cove 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, $R^2 = 0.28$, p = 0.01), total nitrogen (TN No Trend, $R^2 = 0.02$, p = 0.58), chlorophyll (CHL No Trend, $R^2 = 0.07$, p = 0.25) and Secchi depth (Secchi No Trend, $R^2 = 0.01$, p = 0.65).



Florida LAKEWATCH Report for Crenshaw in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	13 - 31	17 (19)
Total Nitrogen (µg/L)	528 - 1265	689 (19)
Chlorophyll- uncorrected (µg/L)	4 - 17	7 (19)
Secchi (ft)	2.1 - 8.4	5.8 (19)
Secchi (m)	0.7 - 2.6	1.8 (19)
Color (Pt-Co Units)	32 - 88	52 (7)
Specific Conductance (µS/cm@25 C)	97 - 97	97 (1)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Crenshaw
GNIS Number	281028
Latitude	28.1265
Longitude	-82.4972
Water Body Type	Lake
Surface Area (ha and acre)	11 ha or 28 acre
Period of Record (year)	1990 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	17 (13 to 31)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	689 (528 to 1265)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Crenshaw 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, $R^2 = 0.18$, p = 0.07), total nitrogen (TN No Trend, $R^2 = 0.04$, p = 0.43), chlorophyll (CHL No Trend, $R^2 = 0.05$, p = 0.34) and Secchi depth (Secchi No Trend, $R^2 = 0.00$, p = 0.94).



Florida LAKEWATCH Report for Crescent in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 μg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	11 - 25	16 (13)
Total Nitrogen (µg/L)	518 - 712	620 (13)
Chlorophyll- uncorrected (µg/L)	3 - 21	8 (13)
Secchi (ft)	4.4 - 8.1	6.0 (13)
Secchi (m)	1.3 - 2.5	1.8 (13)
Color (Pt-Co Units)	30 - 30	30 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Crescent
GNIS Number	281034
Latitude	28.1598
Longitude	-82.5935
Water Body Type	Lake
Surface Area (ha and acre)	19 ha or 46 acre
Period of Record (year)	1990 to 2002
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	16 (11 to 25)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	620 (518 to 712)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Crescent 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, $R^2 = 0.05$, p = 0.46), total nitrogen (TN No Trend, $R^2 = 0.21$, p = 0.11), chlorophyll (CHL No Trend, $R^2 = 0.00$, p = 0.93) and Secchi depth (Secchi No Trend, $R^2 = 0.07$, p = 0.37).



Florida LAKEWATCH Report for Crum in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
I abic I.	I IVI Iuu	Department			1 5 I vuinci ic	1 vuti itilit	Critteria	ioi ianco.

Long Term Geometric	Annual	Minimum calculated		Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	17 - 33	22 (7)
Total Nitrogen (µg/L)	627 - 1084	779 (7)
Chlorophyll- uncorrected (µg/L)	2 - 15	7 (7)
Secchi (ft)	3.9 - 5.0	4.5 (7)
Secchi (m)	1.2 - 1.5	1.4 (7)
Color (Pt-Co Units)	49 - 122	68 (7)
Specific Conductance (µS/cm@25 C)	115 - 134	123 (5)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Crum
GNIS Number	
Latitude	28.1189
Longitude	-82.5085
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2004 to 2021
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	22 (17 to 33)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	779 (627 to 1084)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Crum 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, $R^2 = 0.69$, p = 0.02), total nitrogen (TN Decreasing, $R^2 = 0.89$, p = 0.00), chlorophyll (CHL No Trend, $R^2 = 0.10$, p = 0.50) and Secchi depth (Secchi No Trend, $R^2 = 0.06$, p = 0.61).



Florida LAKEWATCH Report for Crystal in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum	calculated	Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	10 - 26	18 (14)
Total Nitrogen (µg/L)	586 - 1183	939 (14)
Chlorophyll- uncorrected (µg/L)	2 - 24	10 (14)
Secchi (ft)	2.7 - 9.4	4.8 (14)
Secchi (m)	0.8 - 2.9	1.5 (14)
Color (Pt-Co Units)	12 - 52	34 (11)
Specific Conductance (µS/cm@25 C)	169 - 191	182 (5)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Crystal
GNIS Number	291365
Latitude	28.1347
Longitude	-82.4755
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1998 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	18 (10 to 26)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	939 (586 to 1183)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Crystal 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, $R^2 = 0.20$, p = 0.11), total nitrogen (TN Increasing, $R^2 = 0.60$, p = 0.00), chlorophyll (CHL Increasing, $R^2 = 0.84$, p = 0.00) and Secchi depth (Secchi Decreasing, $R^2 = 0.67$, p = 0.00).



Florida LAKEWATCH Report for Cypress in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum	calculated	Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	5 - 18	11 (20)
Total Nitrogen (µg/L)	225 - 633	488 (20)
Chlorophyll- uncorrected (µg/L)	2 - 11	4 (20)
Secchi (ft)	5.7 - 18.0	9.7 (19)
Secchi (m)	1.7 - 5.5	3.0 (19)
Color (Pt-Co Units)	4 - 37	14 (15)
Specific Conductance (µS/cm@25 C)	193 - 321	261 (9)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Cypress
GNIS Number	277633
Latitude	28.1261
Longitude	-82.5656
Water Body Type	Lake
Surface Area (ha and acre)	7 ha or 17 acre
Period of Record (year)	1996 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	11 (5 to 18)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	488 (225 to 633)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Cypress 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, $R^2 = 0.19$, p = 0.06), total nitrogen (TN Increasing, $R^2 = 0.29$, p = 0.01), chlorophyll (CHL No Trend, $R^2 = 0.06$, p = 0.29) and Secchi depth (Secchi No Trend, $R^2 = 0.08$, p = 0.26).



Florida LAKEWATCH Report for Dan in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum	calculated	Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	14 - 33	21 (14)
Total Nitrogen (µg/L)	687 - 1026	885 (14)
Chlorophyll- uncorrected (µg/L)	3 - 15	9 (14)
Secchi (ft)	3.4 - 5.2	4.3 (14)
Secchi (m)	1.0 - 1.6	1.3 (14)
Color (Pt-Co Units)	17 - 139	65 (14)
Specific Conductance (µS/cm@25 C)	90 - 191	128 (14)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Dan
GNIS Number	281274
Latitude	28.1654
Longitude	-82.6450
Water Body Type	Lake
Surface Area (ha and acre)	14 ha or 35 acre
Period of Record (year)	2009 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	21 (14 to 33)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	885 (687 to 1026)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Dan 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 Increasing, $R^2 = 0.56$, p = 0.00), total nitrogen (TN No Trend, $R^2 = 0.00$, p = 0.97), chlorophyll (CHL No Trend, $R^2 = 0.26$, p = 0.06) and Secchi depth (Secchi No Trend, $R^2 = 0.13$, p = 0.21).



Florida LAKEWATCH Report for Dead Lady in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	25 - 63	46 (32)
Total Nitrogen (µg/L)	771 - 1344	1063 (32)
Chlorophyll- uncorrected (μ g/L)	12 - 69	31 (32)
Secchi (ft)	3.3 - 7.2	4.8 (32)
Secchi (m)	1.0 - 2.2	1.5 (32)
Color (Pt-Co Units)	66 - 154	99 (21)
Specific Conductance (µS/cm@25 C)	116 - 207	148 (15)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Dead Lady
GNIS Number	
Latitude	28.1555
Longitude	-82.5708
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1991 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	46 (25 to 63)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1063 (771 to 1344)


- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Dead Lady 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 Increasing, $R^2 = 0.31$, p = 0.00), total nitrogen (TN No Trend, $R^2 = 0.10$, p = 0.07), chlorophyll (CHL Increasing, $R^2 = 0.29$, p = 0.00) and Secchi depth (Secchi Decreasing, $R^2 = 0.14$, p = 0.04).



Florida LAKEWATCH Report for Deer in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	10 - 23	14 (16)
Total Nitrogen (µg/L)	314 - 797	545 (16)
Chlorophyll- uncorrected (µg/L)	2 - 9	5 (16)
Secchi (ft)	5.0 - 14.2	7.0 (16)
Secchi (m)	1.5 - 4.3	2.1 (16)
Color (Pt-Co Units)	5 - 21	13 (7)
Specific Conductance (µS/cm@25 C)	160 - 201	179 (2)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Deer
GNIS Number	281448
Latitude	28.1690
Longitude	-82.4628
Water Body Type	Lake
Surface Area (ha and acre)	14 ha or 35 acre
Period of Record (year)	1991 to 2018
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	14 (10 to 23)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	545 (314 to 797)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Deer 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, $R^2 = 0.07$, p = 0.32), total nitrogen (TN No Trend, $R^2 = 0.16$, p = 0.12), chlorophyll (CHL No Trend, $R^2 = 0.15$, p = 0.14) and Secchi depth (Secchi Increasing, $R^2 = 0.46$, p = 0.00).



Florida LAKEWATCH Report for Dorothy in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	25 - 57	38 (4)
Total Nitrogen (µg/L)	927 - 1787	1251 (4)
Chlorophyll- uncorrected (µg/L)	6 - 44	15 (4)
Secchi (ft)	2.2 - 4.0	3.0 (3)
Secchi (m)	0.7 - 1.2	0.9 (3)
Color (Pt-Co Units)	16 - 43	24 (3)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Dorothy
GNIS Number	
Latitude	28.0603
Longitude	-82.4801
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2000 to 2003
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	38 (25 to 57)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1251 (927 to 1787)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Dorsett in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	11 - 22	18 (5)
Total Nitrogen (µg/L)	494 - 923	667 (5)
Chlorophyll- uncorrected (µg/L)	3 - 14	5 (5)
Secchi (ft)	5.9 - 14.0	8.0 (4)
Secchi (m)	1.8 - 4.3	2.4 (4)
Color (Pt-Co Units)	19 - 28	22 (3)
Specific Conductance (µS/cm@25 C)	104 - 174	134 (2)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Dorsett
GNIS Number	281686
Latitude	28.0680
Longitude	-82.4742
Water Body Type	Lake
Surface Area (ha and acre)	2 ha or 4 acre
Period of Record (year)	1999 to 2008
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	18 (11 to 22)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	667 (494 to 923)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Dorsett 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 = 0.93), total nitrogen (TN No Trend, $R^2 = 0.49$, p = 0.19), chlorophyll (CHL No Trend, $R^2 = 0.30$, p = 0.34) and Secchi depth (Secchi No Trend, $R^2 = 0.03$, p = 0.83).



Florida LAKEWATCH Report for Dosson in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	25 - 44	32 (10)
Total Nitrogen (µg/L)	755 - 1531	930 (10)
Chlorophyll- uncorrected (μ g/L)	11 - 56	23 (10)
Secchi (ft)	2.4 - 4.7	3.5 (10)
Secchi (m)	0.7 - 1.4	1.1 (10)
Color (Pt-Co Units)	82 - 184	108 (6)
Specific Conductance (µS/cm@25 C)	98 - 130	113 (6)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Dosson
GNIS Number	281687
Latitude	28.1245
Longitude	-82.5257
Water Body Type	Lake
Surface Area (ha and acre)	5 ha or 11 acre
Period of Record (year)	1991 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP4
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	32 (25 to 44)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	930 (755 to 1531)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Dosson 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, $R^2 = 0.10$, p = 0.38), total nitrogen (TN Decreasing, $R^2 = 0.81$, p = 0.00), chlorophyll (CHL No Trend, $R^2 = 0.39$, p = 0.05) and Secchi depth (Secchi Increasing, $R^2 = 0.75$, p = 0.00).



Florida LAKEWATCH Report for East in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	58 - 117	91 (14)	
Total Nitrogen (µg/L)	1384 - 3720	2307 (14)	
Chlorophyll- uncorrected (µg/L)	46 - 224	102 (14)	
Secchi (ft)	0.9 - 2.3	1.5 (14)	
Secchi (m)	0.3 - 0.7	0.5 (14)	
Color (Pt-Co Units)	22 - 86	37 (9)	
Specific Conductance (µS/cm@25 C)	139 - 195	164 (6)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	East
GNIS Number	278461
Latitude	27.9912
Longitude	-82.3825
Water Body Type	Lake
Surface Area (ha and acre)	35 ha or 86 acre
Period of Record (year)	1998 to 2022
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	91 (58 to 117)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	2307 (1384 to 3720)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake East 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, $R^2 = 0.27$, p = 0.06), total nitrogen (TN Increasing, $R^2 = 0.67$, p = 0.00), chlorophyll (CHL Increasing, $R^2 = 0.37$, p = 0.02) and Secchi depth (Secchi Decreasing, $R^2 = 0.39$, p = 0.02).



Florida LAKEWATCH Report for Echo in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department	of Environm	iental Protec	tion's Nun	ieric Nutrie	nt Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)	
Total Phosphorus (µg/L)	16 - 18	17 (2)	
Total Nitrogen (µg/L)	597 - 621	609 (2)	
Chlorophyll- uncorrected (µg/L)	5 - 6	5 (2)	
Secchi (ft)	-	(0)	
Secchi (m)	-	(0)	
Color (Pt-Co Units)	19 - 19	19 (1)	
Specific Conductance (µS/cm@25 C)	184 - 184	184 (1)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Echo
GNIS Number	282070
Latitude	28.1084
Longitude	-82.6048
Water Body Type	Lake
Surface Area (ha and acre)	11 ha or 27 acre
Period of Record (year)	1991 to 2007
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	17 (16 to 18)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	609 (597 to 621)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Eckles in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	16 - 42	26 (27)	
Total Nitrogen (µg/L)	676 - 1496	943 (27)	
Chlorophyll- uncorrected (µg/L)	5 - 28	12 (27)	
Secchi (ft)	2.7 - 7.8	4.8 (27)	
Secchi (m)	0.8 - 2.4	1.5 (27)	
Color (Pt-Co Units)	17 - 29	22 (22)	
Specific Conductance (µS/cm@25 C)	145 - 196	165 (16)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough	
Name	Eckles	
GNIS Number	300095	
Latitude	28.0567	
Longitude	-82.4711	
Water Body Type	Lake	
Surface Area (ha and acre)	. ha or . acre	
Period of Record (year)	1996 to 2022	
Lake Trophic Status (CHL)	Eutrophic	
TP Zone	TP3	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	26 (16 to 42)	
TN Zone	TN4	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	943 (676 to 1496)	



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Eckles 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 = 0.86), total nitrogen (TN No Trend, $R^2 = 0.05$, p = 0.27), chlorophyll (CHL No Trend, $R^2 = 0.01$, p = 0.66) and Secchi depth (Secchi Increasing, $R^2 = 0.18$, p = 0.03).



Florida LAKEWATCH Report for Edna in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).
| Table 1. | Florida | Department | of Environm | iental Protec | tion's Nun | ieric Nutrie | nt Criteria | for lakes. |
|-----------|-----------|------------|-------------|---------------|------------|--------------|-------------|------------|
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	159 - 159	159 (1)
Total Nitrogen (µg/L)	2457 - 2457	2457 (1)
Chlorophyll- uncorrected (µg/L)	-	(0)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Edna
GNIS Number	
Latitude	27.9915
Longitude	-82.4770
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2005 to 2005
Lake Trophic Status (CHL)	
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	159 (159 to 159)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	2457 (2457 to 2457)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Egypt in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	15 - 74	22 (22)	
Total Nitrogen (µg/L)	510 - 930	715 (22)	
Chlorophyll- uncorrected (µg/L)	4 - 24	12 (22)	
Secchi (ft)	3.8 - 9.7	5.8 (22)	
Secchi (m)	1.2 - 3.0	1.8 (22)	
Color (Pt-Co Units)	9 - 23	14 (13)	
Specific Conductance (µS/cm@25 C)	164 - 182	176 (8)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Egypt
GNIS Number	282124
Latitude	28.0131
Longitude	-82.4934
Water Body Type	Lake
Surface Area (ha and acre)	27 ha or 67 acre
Period of Record (year)	1993 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	22 (15 to 74)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	715 (510 to 930)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Egypt 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, $R^2 = 0.04$, p = 0.37), total nitrogen (TN No Trend, $R^2 = 0.13$, p = 0.10), chlorophyll (CHL Decreasing, $R^2 = 0.36$, p = 0.00) and Secchi depth (Secchi Increasing, $R^2 = 0.31$, p = 0.01).



Florida LAKEWATCH Report for Elizabeth in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	12 - 21	15 (13)	
Total Nitrogen (µg/L)	645 - 832	708 (13)	
Chlorophyll- uncorrected (µg/L)	3 - 11	6 (13)	
Secchi (ft)	4.5 - 8.0	6.7 (13)	
Secchi (m)	1.4 - 2.4	2.0 (13)	
Color (Pt-Co Units)	28 - 47	42 (8)	
Specific Conductance (µS/cm@25 C)	119 - 160	140 (7)	
Lake Classification	Colored		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Elizabeth
GNIS Number	282162
Latitude	28.1583
Longitude	-82.5737
Water Body Type	Lake
Surface Area (ha and acre)	9 ha or 22 acre
Period of Record (year)	1994 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	15 (12 to 21)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	708 (645 to 832)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Elizabeth 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, $R^2 = 0.10$, p = 0.29), total nitrogen (TN No Trend, $R^2 = 0.00$, p = 0.94), chlorophyll (CHL No Trend, $R^2 = 0.03$, p = 0.55) and Secchi depth (Secchi No Trend, $R^2 = 0.01$, p = 0.80).



Florida LAKEWATCH Report for Ellen in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	14 - 27	20 (10)	
Total Nitrogen (µg/L)	630 - 793	711 (10)	
Chlorophyll- uncorrected (µg/L)	7 - 18	12 (10)	
Secchi (ft)	4.4 - 7.1	6.0 (10)	
Secchi (m)	1.3 - 2.2	1.8 (10)	
Color (Pt-Co Units)	18 - 31	22 (4)	
Specific Conductance (µS/cm@25 C)	145 - 204	176 (3)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Ellen
GNIS Number	282168
Latitude	28.0633
Longitude	-82.4976
Water Body Type	Lake
Surface Area (ha and acre)	21 ha or 53 acre
Period of Record (year)	1996 to 2009
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	20 (14 to 27)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	711 (630 to 793)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Ellen 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 = 0.81), total nitrogen (TN No Trend, $R^2 = 0.29$, p = 0.10), chlorophyll (CHL No Trend, $R^2 = 0.15$, p = 0.27) and Secchi depth (Secchi No Trend, $R^2 = 0.00$, p = 0.85).



Florida LAKEWATCH Report for Estes in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	22 - 43	34 (22)	
Total Nitrogen (µg/L)	761 - 1298	955 (22)	
Chlorophyll- uncorrected (µg/L)	5 - 29	12 (22)	
Secchi (ft)	3.3 - 9.6	4.9 (22)	
Secchi (m)	1.0 - 2.9	1.5 (22)	
Color (Pt-Co Units)	22 - 58	35 (17)	
Specific Conductance (µS/cm@25 C)	226 - 313	253 (11)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Estes
GNIS Number	
Latitude	28.1203
Longitude	-82.4664
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1996 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	34 (22 to 43)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	955 (761 to 1298)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Estes 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 Increasing, $R^2 = 0.26$, p = 0.02), total nitrogen (TN No Trend, $R^2 = 0.00$, p = 0.79), chlorophyll (CHL Increasing, $R^2 = 0.48$, p = 0.00) and Secchi depth (Secchi Decreasing, $R^2 = 0.64$, p = 0.00).



Florida LAKEWATCH Report for Eva in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	18 - 18	18 (1)
Total Nitrogen (µg/L)	542 - 542	542 (1)
Chlorophyll- uncorrected (μ g/L)	8 - 8	8 (1)
Secchi (ft)	6.1 - 6.1	6.1 (1)
Secchi (m)	1.9 - 1.9	1.9 (1)
Color (Pt-Co Units)	47 - 47	47 (1)
Specific Conductance (µS/cm@25 C)	144 - 144	144 (1)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Eva
GNIS Number	
Latitude	28.1204
Longitude	-82.5946
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2014 to 2014
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	18 (18 to 18)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	542 (542 to 542)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Fantasia in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 μg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	331 - 476	<u>397 (2)</u>
Total Nitrogen (µg/L)	2773 - 3314	3032 (2)
Chlorophyll- uncorrected (µg/L)	121 - 133	127 (2)
Secchi (ft)	1.2 - 1.5	1.3 (2)
Secchi (m)	0.4 - 0.4	0.4 (2)
Color (Pt-Co Units)	28 - 28	28 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Fantasia
GNIS Number	
Latitude	27.8702
Longitude	-82.3507
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2000 to 2001
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	397 (331 to 476)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	3032 (2773 to 3314)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Fleur de Lis in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 μg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	10 - 44	23 (3)
Total Nitrogen (µg/L)	908 - 1440	1182 (3)
Chlorophyll- uncorrected (µg/L)	16 - 20	18 (3)
Secchi (ft)	3.8 - 6.5	4.7 (3)
Secchi (m)	1.2 - 2.0	1.4 (3)
Color (Pt-Co Units)	29 - 29	29 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Fleur de Lis
GNIS Number	
Latitude	28.0639
Longitude	-82.4829
Water Body Type	Lake
Surface Area (ha and acre)	10 ha or 25 acre
Period of Record (year)	2000 to 2003
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	23 (10 to 44)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1182 (908 to 1440)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Flynn in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).
| Table 1. | Florida | Department of | of Environmen | tal Protection | ı's Numeric | Nutrient | Criteria | for lakes. |
|-----------|-----------|---------------|---------------|----------------|-----------------|---------------|-----------|------------|
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	7 - 24	11 (24)	
Total Nitrogen (µg/L)	595 - 2250	977 (24)	
Chlorophyll- uncorrected (µg/L)	3 - 13	6 (24)	
Secchi (ft)	2.9 - 7.1	5.1 (24)	
Secchi (m)	0.9 - 2.2	1.5 (24)	
Color (Pt-Co Units)	20 - 121	40 (22)	
Specific Conductance (µS/cm@25 C)	28 - 80	39 (16)	
Lake Classification	Colored		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Flynn
GNIS Number	282639
Latitude	28.0978
Longitude	-82.4386
Water Body Type	Lake
Surface Area (ha and acre)	11 ha or 26 acre
Period of Record (year)	1999 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	11 (7 to 24)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	977 (595 to 2250)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Flynn 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, $R^2 = 0.34$, p = 0.00), total nitrogen (TN Decreasing, $R^2 = 0.39$, p = 0.00), chlorophyll (CHL Decreasing, $R^2 = 0.36$, p = 0.00) and Secchi depth (Secchi Increasing, $R^2 = 0.30$, p = 0.01).



Florida LAKEWATCH Report for Forest in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	33 - 92	61 (19)	
Total Nitrogen (µg/L)	600 - 1769	1095 (19)	
Chlorophyll- uncorrected (µg/L)	17 - 110	42 (19)	
Secchi (ft)	1.0 - 4.0	1.8 (19)	
Secchi (m)	0.3 - 1.2	0.6 (19)	
Color (Pt-Co Units)	14 - 27	21 (13)	
Specific Conductance (µS/cm@25 C)	137 - 215	174 (8)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Forest
GNIS Number	
Latitude	28.0891
Longitude	-82.4189
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 2016
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	61 (33 to 92)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1095 (600 to 1769)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Forest 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 = 0.80), total nitrogen (TN No Trend, $R^2 = 0.00$, p = 0.90), chlorophyll (CHL No Trend, $R^2 = 0.02$, p = 0.61) and Secchi depth (Secchi No Trend, $R^2 = 0.08$, p = 0.24).



Florida LAKEWATCH Report for Francis in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	30 - 99	48 (13)	
Total Nitrogen (µg/L)	742 - 1268	934 (13)	
Chlorophyll- uncorrected (µg/L)	8 - 50	20 (13)	
Secchi (ft)	2.1 - 3.3	2.7 (13)	
Secchi (m)	0.6 - 1.0	0.8 (13)	
Color (Pt-Co Units)	72 - 177	118 (13)	
Specific Conductance (µS/cm@25 C)	30 - 65	44 (13)	
Lake Classification	Colored		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Francis
GNIS Number	282779
Latitude	28.1603
Longitude	-82.6016
Water Body Type	Lake
Surface Area (ha and acre)	17 ha or 43 acre
Period of Record (year)	2010 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	48 (30 to 99)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	934 (742 to 1268)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Francis 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, $R^2 = 0.20$, p = 0.13), total nitrogen (TN No Trend, $R^2 = 0.11$, p = 0.26), chlorophyll (CHL Increasing, $R^2 = 0.76$, p = 0.00) and Secchi depth (Secchi No Trend, $R^2 = 0.20$, p = 0.12).



Florida LAKEWATCH Report for Freedom in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	9 - 17	13 (4)
Total Nitrogen (µg/L)	409 - 497	447 (4)
Chlorophyll- uncorrected (µg/L)	4 - 9	6 (4)
Secchi (ft)	6.5 - 9.1	7.9 (4)
Secchi (m)	2.0 - 2.8	2.4 (4)
Color (Pt-Co Units)	28 - 43	35 (2)
Specific Conductance (µS/cm@25 C)	47 - 110	72 (2)
Lake Classification	Clear Softwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Freedom
GNIS Number	
Latitude	28.1280
Longitude	-82.5728
Water Body Type	Lake
Surface Area (ha and acre)	ha or . acre
Period of Record (year)	2019 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	13 (9 to 17)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	447 (409 to 497)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Fuller in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	23 - 28	24 (3)
Total Nitrogen (µg/L)	635 - 858	771 (3)
Chlorophyll- uncorrected (µg/L)	3 - 14	7 (3)
Secchi (ft)	5.6 - 8.4	6.7 (3)
Secchi (m)	1.7 - 2.6	2.0 (3)
Color (Pt-Co Units)	43 - 44	43 (3)
Specific Conductance (µS/cm@25 C)	211 - 230	219 (3)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Fuller
GNIS Number	
Latitude	28.1512
Longitude	-82.4789
Water Body Type	Lake
Surface Area (ha and acre)	6 ha or 15 acre
Period of Record (year)	2011 to 2021
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	24 (23 to 28)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	771 (635 to 858)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Garden in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	11 - 90	26 (19)
Total Nitrogen (µg/L)	392 - 2013	821 (19)
Chlorophyll- uncorrected (μ g/L)	3 - 132	11 (19)
Secchi (ft)	1.5 - 10.0	4.4 (19)
Secchi (m)	0.5 - 3.0	1.3 (19)
Color (Pt-Co Units)	28 - 152	67 (9)
Specific Conductance (µS/cm@25 C)	53 - 257	124 (7)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Garden
GNIS Number	282929
Latitude	28.1322
Longitude	-82.6319
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1991 to 2021
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	26 (11 to 90)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	821 (392 to 2013)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Garden 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 Increasing, $R^2 = 0.24$, p = 0.03), total nitrogen (TN No Trend, $R^2 = 0.21$, p = 0.05), chlorophyll (CHL No Trend, $R^2 = 0.07$, p = 0.29) and Secchi depth (Secchi Decreasing, $R^2 = 0.32$, p = 0.01).



Florida LAKEWATCH Report for Gass in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department	of Environm	ental Protec	tion's Nun	neric Nutrier	nt Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 μg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	8 - 9	8 (2)
Total Nitrogen (µg/L)	457 - 492	474 (2)
Chlorophyll- uncorrected (µg/L)	2 - 3	2 (2)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Gass
GNIS Number	282964
Latitude	28.0939
Longitude	-82.4632
Water Body Type	Lake
Surface Area (ha and acre)	13 ha or 33 acre
Period of Record (year)	1998 to 1999
Lake Trophic Status (CHL)	Oligotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	8 (8 to 9)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	474 (457 to 492)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for George in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	n's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	16 - 24	20 (2)
Total Nitrogen (µg/L)	467 - 723	581 (2)
Chlorophyll- uncorrected (µg/L)	7 - 17	11 (2)
Secchi (ft)	3.6 - 4.9	4.2 (2)
Secchi (m)	1.1 - 1.5	1.3 (2)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	George
GNIS Number	300093
Latitude	28.0698
Longitude	-82.4870
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 1998
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	20 (16 to 24)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	581 (467 to 723)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Gibson in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).
| Table 1. | Florida | Department of | of Environmen | tal Protection | ı's Numeric | Nutrient | Criteria | for lakes. |
|-----------|-----------|---------------|---------------|----------------|-----------------|---------------|-----------|------------|
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	12 - 15	13 (4)	
Total Nitrogen (µg/L)	496 - 592	536 (4)	
Chlorophyll- uncorrected (µg/L)	4 - 11	6 (4)	
Secchi (ft)	6.8 - 8.2	7.4 (4)	
Secchi (m)	2.1 - 2.5	2.3 (4)	
Color (Pt-Co Units)	12 - 30	20 (3)	
Specific Conductance (µS/cm@25 C)	98 - 150	128 (3)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Gibson
GNIS Number	
Latitude	28.1249
Longitude	-82.5917
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1998 to 2010
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	13 (12 to 15)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	536 (496 to 592)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Glass in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	7 - 9	8 (3)
Total Nitrogen (µg/L)	338 - 434	368 (3)
Chlorophyll- uncorrected (µg/L)	2 - 3	3 (3)
Secchi (ft)	6.1 - 10.6	8.4 (3)
Secchi (m)	1.9 - 3.2	2.6 (3)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Glass
GNIS Number	283106
Latitude	28.0996
Longitude	-82.6196
Water Body Type	Lake
Surface Area (ha and acre)	7 ha or 18 acre
Period of Record (year)	1996 to 1998
Lake Trophic Status (CHL)	Oligotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	8 (7 to 9)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	368 (338 to 434)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Gornto in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)	
Total Phosphorus (µg/L)	22 - 30	26 (2)	
Total Nitrogen (µg/L)	773 - 826	799 (2)	
Chlorophyll- uncorrected (µg/L)	10 - 11	11 (2)	
Secchi (ft)	6.8 - 8.0	7.4 (2)	
Secchi (m)	2.1 - 2.4	2.3 (2)	
Color (Pt-Co Units)	18 - 27	22 (2)	
Specific Conductance (µS/cm@25 C)	-	(0)	
Lake Classification			

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Gornto
GNIS Number	283229
Latitude	27.9456
Longitude	-82.3179
Water Body Type	Lake
Surface Area (ha and acre)	6.8 ha or 17 acre
Period of Record (year)	2003 to 2004
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	26 (22 to 30)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	799 (773 to 826)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Grace in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	6 - 10	8 (4)
Total Nitrogen (µg/L)	342 - 478	399 (4)
Chlorophyll- uncorrected (µg/L)	2 - 3	2 (4)
Secchi (ft)	13.0 - 15.4	13.8 (4)
Secchi (m)	4.0 - 4.7	4.2 (4)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in **bold** can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Grace
GNIS Number	
Latitude	28.0978
Longitude	-82.5875
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1990 to 1993
Lake Trophic Status (CHL)	Oligotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	8 (6 to 10)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	399 (342 to 478)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Grady in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 µg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	269 - 358	318 (3)
Total Nitrogen (µg/L)	983 - 1201	1073 (3)
Chlorophyll- uncorrected (µg/L)	20 - 34	28 (3)
Secchi (ft)	2.4 - 2.8	2.6 (3)
Secchi (m)	0.7 - 0.8	0.8 (3)
Color (Pt-Co Units)	128 - 141	134 (2)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Grady
GNIS Number	
Latitude	27.8358
Longitude	-82.2742
Water Body Type	Lake
Surface Area (ha and acre)	57 ha or 141 acre
Period of Record (year)	2000 to 2002
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	318 (269 to 358)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1073 (983 to 1201)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Halfmoon in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	12 - 23	16 (19)	
Total Nitrogen (µg/L)	530 - 912	661 (19)	
Chlorophyll- uncorrected (µg/L)	3 - 9	5 (19)	
Secchi (ft)	5.1 - 10.1	7.6 (19)	
Secchi (m)	1.6 - 3.1	2.3 (19)	
Color (Pt-Co Units)	17 - 31	24 (12)	
Specific Conductance (µS/cm@25 C)	169 - 228	199 (9)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Halfmoon
GNIS Number	283602
Latitude	28.0960
Longitude	-82.5481
Water Body Type	Lake
Surface Area (ha and acre)	13 ha or 32 acre
Period of Record (year)	1992 to 2019
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	16 (12 to 23)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	661 (530 to 912)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Halfmoon 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 = 0.88), total nitrogen (TN No Trend, $R^2 = 0.03$, p = 0.46), chlorophyll (CHL No Trend, $R^2 = 0.14$, p = 0.12) and Secchi depth (Secchi No Trend, $R^2 = 0.14$, p = 0.11).



Florida LAKEWATCH Report for Hammock in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	31 - 79	50 (2)	
Total Nitrogen (µg/L)	1027 - 1180	1101 (2)	
Chlorophyll- uncorrected (µg/L)	36 - 40	38 (2)	
Secchi (ft)	2.4 - 2.9	2.7 (2)	
Secchi (m)	0.7 - 0.9	0.8 (2)	
Color (Pt-Co Units)	12 - 17	14 (2)	
Specific Conductance (µS/cm@25 C)	175 - 175	175 (1)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Hammock
GNIS Number	
Latitude	27.9822
Longitude	-82.1530
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2001 to 2016
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP6
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	50 (31 to 79)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1101 (1027 to 1180)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Hanna in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	11 - 36	23 (8)
Total Nitrogen (µg/L)	714 - 1138	833 (8)
Chlorophyll- uncorrected (μ g/L)	6 - 24	11 (8)
Secchi (ft)	3.3 - 5.3	4.5 (8)
Secchi (m)	1.0 - 1.6	1.4 (8)
Color (Pt-Co Units)	41 - 65	56 (3)
Specific Conductance (µS/cm@25 C)	182 - 209	195 (3)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Hanna
GNIS Number	283691
Latitude	28.1410
Longitude	-82.4471
Water Body Type	Lake
Surface Area (ha and acre)	12 ha or 30 acre
Period of Record (year)	1996 to 2018
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	23 (11 to 36)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	833 (714 to 1138)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Hanna 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 = 0.81), total nitrogen (TN No Trend, $R^2 = 0.01$, p = 0.80), chlorophyll (CHL No Trend, $R^2 = 0.02$, p = 0.71) and Secchi depth (Secchi No Trend, $R^2 = 0.05$, p = 0.58).



Florida LAKEWATCH Report for Harvey in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	11 - 32	22 (17)
Total Nitrogen (µg/L)	613 - 1458	942 (17)
Chlorophyll- uncorrected (μ g/L)	4 - 33	12 (17)
Secchi (ft)	2.5 - 7.0	4.4 (17)
Secchi (m)	0.8 - 2.1	1.3 (17)
Color (Pt-Co Units)	30 - 82	60 (13)
Specific Conductance (µS/cm@25 C)	88 - 209	157 (11)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Harvey
GNIS Number	283796
Latitude	28.1651
Longitude	-82.4857
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2005 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	22 (11 to 32)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	942 (613 to 1458)


- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Harvey 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, $R^2 = 0.59$, p = 0.00), total nitrogen (TN Decreasing, $R^2 = 0.71$, p = 0.00), chlorophyll (CHL Decreasing, $R^2 = 0.73$, p = 0.00) and Secchi depth (Secchi Increasing, $R^2 = 0.59$, p = 0.00).



Florida LAKEWATCH Report for Heather in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum	calculated	Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	58 - 94	73 (7)
Total Nitrogen (µg/L)	978 - 1280	1124 (7)
Chlorophyll- uncorrected (µg/L)	19 - 52	30 (7)
Secchi (ft)	1.7 - 3.0	2.1 (7)
Secchi (m)	0.5 - 0.9	0.6 (7)
Color (Pt-Co Units)	68 - 103	84 (2)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Heather
GNIS Number	
Latitude	28.1102
Longitude	-82.4978
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 2003
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	73 (58 to 94)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1124 (978 to 1280)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Heather 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, $R^2 = 0.17$, p = 0.35), total nitrogen (TN No Trend, $R^2 = 0.34$, p = 0.17), chlorophyll (CHL No Trend, $R^2 = 0.12$, p = 0.44) and Secchi depth (Secchi Decreasing, $R^2 = 0.63$, p = 0.03).



Florida LAKEWATCH Report for Helen in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum	calculated	Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	22 - 22	22 (1)
Total Nitrogen (µg/L)	1040 - 1040	1040 (1)
Chlorophyll- uncorrected (µg/L)	12 - 12	12 (1)
Secchi (ft)	3.6 - 3.6	3.6 (1)
Secchi (m)	1.1 - 1.1	1.1 (1)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Helen
GNIS Number	283867
Latitude	28.1211
Longitude	-82.5378
Water Body Type	Lake
Surface Area (ha and acre)	6 ha or 16 acre
Period of Record (year)	2018 to 2019
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	22 (22 to 22)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1040 (1040 to 1040)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Hiawatha in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum	calculated	Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	15 - 28	20 (31)	
Total Nitrogen (µg/L)	504 - 794	621 (31)	
Chlorophyll- uncorrected (µg/L)	6 - 18	10 (31)	
Secchi (ft)	3.6 - 10.0	5.7 (31)	
Secchi (m)	1.1 - 3.0	1.7 (31)	
Color (Pt-Co Units)	16 - 49	29 (19)	
Specific Conductance (µS/cm@25 C)	112 - 164	141 (13)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Hiawatha
GNIS Number	283935
Latitude	28.1723
Longitude	-82.5744
Water Body Type	Lake
Surface Area (ha and acre)	55 ha or 136 acre
Period of Record (year)	1990 to 2021
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	20 (15 to 28)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	621 (504 to 794)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Hiawatha 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 Increasing, $R^2 = 0.26$, p = 0.00), total nitrogen (TN No Trend, $R^2 = 0.01$, p = 0.58), chlorophyll (CHL No Trend, $R^2 = 0.10$, p = 0.08) and Secchi depth (Secchi Increasing, $R^2 = 0.19$, p = 0.01).



Florida LAKEWATCH Report for Hickory Hammock in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	53 - 124	77 (6)
Total Nitrogen (µg/L)	1213 - 2010	1562 (6)
Chlorophyll- uncorrected (µg/L)	9 - 84	31 (6)
Secchi (ft)	2.2 - 5.1	3.2 (6)
Secchi (m)	0.7 - 1.6	1.0 (6)
Color (Pt-Co Units)	27 - 42	33 (5)
Specific Conductance (µS/cm@25 C)	157 - 157	157 (1)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Hickory Hammock
GNIS Number	283957
Latitude	27.9133
Longitude	-82.2891
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2002 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	77 (53 to 124)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1562 (1213 to 2010)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Hickory Hammock 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, $R^2 = 0.54$, p = 0.09), total nitrogen (TN No Trend, $R^2 = 0.41$, p = 0.17), chlorophyll (CHL No Trend, $R^2 = 0.59$, p = 0.07) and Secchi depth (Secchi Increasing, $R^2 = 0.73$, p = 0.03).



Florida LAKEWATCH Report for Hickory Manor North in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	267 - 267	267 (1)
Total Nitrogen (µg/L)	2356 - 2356	2356 (1)
Chlorophyll- uncorrected (µg/L)	133 - 133	133 (1)
Secchi (ft)	1.1 - 1.1	1.1 (1)
Secchi (m)	0.3 - 0.3	0.3 (1)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Hickory Manor North
GNIS Number	
Latitude	28.0014
Longitude	-82.2632
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1999 to 1999
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	267 (267 to 267)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	2356 (2356 to 2356)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Hobbs in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	6 - 21	11 (15)
Total Nitrogen (µg/L)	243 - 783	485 (15)
Chlorophyll- uncorrected (µg/L)	1 - 9	3 (15)
Secchi (ft)	6.1 - 15.0	8.8 (13)
Secchi (m)	1.9 - 4.6	2.7 (13)
Color (Pt-Co Units)	3 - 15	8 (8)
Specific Conductance (µS/cm@25 C)	184 - 225	205 (3)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Hobbs
GNIS Number	284062
Latitude	28.1593
Longitude	-82.4654
Water Body Type	Lake
Surface Area (ha and acre)	27 ha or 67 acre
Period of Record (year)	1994 to 2009
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	11 (6 to 21)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	485 (243 to 783)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Hobbs 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 Increasing, $R^2 = 0.38$, p = 0.01), total nitrogen (TN Increasing, $R^2 = 0.63$, p = 0.00), chlorophyll (CHL No Trend, $R^2 = 0.18$, p = 0.11) and Secchi depth (Secchi Decreasing, $R^2 = 0.64$, p = 0.00).



Florida LAKEWATCH Report for Hog Island in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	n's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated		
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation		
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual	
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric	
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total	
		Phosphorus	Nitrogen	Phosphorus	Nitrogen	
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L	
Colored Lakes						
\leq 40 Platinum Cobalt Units						
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L	
or						
>100 µS/cm@25 C						
Clear Hard Water Lakes						
\leq 40 Platinum Cobalt Units						
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L	
or			μg/L			
< 100 µS/cm@25 C						
Clear Soft Water Lakes						

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	26 - 42	31 (9)
Total Nitrogen (µg/L)	869 - 1409	1036 (9)
Chlorophyll- uncorrected (µg/L)	6 - 35	13 (9)
Secchi (ft)	3.0 - 5.9	4.4 (9)
Secchi (m)	0.9 - 1.8	1.3 (9)
Color (Pt-Co Units)	39 - 105	75 (5)
Specific Conductance (µS/cm@25 C)	133 - 170	149 (3)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Hog Island
GNIS Number	284090
Latitude	28.1707
Longitude	-82.4449
Water Body Type	Lake
Surface Area (ha and acre)	19 ha or 47 acre
Period of Record (year)	1996 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	31 (26 to 42)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1036 (869 to 1409)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Hog Island 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, $R^2 = 0.15$, p = 0.30), total nitrogen (TN No Trend, $R^2 = 0.16$, p = 0.28), chlorophyll (CHL No Trend, $R^2 = 0.00$, p = 0.89) and Secchi depth (Secchi No Trend, $R^2 = 0.14$, p = 0.32).



Florida LAKEWATCH Report for Holly in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).
| Long Term Geometric | Annual | Minimum calculated | | Maximum calculated | |
|-----------------------------------|--------------|------------------------|------------|------------------------|------------|
| Mean Lake Color and Long- | Geometric | numeric interpretation | | numeric interpretation | |
| Term Geometric Mean | Mean | Annual | Annual | Annual | Annual |
| Color, Alkalinity and | Chlorophyll- | Geometric | Geometric | Geometric | Geometric |
| Specific Conductance | corrected | Mean Total | Mean Total | Mean Total | Mean Total |
| | | Phosphorus | Nitrogen | Phosphorus | Nitrogen |
| > 40 Platinum Cobalt Units | 20 µg/L | 50 μg/L | 1270 μg/L | 160 μg/L ¹ | 2230 µg/L |
| Colored Lakes | | | | | |
| \leq 40 Platinum Cobalt Units | | | | | |
| and $> 20 \text{ mg/L CaCO}_3$ | 20 µg/L | 30 µg/L | 1050 μg/L | 90 μg/L | 1910 µg/L |
| or | | | | | |
| >100 µS/cm@25 C | | | | | |
| Clear Hard Water Lakes | | | | | |
| \leq 40 Platinum Cobalt Units | | | | | |
| and $\leq 20 \text{ mg/L CaCO}_3$ | 6 µg/L | 10 µg/L | 510 | 30 µg/L | 930 μg/L |
| or | | | μg/L | | |
| < 100 µS/cm@25 C | | | | | |
| Clear Soft Water Lakes | | | | | |

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	17 - 36	26 (6)	
Total Nitrogen (µg/L)	537 - 899	749 (6)	
Chlorophyll- uncorrected (µg/L)	5 - 27	13 (6)	
Secchi (ft)	4.4 - 7.0	5.1 (6)	
Secchi (m)	1.3 - 2.1	1.5 (6)	
Color (Pt-Co Units)	10 - 59	36 (5)	
Specific Conductance (µS/cm@25 C)	135 - 163	149 (4)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Holly
GNIS Number	279493
Latitude	28.1716
Longitude	-82.4824
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 2017
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	26 (17 to 36)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	749 (537 to 899)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Holly 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 Increasing, $R^2 = 0.70$, p = 0.04), total nitrogen (TN No Trend, $R^2 = 0.40$, p = 0.18), chlorophyll (CHL No Trend, $R^2 = 0.35$, p = 0.22) and Secchi depth (Secchi No Trend, $R^2 = 0.16$, p = 0.43).



Florida LAKEWATCH Report for Holly 2 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 μg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	23 - 33	28 (2)
Total Nitrogen (µg/L)	607 - 720	661 (2)
Chlorophyll- uncorrected (µg/L)	6 - 13	9 (2)
Secchi (ft)	4.2 - 5.3	4.7 (2)
Secchi (m)	1.3 - 1.6	1.4 (2)
Color (Pt-Co Units)	62 - 95	77 (2)
Specific Conductance (µS/cm@25 C)	86 - 89	88 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Holly 2
GNIS Number	
Latitude	28.0897
Longitude	-82.5481
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2021 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	28 (23 to 33)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	661 (607 to 720)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Horse in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	16 - 16	16 (1)
Total Nitrogen (µg/L)	1007 - 1007	1007 (1)
Chlorophyll- uncorrected (µg/L)	4 - 4	4 (1)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Horse
GNIS Number	284280
Latitude	28.1117
Longitude	-82.5791
Water Body Type	Lake
Surface Area (ha and acre)	11 ha or 28 acre
Period of Record (year)	1999 to 1999
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	16 (16 to 16)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1007 (1007 to 1007)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Island Ford in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	11 - 19	14 (12)
Total Nitrogen (µg/L)	417 - 637	520 (12)
Chlorophyll- uncorrected (μ g/L)	3 - 11	6 (12)
Secchi (ft)	4.1 - 9.4	5.6 (12)
Secchi (m)	1.2 - 2.9	1.7 (12)
Color (Pt-Co Units)	15 - 124	49 (7)
Specific Conductance (µS/cm@25 C)	83 - 125	107 (6)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Island Ford
GNIS Number	284612
Latitude	28.1529
Longitude	-82.5986
Water Body Type	Lake
Surface Area (ha and acre)	39 ha or 96 acre
Period of Record (year)	1997 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	14 (11 to 19)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	520 (417 to 637)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Island Ford 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, $R^2 = 0.27$, p = 0.08), total nitrogen (TN Increasing, $R^2 = 0.42$, p = 0.02), chlorophyll (CHL No Trend, $R^2 = 0.05$, p = 0.50) and Secchi depth (Secchi Decreasing, $R^2 = 0.63$, p = 0.00).



Florida LAKEWATCH Report for Jackson in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	9 - 47	21 (4)
Total Nitrogen (µg/L)	563 - 1157	794 (4)
Chlorophyll- uncorrected (μ g/L)	3 - 17	7 (4)
Secchi (ft)	4.4 - 10.0	6.3 (3)
Secchi (m)	1.3 - 3.0	1.9 (3)
Color (Pt-Co Units)	107 - 113	110 (2)
Specific Conductance (µS/cm@25 C)	130 - 140	135 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Jackson
GNIS Number	
Latitude	28.1380
Longitude	-82.6300
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1991 to 2017
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	21 (9 to 47)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	794 (563 to 1157)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for James in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	14 - 32	22 (29)
Total Nitrogen (µg/L)	627 - 995	785 (29)
Chlorophyll- uncorrected (µg/L)	4 - 24	12 (29)
Secchi (ft)	4.2 - 9.4	5.8 (29)
Secchi (m)	1.3 - 2.9	1.8 (29)
Color (Pt-Co Units)	31 - 70	49 (22)
Specific Conductance (µS/cm@25 C)	121 - 163	149 (16)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	James
GNIS Number	284712
Latitude	28.1179
Longitude	-82.5735
Water Body Type	Lake
Surface Area (ha and acre)	6 ha or 16 acre
Period of Record (year)	1994 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	22 (14 to 32)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	785 (627 to 995)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake James 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, $R^2 = 0.03$, p = 0.37), total nitrogen (TN No Trend, $R^2 = 0.00$, p = 0.92), chlorophyll (CHL Increasing, $R^2 = 0.15$, p = 0.04) and Secchi depth (Secchi Decreasing, $R^2 = 0.18$, p = 0.02).



Florida LAKEWATCH Report for Jeanette in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	35 - 55	44 (2)
Total Nitrogen (µg/L)	570 - 964	741 (2)
Chlorophyll- uncorrected (µg/L)	19 - 31	24 (2)
Secchi (ft)	2.4 - 4.5	3.3 (2)
Secchi (m)	0.7 - 1.4	1.0 (2)
Color (Pt-Co Units)	20 - 20	20 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Jeanette
GNIS Number	
Latitude	28.0621
Longitude	-82.4809
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2001 to 2002
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	44 (35 to 55)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	741 (570 to 964)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Jeremy in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	n's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	51 - 51	51 (1)
Total Nitrogen (µg/L)	1035 - 1035	1035 (1)
Chlorophyll- uncorrected (μ g/L)	35 - 35	35 (1)
Secchi (ft)	3.3 - 3.3	3.3 (1)
Secchi (m)	1.0 - 1.0	1.0 (1)
Color (Pt-Co Units)	61 - 61	61 (1)
Specific Conductance (µS/cm@25 C)	131 - 131	131 (1)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Jeremy
GNIS Number	
Latitude	28.0653
Longitude	-82.3841
Water Body Type	Lake
Surface Area (ha and acre)	ha or . acre
Period of Record (year)	2017 to 2017
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	51 (51 to 51)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1035 (1035 to 1035)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Josephine in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	21 - 45	34 (23)
Total Nitrogen (µg/L)	740 - 1212	963 (23)
Chlorophyll- uncorrected (µg/L)	8 - 30	14 (22)
Secchi (ft)	2.4 - 4.5	3.2 (22)
Secchi (m)	0.7 - 1.4	1.0 (22)
Color (Pt-Co Units)	57 - 185	113 (17)
Specific Conductance (µS/cm@25 C)	132 - 212	177 (11)
Lake Classification	Colored	
The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Josephine
GNIS Number	284944
Latitude	28.1113
Longitude	-82.5620
Water Body Type	Lake
Surface Area (ha and acre)	21 ha or 51 acre
Period of Record (year)	1998 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP4
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	34 (21 to 45)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	963 (740 to 1212)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Josephine 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, $R^2 = 0.07$, p = 0.21), total nitrogen (TN No Trend, $R^2 = 0.05$, p = 0.33), chlorophyll (CHL No Trend, $R^2 = 0.12$, p = 0.11) and Secchi depth (Secchi No Trend, $R^2 = 0.00$, p = 0.81).



Florida LAKEWATCH Report for Juanita in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum	calculated	Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	8 - 27	15 (18)
Total Nitrogen (µg/L)	388 - 958	633 (18)
Chlorophyll- uncorrected (µg/L)	2 - 18	5 (18)
Secchi (ft)	3.7 - 9.9	6.0 (18)
Secchi (m)	1.1 - 3.0	1.8 (18)
Color (Pt-Co Units)	5 - 53	31 (6)
Specific Conductance (µS/cm@25 C)	157 - 166	161 (2)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Juanita
GNIS Number	284951
Latitude	28.1185
Longitude	-82.5878
Water Body Type	Lake
Surface Area (ha and acre)	10 ha or 24 acre
Period of Record (year)	1991 to 2012
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	15 (8 to 27)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	633 (388 to 958)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Juanita 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 Increasing, $R^2 = 0.31$, p = 0.02), total nitrogen (TN Increasing, $R^2 = 0.48$, p = 0.00), chlorophyll (CHL Increasing, $R^2 = 0.43$, p = 0.00) and Secchi depth (Secchi Decreasing, $R^2 = 0.52$, p = 0.00).



Florida LAKEWATCH Report for June in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum	calculated	Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	33 - 72	48 (19)
Total Nitrogen (µg/L)	838 - 1606	1174 (19)
Chlorophyll- uncorrected (µg/L)	9 - 77	34 (19)
Secchi (ft)	2.3 - 5.9	3.4 (19)
Secchi (m)	0.7 - 1.8	1.0 (19)
Color (Pt-Co Units)	23 - 62	40 (17)
Specific Conductance (µS/cm@25 C)	99 - 172	144 (13)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	June
GNIS Number	
Latitude	27.9575
Longitude	-82.2975
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2003 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	48 (33 to 72)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1174 (838 to 1606)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake June 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 Increasing, $R^2 = 0.23$, p = 0.04), total nitrogen (TN Increasing, $R^2 = 0.31$, p = 0.01), chlorophyll (CHL No Trend, $R^2 = 0.16$, p = 0.09) and Secchi depth (Secchi Decreasing, $R^2 = 0.41$, p = 0.00).



Florida LAKEWATCH Report for Keene in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum	calculated	Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	18 - 55	35 (14)
Total Nitrogen (µg/L)	738 - 1511	1142 (14)
Chlorophyll- uncorrected (µg/L)	7 - 44	18 (13)
Secchi (ft)	1.9 - 5.1	3.0 (14)
Secchi (m)	0.6 - 1.5	0.9 (14)
Color (Pt-Co Units)	73 - 185	103 (3)
Specific Conductance (µS/cm@25 C)	185 - 190	187 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Keene
GNIS Number	285028
Latitude	28.1454
Longitude	-82.4470
Water Body Type	Lake
Surface Area (ha and acre)	13 ha or 31 acre
Period of Record (year)	1991 to 2020
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	35 (18 to 55)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1142 (738 to 1511)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Keene 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, $R^2 = 0.21$, p = 0.10), total nitrogen (TN Decreasing, $R^2 = 0.51$, p = 0.00), chlorophyll (CHL No Trend, $R^2 = 0.05$, p = 0.44) and Secchi depth (Secchi No Trend, $R^2 = 0.02$, p = 0.67).



Florida LAKEWATCH Report for Kell in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	13 - 35	23 (9)
Total Nitrogen (µg/L)	700 - 1046	854 (9)
Chlorophyll- uncorrected (µg/L)	5 - 34	14 (9)
Secchi (ft)	4.0 - 8.7	5.2 (9)
Secchi (m)	1.2 - 2.6	1.6 (9)
Color (Pt-Co Units)	18 - 70	32 (4)
Specific Conductance (µS/cm@25 C)	213 - 213	213 (1)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Kell
GNIS Number	285033
Latitude	28.1680
Longitude	-82.4556
Water Body Type	Lake
Surface Area (ha and acre)	13 ha or 31 acre
Period of Record (year)	1997 to 2020
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	23 (13 to 35)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	854 (700 to 1046)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Kell 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, $R^2 = 0.35$, p = 0.09), total nitrogen (TN No Trend, $R^2 = 0.13$, p = 0.34), chlorophyll (CHL No Trend, $R^2 = 0.01$, p = 0.77) and Secchi depth (Secchi No Trend, $R^2 = 0.35$, p = 0.09).



Florida LAKEWATCH Report for Ken in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	34 - 44	39 (2)
Total Nitrogen (µg/L)	1415 - 1545	1479 (2)
Chlorophyll- uncorrected (µg/L)	23 - 25	24 (2)
Secchi (ft)	2.6 - 2.9	2.8 (2)
Secchi (m)	0.8 - 0.9	0.8 (2)
Color (Pt-Co Units)	26 - 28	27 (2)
Specific Conductance (µS/cm@25 C)	270 - 297	283 (2)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Ken
GNIS Number	
Latitude	27.8512
Longitude	-82.3389
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2016 to 2017
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	39 (34 to 44)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1479 (1415 to 1545)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Keystone in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	7 - 18	12 (29)
Total Nitrogen (µg/L)	401 - 802	582 (29)
Chlorophyll- uncorrected (µg/L)	2 - 10	4 (29)
Secchi (ft)	4.0 - 11.4	6.2 (29)
Secchi (m)	1.2 - 3.5	1.9 (29)
Color (Pt-Co Units)	23 - 141	78 (18)
Specific Conductance (µS/cm@25 C)	56 - 158	104 (14)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Keystone
GNIS Number	285091
Latitude	28.1234
Longitude	-82.5827
Water Body Type	Lake
Surface Area (ha and acre)	169 ha or 417 acre
Period of Record (year)	1990 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	12 (7 to 18)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	582 (401 to 802)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Keystone 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 Increasing, $R^2 = 0.65$, p = 0.00), total nitrogen (TN Increasing, $R^2 = 0.40$, p = 0.00), chlorophyll (CHL No Trend, $R^2 = 0.05$, p = 0.23) and Secchi depth (Secchi Decreasing, $R^2 = 0.60$, p = 0.00).



Florida LAKEWATCH Report for Keystone North in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	n's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual Annual		Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	13 - 14	14 (2)
Total Nitrogen (µg/L)	637 - 667	652 (2)
Chlorophyll- uncorrected (μ g/L)	3 - 5	4 (2)
Secchi (ft)	5.1 - 5.4	5.2 (2)
Secchi (m)	1.6 - 1.6	1.6 (2)
Color (Pt-Co Units)	80 - 116	96 (2)
Specific Conductance (µS/cm@25 C)	114 - 127	120 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Keystone North
GNIS Number	285091
Latitude	28.1443
Longitude	-82.5963
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2021 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	14 (13 to 14)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	652 (637 to 667)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.
Florida LAKEWATCH Report for LeClare in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	14 - 29	22 (10)	
Total Nitrogen (µg/L)	567 - 846	685 (10)	
Chlorophyll- uncorrected (µg/L)	3 - 20	8 (10)	
Secchi (ft)	3.3 - 10.6	5.7 (9)	
Secchi (m)	1.0 - 3.2	1.7 (9)	
Color (Pt-Co Units)	23 - 41	27 (6)	
Specific Conductance (µS/cm@25 C)	92 - 155	135 (6)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	LeClare
GNIS Number	285412
Latitude	28.1100
Longitude	-82.5370
Water Body Type	Lake
Surface Area (ha and acre)	18 ha or 44 acre
Period of Record (year)	1997 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	22 (14 to 29)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	685 (567 to 846)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake LeClare 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 = 0.40), total nitrogen (TN No Trend, $R^2 = 0.00$, p = 0.89), chlorophyll (CHL No Trend, $R^2 = 0.04$, p = 0.59) and Secchi depth (Secchi No Trend, $R^2 = 0.36$, p = 0.09).



Florida LAKEWATCH Report for Lipsey in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	20 - 37	26 (21)	
Total Nitrogen (µg/L)	619 - 954	751 (21)	
Chlorophyll- uncorrected (µg/L)	4 - 23	12 (21)	
Secchi (ft)	3.9 - 8.7	5.4 (21)	
Secchi (m)	1.2 - 2.6	1.7 (21)	
Color (Pt-Co Units)	20 - 35	27 (17)	
Specific Conductance (µS/cm@25 C)	180 - 228	199 (11)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Lipsey
GNIS Number	300092
Latitude	28.0573
Longitude	-82.4979
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1998 to 2019
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	26 (20 to 37)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	751 (619 to 954)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Lipsey 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 = 0.68), total nitrogen (TN No Trend, $R^2 = 0.00$, p = 0.85), chlorophyll (CHL Increasing, $R^2 = 0.21$, p = 0.03) and Secchi depth (Secchi No Trend, $R^2 = 0.15$, p = 0.08).



Florida LAKEWATCH Report for Little in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	26 - 43	34 (8)	
Total Nitrogen (µg/L)	523 - 1103	772 (8)	
Chlorophyll- uncorrected (µg/L)	14 - 42	25 (8)	
Secchi (ft)	3.2 - 4.7	3.9 (8)	
Secchi (m)	1.0 - 1.4	1.2 (8)	
Color (Pt-Co Units)	20 - 23	22 (6)	
Specific Conductance (µS/cm@25 C)	227 - 263	240 (6)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Little
GNIS Number	
Latitude	28.0727
Longitude	-82.4801
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1996 to 2014
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	34 (26 to 43)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	772 (523 to 1103)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Little 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, $R^2 = 0.17$, p = 0.32), total nitrogen (TN No Trend, $R^2 = 0.23$, p = 0.23), chlorophyll (CHL No Trend, $R^2 = 0.02$, p = 0.71) and Secchi depth (Secchi No Trend, $R^2 = 0.37$, p = 0.11).



Florida LAKEWATCH Report for Little Bass in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)	
Total Phosphorus (µg/L)	17 - 17	17 (1)	
Total Nitrogen (µg/L)	706 - 706	706 (1)	
Chlorophyll- uncorrected (µg/L)	6 - 6	6 (1)	
Secchi (ft)	4.9 - 4.9	4.9 (1)	
Secchi (m)	1.5 - 1.5	1.5 (1)	
Color (Pt-Co Units)	-	(0)	
Specific Conductance (µS/cm@25 C)	-	(0)	
Lake Classification			

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Little Bass
GNIS Number	
Latitude	28.1028
Longitude	-82.5671
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1996 to 1996
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP4
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	17 (17 to 17)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	706 (706 to 706)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Little Halfmoon in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	6 - 18	11 (8)
Total Nitrogen (µg/L)	354 - 722	531 (8)
Chlorophyll- uncorrected (µg/L)	3 - 8	4 (8)
Secchi (ft)	6.2 - 11.2	8.8 (7)
Secchi (m)	1.9 - 3.4	2.7 (7)
Color (Pt-Co Units)	26 - 26	26 (1)
Specific Conductance (µS/cm@25 C)	275 - 275	275 (1)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Little Halfmoon
GNIS Number	285703
Latitude	28.1037
Longitude	-82.5505
Water Body Type	Lake
Surface Area (ha and acre)	4 ha or 9 acre
Period of Record (year)	1991 to 2010
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	11 (6 to 18)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	531 (354 to 722)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Little Halfmoon 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, $R^2 = 0.13$, p = 0.38), total nitrogen (TN No Trend, $R^2 = 0.22$, p = 0.24), chlorophyll (CHL No Trend, $R^2 = 0.02$, p = 0.77) and Secchi depth (Secchi No Trend, $R^2 = 0.01$, p = 0.85).



Florida LAKEWATCH Report for Little Jewel in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)	
Total Phosphorus (µg/L)	5 - 22	10 (2)	
Total Nitrogen (µg/L)	103 - 593	248 (2)	
Chlorophyll- uncorrected (µg/L)	1 - 15	4 (2)	
Secchi (ft)	5.6 - 5.6	5.6 (1)	
Secchi (m)	1.7 - 1.7	1.7 (1)	
Color (Pt-Co Units)	-	(0)	
Specific Conductance (µS/cm@25 C)	-	(0)	
Lake Classification			

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Little Jewel
GNIS Number	
Latitude	28.1174
Longitude	-82.5851
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1995 to 1997
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	10 (5 to 22)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	248 (103 to 593)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Little Moon in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum	calculated	Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric in	terpretation
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	6 - 31	12 (7)
Total Nitrogen (µg/L)	340 - 1270	544 (7)
Chlorophyll- uncorrected (µg/L)	1 - 33	3 (7)
Secchi (ft)	7.7 - 14.0	10.7 (5)
Secchi (m)	2.3 - 4.3	3.3 (5)
Color (Pt-Co Units)	45 - 45	45 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Little Moon
GNIS Number	285744
Latitude	28.1144
Longitude	-82.6006
Water Body Type	Lake
Surface Area (ha and acre)	5 ha or 13 acre
Period of Record (year)	1991 to 2005
Lake Trophic Status (CHL)	Oligotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	12 (6 to 31)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	544 (340 to 1270)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Little Moon 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 Increasing, $R^2 = 0.81$, p = 0.01), total nitrogen (TN Increasing, $R^2 = 0.91$, p = 0.00), chlorophyll (CHL Increasing, $R^2 = 0.68$, p = 0.02) and Secchi depth (Secchi No Trend, $R^2 = 0.64$, p = 0.10).



Florida LAKEWATCH Report for Little Wilson in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum	calculated	Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric in	terpretation
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	25 - 186	48 (18)
Total Nitrogen (µg/L)	812 - 1562	1018 (18)
Chlorophyll- uncorrected (µg/L)	7 - 78	26 (18)
Secchi (ft)	2.6 - 6.3	3.9 (18)
Secchi (m)	0.8 - 1.9	1.2 (18)
Color (Pt-Co Units)	31 - 86	48 (13)
Specific Conductance (µS/cm@25 C)	239 - 440	325 (8)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Little Wilson
GNIS Number	
Latitude	28.1481
Longitude	-82.4922
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1998 to 2018
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	48 (25 to 186)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1018 (812 to 1562)


- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Little Wilson 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 = 0.75), total nitrogen (TN No Trend, $R^2 = 0.01$, p = 0.67), chlorophyll (CHL Increasing, $R^2 = 0.26$, p = 0.03) and Secchi depth (Secchi No Trend, $R^2 = 0.09$, p = 0.22).



Florida LAKEWATCH Report for Long Pond in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	18 - 65	38 (15)
Total Nitrogen (µg/L)	572 - 1420	965 (15)
Chlorophyll- uncorrected (µg/L)	6 - 47	19 (15)
Secchi (ft)	2.0 - 9.1	3.9 (15)
Secchi (m)	0.6 - 2.8	1.2 (15)
Color (Pt-Co Units)	19 - 33	26 (11)
Specific Conductance (µS/cm@25 C)	114 - 160	136 (11)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Long Pond
GNIS Number	286044
Latitude	27.9671
Longitude	-82.2660
Water Body Type	Lake
Surface Area (ha and acre)	20.9 ha or 52 acre
Period of Record (year)	1998 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	38 (18 to 65)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	965 (572 to 1420)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Long Pond 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, $R^2 = 0.01$, p = 0.77), chlorophyll (CHL No Trend, $R^2 = 0.04$, p = 0.48) and Secchi depth (Secchi No Trend, $R^2 = 0.01$, p = 0.69).



Florida LAKEWATCH Report for Lords in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	24 - 27	26 (2)
Total Nitrogen (µg/L)	1066 - 1135	1100 (2)
Chlorophyll- uncorrected (µg/L)	12 - 19	15 (2)
Secchi (ft)	4.5 - 4.8	4.6 (2)
Secchi (m)	1.4 - 1.5	1.4 (2)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Lords
GNIS Number	
Latitude	28.1084
Longitude	-82.4505
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 1998
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	26 (24 to 27)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1100 (1066 to 1135)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Lutz in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	10 - 33	18 (26)
Total Nitrogen (µg/L)	439 - 1003	673 (26)
Chlorophyll- uncorrected (µg/L)	3 - 23	7 (26)
Secchi (ft)	4.4 - 13.2	7.2 (26)
Secchi (m)	1.4 - 4.0	2.2 (26)
Color (Pt-Co Units)	8 - 63	23 (22)
Specific Conductance (µS/cm@25 C)	173 - 247	207 (16)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Lutz
GNIS Number	285710
Latitude	28.1536
Longitude	-82.4635
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	18 (10 to 33)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	673 (439 to 1003)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Lutz 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 Increasing, $R^2 = 0.38$, p = 0.00), total nitrogen (TN Increasing, $R^2 = 0.52$, p = 0.00), chlorophyll (CHL Increasing, $R^2 = 0.32$, p = 0.00) and Secchi depth (Secchi Decreasing, $R^2 = 0.19$, p = 0.02).



Florida LAKEWATCH Report for Magdalene in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	8 - 21	13 (34)	
Total Nitrogen (µg/L)	569 - 843	696 (34)	
Chlorophyll- uncorrected (µg/L)	2 - 10	4 (34)	
Secchi (ft)	6.3 - 12.2	8.9 (34)	
Secchi (m)	1.9 - 3.7	2.7 (34)	
Color (Pt-Co Units)	12 - 37	26 (21)	
Specific Conductance (µS/cm@25 C)	175 - 242	218 (15)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Magdalene
GNIS Number	286281
Latitude	28.0863
Longitude	-82.4810
Water Body Type	Lake
Surface Area (ha and acre)	96 ha or 238 acre
Period of Record (year)	1989 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	13 (8 to 21)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	696 (569 to 843)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Magdalene 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 Increasing, $R^2 = 0.30$, p = 0.00), total nitrogen (TN Increasing, $R^2 = 0.14$, p = 0.03), chlorophyll (CHL No Trend, $R^2 = 0.09$, p = 0.08) and Secchi depth (Secchi Decreasing, $R^2 = 0.31$, p = 0.00).



Florida LAKEWATCH Report for Mango in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
Total Phosphorus (µg/L)	103 - 224	164 (17)	
Total Nitrogen (µg/L)	1627 - 3006	2269 (17)	
Chlorophyll- uncorrected (µg/L)	73 - 158	116 (17)	
Secchi (ft)	1.0 - 2.2	1.5 (17)	
Secchi (m)	0.3 - 0.7	0.4 (17)	
Color (Pt-Co Units)	44 - 70	51 (11)	
Specific Conductance (µS/cm@25 C)	146 - 192	172 (9)	
Lake Classification	Colored		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Mango
GNIS Number	286374
Latitude	27.9717
Longitude	-82.2994
Water Body Type	Lake
Surface Area (ha and acre)	13 ha or 30 acre
Period of Record (year)	1999 to 2021
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	164 (103 to 224)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	2269 (1627 to 3006)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Mango 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, $R^2 = 0.34$, p = 0.01), total nitrogen (TN No Trend, $R^2 = 0.08$, p = 0.27), chlorophyll (CHL Decreasing, $R^2 = 0.25$, p = 0.04) and Secchi depth (Secchi Increasing, $R^2 = 0.57$, p = 0.00).



Florida LAKEWATCH Report for Martha in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	9 - 13	11 (2)
Total Nitrogen (µg/L)	780 - 902	839 (2)
Chlorophyll- uncorrected (µg/L)	3 - 7	5 (2)
Secchi (ft)	5.8 - 8.0	6.8 (2)
Secchi (m)	1.8 - 2.4	2.1 (2)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in **bold** can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Martha
GNIS Number	
Latitude	28.1478
Longitude	-82.5996
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1996 to 1997
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	11 (9 to 13)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	839 (780 to 902)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Maurine in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	16 - 28	22 (19)	
Total Nitrogen (µg/L)	507 - 905	748 (19)	
Chlorophyll- uncorrected (µg/L)	3 - 15	7 (19)	
Secchi (ft)	3.6 - 9.0	5.6 (19)	
Secchi (m)	1.1 - 2.8	1.7 (19)	
Color (Pt-Co Units)	37 - 63	50 (12)	
Specific Conductance (µS/cm@25 C)	120 - 278	223 (10)	
Lake Classification	Colored		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough	
Name	Maurine	
GNIS Number	282343	
Latitude	28.0899	
Longitude	-82.5851	
Water Body Type	Lake	
Surface Area (ha and acre)	. ha or . acre	
Period of Record (year)	1991 to 2022	
Lake Trophic Status (CHL)	Eutrophic	
TP Zone	TP3	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	22 (16 to 28)	
TN Zone	TN3	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	748 (507 to 905)	



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Maurine 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 Increasing, $R^2 = 0.21$, p = 0.05), total nitrogen (TN No Trend, $R^2 = 0.00$, p = 0.89), chlorophyll (CHL No Trend, $R^2 = 0.10$, p = 0.19) and Secchi depth (Secchi No Trend, $R^2 = 0.09$, p = 0.21).



Florida LAKEWATCH Report for McComas in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).
| Long Term Geometric | Annual | Minimum calculated | | Maximum calculated | |
|-----------------------------------|--------------|------------------------|------------|------------------------|------------|
| Mean Lake Color and Long- | Geometric | numeric interpretation | | numeric interpretation | |
| Term Geometric Mean | Mean | Annual | Annual | Annual | Annual |
| Color, Alkalinity and | Chlorophyll- | Geometric | Geometric | Geometric | Geometric |
| Specific Conductance | corrected | Mean Total | Mean Total | Mean Total | Mean Total |
| | | Phosphorus | Nitrogen | Phosphorus | Nitrogen |
| > 40 Platinum Cobalt Units | 20 µg/L | 50 µg/L | 1270 μg/L | 160 μg/L ¹ | 2230 µg/L |
| Colored Lakes | | | | | |
| \leq 40 Platinum Cobalt Units | | | | | |
| and $> 20 \text{ mg/L CaCO}_3$ | 20 µg/L | 30 µg/L | 1050 μg/L | 90 μg/L | 1910 µg/L |
| or | | | | | |
| >100 µS/cm@25 C | | | | | |
| Clear Hard Water Lakes | | | | | |
| \leq 40 Platinum Cobalt Units | | | | | |
| and $\leq 20 \text{ mg/L CaCO}_3$ | 6 µg/L | 10 µg/L | 510 | 30 µg/L | 930 μg/L |
| or | | | μg/L | | |
| < 100 µS/cm@25 C | | | | | |
| Clear Soft Water Lakes | | | | | |

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	225 - 225	225 (1)
Total Nitrogen (µg/L)	4483 - 4483	4483 (1)
Chlorophyll- uncorrected (µg/L)	176 - 176	176 (1)
Secchi (ft)	1.0 - 1.0	1.0 (1)
Secchi (m)	0.3 - 0.3	0.3 (1)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	McComas
GNIS Number	
Latitude	27.8880
Longitude	-82.3401
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2007 to 2007
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	225 (225 to 225)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	4483 (4483 to 4483)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Mead in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	22 - 68	40 (7)
Total Nitrogen (µg/L)	640 - 1497	889 (7)
Chlorophyll- uncorrected (μ g/L)	4 - 21	9 (7)
Secchi (ft)	3.5 - 8.7	5.4 (7)
Secchi (m)	1.1 - 2.6	1.6 (7)
Color (Pt-Co Units)	35 - 67	46 (6)
Specific Conductance (µS/cm@25 C)	62 - 123	86 (4)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Mead
GNIS Number	286660
Latitude	27.9485
Longitude	-82.2954
Water Body Type	Lake
Surface Area (ha and acre)	5.6 ha or 14 acre
Period of Record (year)	2002 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	40 (22 to 68)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	889 (640 to 1497)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Mead 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 Increasing, $R^2 = 0.72$, p = 0.02), total nitrogen (TN Increasing, $R^2 = 0.75$, p = 0.01), chlorophyll (CHL Increasing, $R^2 = 0.73$, p = 0.01) and Secchi depth (Secchi Decreasing, $R^2 = 0.85$, p = 0.00).



Florida LAKEWATCH Report for Michaela in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	268 - 271	269 (2)	
Total Nitrogen (µg/L)	2438 - 2832	2628 (2)	
Chlorophyll- uncorrected (µg/L)	102 - 112	107 (2)	
Secchi (ft)	1.2 - 1.6	1.4 (2)	
Secchi (m)	0.4 - 0.5	0.4 (2)	
Color (Pt-Co Units)	44 - 47	46 (2)	
Specific Conductance (µS/cm@25 C)	327 - 428	374 (2)	
Lake Classification	Colored		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Michaela
GNIS Number	
Latitude	27.9013
Longitude	-82.2107
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2021 to 2022
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	269 (268 to 271)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	2628 (2438 to 2832)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Mid in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	41 - 90	55 (6)
Total Nitrogen (µg/L)	893 - 2030	1153 (6)
Chlorophyll- uncorrected (µg/L)	16 - 41	23 (6)
Secchi (ft)	2.0 - 4.4	3.0 (6)
Secchi (m)	0.6 - 1.3	0.9 (6)
Color (Pt-Co Units)	38 - 38	38 (1)
Specific Conductance (µS/cm@25 C)	263 - 263	263 (1)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Mid
GNIS Number	
Latitude	28.0586
Longitude	-82.4739
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1996 to 2007
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	55 (41 to 90)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1153 (893 to 2030)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Mid 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 = 0.97), total nitrogen (TN No Trend, $R^2 = 0.13$, p = 0.47), chlorophyll (CHL No Trend, $R^2 = 0.06$, p = 0.65) and Secchi depth (Secchi No Trend, $R^2 = 0.09$, p = 0.57).



Florida LAKEWATCH Report for Middle in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	150 - 150	150 (1)	
Total Nitrogen (µg/L)	2241 - 2241	2241 (1)	
Chlorophyll- uncorrected (µg/L)	96 - 96	96 (1)	
Secchi (ft)	1.4 - 1.4	1.4 (1)	
Secchi (m)	0.4 - 0.4	0.4 (1)	
Color (Pt-Co Units)	32 - 32	32 (1)	
Specific Conductance (µS/cm@25 C)	223 - 223	223 (1)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Middle
GNIS Number	
Latitude	27.7244
Longitude	-82.3613
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2014 to 2014
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	150 (150 to 150)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	2241 (2241 to 2241)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Mill in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	16 - 68	42 (15)	
Total Nitrogen (µg/L)	293 - 701	563 (15)	
Chlorophyll- uncorrected (µg/L)	1 - 24	11 (15)	
Secchi (ft)	1.9 - 2.1	2.0 (10)	
Secchi (m)	0.6 - 0.6	0.6 (10)	
Color (Pt-Co Units)	21 - 27	24 (12)	
Specific Conductance (µS/cm@25 C)	178 - 257	216 (11)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Mill
GNIS Number	
Latitude	28.0875
Longitude	-82.4240
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1999 to 2020
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	42 (16 to 68)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	563 (293 to 701)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Mill 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 Increasing, $R^2 = 0.64$, p = 0.00), total nitrogen (TN Increasing, $R^2 = 0.59$, p = 0.00), chlorophyll (CHL Increasing, $R^2 = 0.68$, p = 0.00) and Secchi depth (Secchi No Trend, $R^2 = 0.21$, p = 0.18).



Florida LAKEWATCH Report for Mirror in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	n's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 μg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	114 - 342	197 (2)
Total Nitrogen (µg/L)	1248 - 4000	2234 (2)
Chlorophyll- uncorrected (µg/L)	38 - 52	44 (2)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	31 - 31	31 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough	
Name	Mirror	
GNIS Number		
Latitude		
Longitude		
Water Body Type	Lake	
Surface Area (ha and acre)	. ha or . acre	
Period of Record (year)	2002 to 2003	
Lake Trophic Status (CHL)	Hypereutrophic	
TP Zone		
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	197 (114 to 342)	
TN Zone		
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	2234 (1248 to 4000)	



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Mohrlake in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 μg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	34 - 35	34 (2)	
Total Nitrogen (µg/L)	823 - 996	905 (2)	
Chlorophyll- uncorrected (µg/L)	10 - 12	11 (2)	
Secchi (ft)	4.9 - 5.6	5.3 (2)	
Secchi (m)	1.5 - 1.7	1.6 (2)	
Color (Pt-Co Units)	24 - 34	29 (2)	
Specific Conductance (µS/cm@25 C)	198 - 222	210 (2)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Mohrlake
GNIS Number	
Latitude	27.9145
Longitude	-82.3164
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2019 to 2020
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	34 (34 to 35)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	905 (823 to 996)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Moores in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	106 - 106	106 (1)	
Total Nitrogen (µg/L)	1685 - 1685	1685 (1)	
Chlorophyll- uncorrected (µg/L)	56 - 56	56 (1)	
Secchi (ft)	1.9 - 1.9	1.9 (1)	
Secchi (m)	0.6 - 0.6	0.6 (1)	
Color (Pt-Co Units)	26 - 26	26 (1)	
Specific Conductance (µS/cm@25 C)	177 - 177	177 (1)	
Lake Classification	Clear Hardwater		
The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Moores
GNIS Number	287105
Latitude	28.0096
Longitude	-82.2215
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2007 to 2007
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	106 (106 to 106)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1685 (1685 to 1685)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Morley in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	21 - 85	43 (5)
Total Nitrogen (µg/L)	563 - 1237	915 (5)
Chlorophyll- uncorrected (µg/L)	4 - 43	16 (5)
Secchi (ft)	2.4 - 4.0	3.0 (3)
Secchi (m)	0.7 - 1.2	0.9 (3)
Color (Pt-Co Units)	21 - 36	29 (5)
Specific Conductance (µS/cm@25 C)	130 - 182	150 (4)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Morley
GNIS Number	
Latitude	28.0872
Longitude	-82.4700
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2003 to 2014
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	43 (21 to 85)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	915 (563 to 1237)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Morley 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, $R^2 = 0.08$, p = 0.64), total nitrogen (TN No Trend, $R^2 = 0.14$, p = 0.54), chlorophyll (CHL No Trend, $R^2 = 0.18$, p = 0.48) and Secchi depth (Secchi No Trend, $R^2 = 0.99$, p = 0.08).



Florida LAKEWATCH Report for Morris in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes	Clear Hard Water Lakes				
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	60 - 60	60 (1)
Total Nitrogen (µg/L)	1217 - 1217	1217 (1)
Chlorophyll- uncorrected (µg/L)	31 - 31	31 (1)
Secchi (ft)	2.4 - 2.4	2.4 (1)
Secchi (m)	0.7 - 0.7	0.7 (1)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Morris
GNIS Number	
Latitude	28.0726
Longitude	-82.4656
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 1997
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	60 (60 to 60)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1217 (1217 to 1217)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Mound in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	4 - 18	9 (15)
Total Nitrogen (µg/L)	300 - 623	439 (15)
Chlorophyll- uncorrected (µg/L)	1 - 8	3 (15)
Secchi (ft)	6.4 - 17.1	10.7 (15)
Secchi (m)	1.9 - 5.2	3.3 (15)
Color (Pt-Co Units)	32 - 39	36 (4)
Specific Conductance (µS/cm@25 C)	93 - 123	111 (4)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Mound
GNIS Number	287192
Latitude	28.1495
Longitude	-82.5740
Water Body Type	Lake
Surface Area (ha and acre)	32 ha or 79 acre
Period of Record (year)	1990 to 2021
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	9 (4 to 18)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	439 (300 to 623)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Mound 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 Increasing, $R^2 = 0.74$, p = 0.00), total nitrogen (TN Increasing, $R^2 = 0.88$, p = 0.00), chlorophyll (CHL Increasing, $R^2 = 0.65$, p = 0.00) and Secchi depth (Secchi Decreasing, $R^2 = 0.56$, p = 0.00).



Florida LAKEWATCH Report for Myrtle in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	18 - 21	19 (2)
Total Nitrogen (µg/L)	793 - 917	853 (2)
Chlorophyll- uncorrected (µg/L)	10 - 12	11 (2)
Secchi (ft)	6.1 - 6.1	6.1 (2)
Secchi (m)	1.8 - 1.9	1.9 (2)
Color (Pt-Co Units)	53 - 56	55 (2)
Specific Conductance (µS/cm@25 C)	167 - 202	184 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Myrtle
GNIS Number	
Latitude	28.1490
Longitude	-82.4815
Water Body Type	Lake
Surface Area (ha and acre)	4 ha or 10 acre
Period of Record (year)	2011 to 2012
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	19 (18 to 21)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	853 (793 to 917)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Mystik in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	141 - 202	169 (2)
Total Nitrogen (µg/L)	1301 - 1833	1544 (2)
Chlorophyll- uncorrected (µg/L)	8 - 29	15 (2)
Secchi (ft)	2.6 - 2.8	2.7 (2)
Secchi (m)	0.8 - 0.9	0.8 (2)
Color (Pt-Co Units)	67 - 108	85 (2)
Specific Conductance (µS/cm@25 C)	122 - 126	124 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Mystik
GNIS Number	
Latitude	28.1184
Longitude	-82.5224
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2021 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP4
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	169 (141 to 202)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1544 (1301 to 1833)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Florida LAKEWATCH Report for Nancy in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	13 - 23	17 (11)
Total Nitrogen (µg/L)	417 - 837	618 (11)
Chlorophyll- uncorrected (μ g/L)	2 - 11	6 (11)
Secchi (ft)	4.2 - 6.6	5.3 (11)
Secchi (m)	1.3 - 2.0	1.6 (11)
Color (Pt-Co Units)	46 - 78	65 (9)
Specific Conductance (µS/cm@25 C)	76 - 133	100 (9)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Nancy
GNIS Number	
Latitude	28.1673
Longitude	-82.4916
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2012 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	17 (13 to 23)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	618 (417 to 837)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Nancy 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, $R^2 = 0.38$, p = 0.04), total nitrogen (TN Decreasing, $R^2 = 0.81$, p = 0.00), chlorophyll (CHL No Trend, $R^2 = 0.31$, p = 0.08) and Secchi depth (Secchi Increasing, $R^2 = 0.64$, p = 0.00).



Florida LAKEWATCH Report for Nawela in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	28 - 59	44 (7)
Total Nitrogen (µg/L)	769 - 1609	1098 (7)
Chlorophyll- uncorrected (µg/L)	13 - 59	36 (7)
Secchi (ft)	0.5 - 3.3	2.1 (7)
Secchi (m)	0.2 - 1.0	0.6 (7)
Color (Pt-Co Units)	29 - 41	34 (7)
Specific Conductance (µS/cm@25 C)	78 - 129	102 (7)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Nawela
GNIS Number	
Latitude	28.0571
Longitude	-82.5584
Water Body Type	Lake
Surface Area (ha and acre)	ha or . acre
Period of Record (year)	2011 to 2017
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP4
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	44 (28 to 59)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1098 (769 to 1609)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Nawela 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, $R^2 = 0.84$, p = 0.00), total nitrogen (TN Decreasing, $R^2 = 0.90$, p = 0.00), chlorophyll (CHL Decreasing, $R^2 = 0.78$, p = 0.01) and Secchi depth (Secchi No Trend, $R^2 = 0.09$, p = 0.52).



Florida LAKEWATCH Report for New Ryan in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	n's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	19 - 34	25 (9)
Total Nitrogen (µg/L)	747 - 1200	977 (9)
Chlorophyll- uncorrected (µg/L)	5 - 17	10 (9)
Secchi (ft)	4.4 - 7.5	5.7 (9)
Secchi (m)	1.4 - 2.3	1.7 (9)
Color (Pt-Co Units)	42 - 92	57 (5)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification	Colored	
The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	New Ryan
GNIS Number	2071308
Latitude	28.1642
Longitude	-82.4407
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 2005
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	25 (19 to 34)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	977 (747 to 1200)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake New Ryan 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, $R^2 = 0.20$, p = 0.23), total nitrogen (TN No Trend, $R^2 = 0.04$, p = 0.59), chlorophyll (CHL No Trend, $R^2 = 0.19$, p = 0.24) and Secchi depth (Secchi No Trend, $R^2 = 0.00$, p = 0.89).



Florida LAKEWATCH Report for Newlands in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	39 - 45	42 (4)
Total Nitrogen (µg/L)	895 - 955	929 (4)
Chlorophyll- uncorrected (µg/L)	20 - 25	23 (4)
Secchi (ft)	3.1 - 3.4	3.2 (4)
Secchi (m)	1.0 - 1.0	1.0 (4)
Color (Pt-Co Units)	27 - 32	29 (4)
Specific Conductance (µS/cm@25 C)	172 - 191	184 (4)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Newlands
GNIS Number	
Latitude	28.0834
Longitude	-82.4736
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2019 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	42 (39 to 45)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	929 (895 to 955)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Norbert in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	12 - 34	22 (20)
Total Nitrogen (µg/L)	522 - 1185	883 (20)
Chlorophyll- uncorrected (µg/L)	3 - 25	11 (19)
Secchi (ft)	3.2 - 13.0	5.8 (19)
Secchi (m)	1.0 - 4.0	1.8 (19)
Color (Pt-Co Units)	12 - 42	29 (15)
Specific Conductance (µS/cm@25 C)	158 - 283	213 (12)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Norbert
GNIS Number	
Latitude	28.1542
Longitude	-82.4793
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1996 to 2018
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	22 (12 to 34)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	883 (522 to 1185)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Norbert 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, $R^2 = 0.11$, p = 0.15), total nitrogen (TN Increasing, $R^2 = 0.32$, p = 0.01), chlorophyll (CHL No Trend, $R^2 = 0.16$, p = 0.09) and Secchi depth (Secchi Decreasing, $R^2 = 0.42$, p = 0.00).



Florida LAKEWATCH Report for Noreast in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	14 - 28	21 (9)
Total Nitrogen (µg/L)	537 - 858	695 (9)
Chlorophyll- uncorrected (µg/L)	4 - 12	7 (9)
Secchi (ft)	5.3 - 8.3	7.0 (9)
Secchi (m)	1.6 - 2.5	2.1 (9)
Color (Pt-Co Units)	22 - 32	27 (9)
Specific Conductance (µS/cm@25 C)	166 - 179	173 (4)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Noreast
GNIS Number	287762
Latitude	28.0633
Longitude	-82.4694
Water Body Type	Lake
Surface Area (ha and acre)	3.8 ha or 9 acre
Period of Record (year)	2002 to 2010
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	21 (14 to 28)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	695 (537 to 858)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Noreast 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, $R^2 = 0.50$, p = 0.03), total nitrogen (TN Decreasing, $R^2 = 0.60$, p = 0.01), chlorophyll (CHL Decreasing, $R^2 = 0.47$, p = 0.04) and Secchi depth (Secchi Increasing, $R^2 = 0.64$, p = 0.01).



Florida LAKEWATCH Report for North Pond in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	39 - 92	64 (17)
Total Nitrogen (µg/L)	847 - 1577	1086 (17)
Chlorophyll- uncorrected (µg/L)	19 - 92	39 (17)
Secchi (ft)	1.1 - 3.5	2.1 (16)
Secchi (m)	0.3 - 1.1	0.6 (16)
Color (Pt-Co Units)	19 - 27	23 (15)
Specific Conductance (µS/cm@25 C)	153 - 304	202 (12)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	North Pond
GNIS Number	
Latitude	28.0913
Longitude	-82.4202
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2004 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	64 (39 to 92)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1086 (847 to 1577)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake North Pond 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 = 0.66), total nitrogen (TN No Trend, $R^2 = 0.09$, p = 0.25), chlorophyll (CHL No Trend, $R^2 = 0.07$, p = 0.30) and Secchi depth (Secchi No Trend, $R^2 = 0.02$, p = 0.60).



Florida LAKEWATCH Report for Osceola in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	6 - 21	13 (21)
Total Nitrogen (µg/L)	396 - 846	650 (21)
Chlorophyll- uncorrected (µg/L)	2 - 16	4 (22)
Secchi (ft)	4.7 - 15.5	8.7 (21)
Secchi (m)	1.4 - 4.7	2.6 (21)
Color (Pt-Co Units)	16 - 40	23 (15)
Specific Conductance (µS/cm@25 C)	129 - 254	188 (12)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Osceola
GNIS Number	288266
Latitude	28.1726
Longitude	-82.5843
Water Body Type	Lake
Surface Area (ha and acre)	26 ha or 64 acre
Period of Record (year)	1990 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	13 (6 to 21)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	650 (396 to 846)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Osceola 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 Increasing, $R^2 = 0.62$, p = 0.00), total nitrogen (TN Increasing, $R^2 = 0.74$, p = 0.00), chlorophyll (CHL Increasing, $R^2 = 0.37$, p = 0.00) and Secchi depth (Secchi Decreasing, $R^2 = 0.66$, p = 0.00).



Florida LAKEWATCH Report for Pine in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	22 - 34	28 (6)
Total Nitrogen (µg/L)	673 - 1005	839 (6)
Chlorophyll- uncorrected (µg/L)	5 - 19	8 (6)
Secchi (ft)	3.3 - 9.3	6.5 (5)
Secchi (m)	1.0 - 2.8	2.0 (5)
Color (Pt-Co Units)	19 - 25	22 (3)
Specific Conductance (µS/cm@25 C)	172 - 201	186 (2)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pine
GNIS Number	288888
Latitude	28.0602
Longitude	-82.4717
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	28 (22 to 34)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	839 (673 to 1005)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

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- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
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- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Pine 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, $R^2 = 0.66$, p = 0.05), total nitrogen (TN No Trend, $R^2 = 0.44$, p = 0.15), chlorophyll (CHL No Trend, $R^2 = 0.39$, p = 0.19) and Secchi depth (Secchi No Trend, $R^2 = 0.72$, p = 0.07).



Florida LAKEWATCH Report for Pine Pond in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 μg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Grand Geometric Mea	
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	40 - 46	43 (2)
Total Nitrogen (µg/L)	844 - 1037	935 (2)
Chlorophyll- uncorrected (µg/L)	20 - 22	21 (2)
Secchi (ft)	3.0 - 4.5	3.7 (2)
Secchi (m)	0.9 - 1.4	1.1 (2)
Color (Pt-Co Units)	31 - 31	31 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in **bold** can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pine Pond
GNIS Number	
Latitude	28.0607
Longitude	-82.4696
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2005 to 2006
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	43 (40 to 46)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	935 (844 to 1037)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.
Florida LAKEWATCH Report for Place in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	8 - 31	19 (9)
Total Nitrogen (µg/L)	437 - 1924	1219 (9)
Chlorophyll- uncorrected (µg/L)	1 - 48	14 (9)
Secchi (ft)	2.0 - 6.6	3.0 (7)
Secchi (m)	0.6 - 2.0	0.9 (7)
Color (Pt-Co Units)	23 - 28	26 (4)
Specific Conductance (µS/cm@25 C)	155 - 193	174 (4)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Place
GNIS Number	
Latitude	28.0302
Longitude	-82.5546
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1998 to 2019
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP4
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	19 (8 to 31)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1219 (437 to 1924)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Place 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 Increasing, $R^2 = 0.92$, p = 0.00), total nitrogen (TN Increasing, $R^2 = 0.50$, p = 0.03), chlorophyll (CHL Increasing, $R^2 = 0.89$, p = 0.00) and Secchi depth (Secchi Decreasing, $R^2 = 0.95$, p = 0.00).



Florida LAKEWATCH Report for Platt in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	21 - 51	29 (6)
Total Nitrogen (µg/L)	776 - 1067	905 (6)
Chlorophyll- uncorrected (μ g/L)	11 - 29	18 (6)
Secchi (ft)	3.5 - 5.3	4.1 (6)
Secchi (m)	1.1 - 1.6	1.2 (6)
Color (Pt-Co Units)	31 - 77	43 (5)
Specific Conductance (µS/cm@25 C)	119 - 144	128 (3)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Platt
GNIS Number	289039
Latitude	28.0960
Longitude	-82.4797
Water Body Type	Lake
Surface Area (ha and acre)	26 ha or 63 acre
Period of Record (year)	2001 to 2021
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	29 (21 to 51)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	905 (776 to 1067)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Platt 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, $R^2 = 0.02$, p = 0.82), total nitrogen (TN No Trend, $R^2 = 0.02$, p = 0.81), chlorophyll (CHL No Trend, $R^2 = 0.04$, p = 0.71) and Secchi depth (Secchi No Trend, $R^2 = 0.26$, p = 0.31).



Florida LAKEWATCH Report for Pond 01-14 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
Total Phosphorus (µg/L)	127 - 149	137 (2)
Total Nitrogen (µg/L)	1152 - 1313	1230 (2)
Chlorophyll- uncorrected (µg/L)	35 - 35	35 (2)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	54 - 54	54 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 01-14
GNIS Number	
Latitude	28.0525
Longitude	-82.5950
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2003 to 2004
Lake Trophic Status (CHL)	Eutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	137 (127 to 149)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1230 (1152 to 1313)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 02-07 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department	of Environm	iental Protec	tion's Nun	ieric Nutrie	nt Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	80 - 80	80 (2)
Total Nitrogen (µg/L)	699 - 786	741 (2)
Chlorophyll- uncorrected (µg/L)	37 - 47	42 (2)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	18 - 18	18 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 02-07
GNIS Number	
Latitude	27.8848
Longitude	-82.2695
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2003 to 2004
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	80 (80 to 80)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	741 (699 to 786)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 03-16 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department	of Environm	iental Protec	tion's Nun	ieric Nutrie	nt Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	42 - 47	44 (2)
Total Nitrogen (µg/L)	991 - 1145	1065 (2)
Chlorophyll- uncorrected (μ g/L)	9 - 35	18 (2)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	32 - 41	36 (2)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 03-16
GNIS Number	
Latitude	28.0644
Longitude	-82.4927
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2004 to 2005
Lake Trophic Status (CHL)	Eutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	44 (42 to 47)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1065 (991 to 1145)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 03-19 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department	of Environm	iental Protec	tion's Nun	ieric Nutrie	nt Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	23 - 23	23 (1)
Total Nitrogen (µg/L)	680 - 680	680 (1)
Chlorophyll- uncorrected (µg/L)	12 - 12	12 (1)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 03-19
GNIS Number	
Latitude	28.0896
Longitude	-82.5510
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2005 to 2005
Lake Trophic Status (CHL)	Eutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	23 (23 to 23)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	680 (680 to 680)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 04-05 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department	of Environm	ental Protec	tion's Nun	neric Nutrier	nt Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	50 - 50	50 (1)
Total Nitrogen (µg/L)	455 - 455	455 (1)
Chlorophyll- uncorrected (µg/L)	6 - 6	6 (1)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough		
Name	Pond 04-05		
GNIS Number			
Latitude	28.1224		
Longitude	-82.4591		
Water Body Type	Lake		
Surface Area (ha and acre)	ha or acre		
Period of Record (year)	2005 to 2005		
Lake Trophic Status (CHL)	Mesotrophic		
TP Zone			
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	50 (50 to 50)		
TN Zone			
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	455 (455 to 455)		



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 05-04 Inlet in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department	of Environm	ental Protec	tion's Nun	neric Nutrier	nt Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	99 - 179	129 (6)
Total Nitrogen (µg/L)	1087 - 1460	1220 (6)
Chlorophyll- uncorrected (µg/L)	-	(0)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	31 - 41	38 (4)
Specific Conductance (µS/cm@25 C)	218 - 292	240 (4)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough		
Name	Pond 05-04 Inlet		
GNIS Number			
Latitude	27.8775		
Longitude	-82.2791		
Water Body Type	Lake		
Surface Area (ha and acre)	ha or acre		
Period of Record (year)	2007 to 2012		
Lake Trophic Status (CHL)			
TP Zone			
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	129 (99 to 179)		
TN Zone			
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1220 (1087 to 1460)		



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

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- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Pond 05-04 Inlet 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, $R^2 = 0.32$, p = 0.24), total nitrogen (TN No Trend, $R^2 = 0.07$, p = 0.61), chlorophyll (CHL , $R^2 =$, p =) and Secchi depth (Secchi , $R^2 =$, p =).



Florida LAKEWATCH Report for Pond 05-04 Outlet in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).
| Table 1. | Florida | Department of | of Environmen | tal Protection | ı's Numeric | Nutrient | Criteria | for lakes. |
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)	
Total Phosphorus (µg/L)	100 - 179	130 (6)	
Total Nitrogen (µg/L)	1108 - 1495	1233 (6)	
Chlorophyll- uncorrected (µg/L)	-	(0)	
Secchi (ft)	-	(0)	
Secchi (m)	-	(0)	
Color (Pt-Co Units)	36 - 36	36 (1)	
Specific Conductance (µS/cm@25 C)	252 - 252	252 (1)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 05-04 Outlet
GNIS Number	
Latitude	27.8775
Longitude	-82.2791
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2007 to 2012
Lake Trophic Status (CHL)	
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	130 (100 to 179)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1233 (1108 to 1495)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Pond 05-04 Outlet trend plots of year by average. The R² value indicates the strength of the relations (ranges from 0.0 to 1.0; higher the R² the stronger the relation) and the p value indicates if the relation is significant (p < 0.05 is significant). Total phosphorus (TP No Trend, R² = 0.23, p = 0.33), total nitrogen (TN No Trend, R² = 0.16, p = 0.44), chlorophyll (CHL , R² = , p =) and Secchi depth (Secchi , R² = , p =).



Florida LAKEWATCH Report for Pond 05-07 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	34 - 70	49 (6)	
Total Nitrogen (µg/L)	891 - 1047	974 (6)	
Chlorophyll- uncorrected (µg/L)	7 - 144	29 (6)	
Secchi (ft)	0.5 - 0.9	0.7 (3)	
Secchi (m)	0.2 - 0.3	0.2 (3)	
Color (Pt-Co Units)	25 - 32	27 (5)	
Specific Conductance (µS/cm@25 C)	192 - 257	238 (5)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 05-07
GNIS Number	
Latitude	
Longitude	
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2008 to 2013
Lake Trophic Status (CHL)	Eutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	49 (34 to 70)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	974 (891 to 1047)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Pond 05-07 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 Increasing, $R^2 = 0.88$, p = 0.01), total nitrogen (TN No Trend, $R^2 = 0.34$, p = 0.23), chlorophyll (CHL No Trend, $R^2 = 0.00$, p = 0.94) and Secchi depth (Secchi No Trend, $R^2 = 0.00$, p = 1.00).



Florida LAKEWATCH Report for Pond 06-01 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department	of Environm	iental Protec	tion's Nun	ieric Nutrie	nt Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	58 - 58	58 (1)
Total Nitrogen (µg/L)	2140 - 2140	2140 (1)
Chlorophyll- uncorrected (µg/L)	100 - 100	100 (1)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 06-01
GNIS Number	
Latitude	27.8503
Longitude	-82.2310
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2007 to 2007
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	58 (58 to 58)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	2140 (2140 to 2140)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 06-13 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	50 - 54	52 (2)
Total Nitrogen (µg/L)	1384 - 1510	1446 (2)
Chlorophyll- uncorrected (μ g/L)	15 - 22	18 (2)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	58 - 62	60 (2)
Specific Conductance (µS/cm@25 C)	456 - 484	469 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 06-13
GNIS Number	
Latitude	27.7340
Longitude	-82.3470
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2011 to 2012
Lake Trophic Status (CHL)	Eutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	52 (50 to 54)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1446 (1384 to 1510)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 06-28 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department	of Environm	iental Protec	tion's Nun	ieric Nutrie	nt Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	30 - 70	41 (7)
Total Nitrogen (µg/L)	723 - 1300	987 (7)
Chlorophyll- uncorrected (µg/L)	7 - 34	18 (7)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	32 - 67	42 (7)
Specific Conductance (µS/cm@25 C)	121 - 190	149 (7)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 06-28
GNIS Number	
Latitude	28.1117
Longitude	-82.4926
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2008 to 2014
Lake Trophic Status (CHL)	Eutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	41 (30 to 70)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	987 (723 to 1300)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Pond 06-28 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, $R^2 = 0.36$, p = 0.15), total nitrogen (TN No Trend, $R^2 = 0.03$, p = 0.73), chlorophyll (CHL No Trend, $R^2 = 0.22$, p = 0.29) and Secchi depth (Secchi , $R^2 =$, p =).



Florida LAKEWATCH Report for Pond 06-905 Inflow in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department	of Environm	iental Protec	tion's Nun	ieric Nutrie	nt Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	534 - 534	534 (1)
Total Nitrogen (µg/L)	985 - 985	985 (1)
Chlorophyll- uncorrected (µg/L)	171 - 171	171 (1)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 06-905 Inflow
GNIS Number	
Latitude	27.8779
Longitude	-82.2854
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2006 to 2006
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	534 (534 to 534)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	985 (985 to 985)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 06-905 Outflow in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department	of Environm	ental Protec	tion's Nun	neric Nutrier	nt Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated		
Mean Lake Color and Long-	Geometric	numeric int	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual	
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric	
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total	
		Phosphorus	Nitrogen	Phosphorus	Nitrogen	
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 µg/L ¹	2230 µg/L	
Colored Lakes						
\leq 40 Platinum Cobalt Units						
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L	
or						
>100 µS/cm@25 C						
Clear Hard Water Lakes						
\leq 40 Platinum Cobalt Units						
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L	
or			μg/L			
< 100 µS/cm@25 C						
Clear Soft Water Lakes						

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	515 - 515	515 (1)
Total Nitrogen (µg/L)	883 - 883	883 (1)
Chlorophyll- uncorrected (µg/L)	104 - 104	104 (1)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 06-905 Outflow
GNIS Number	
Latitude	27.8779
Longitude	-82.2854
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2006 to 2006
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	515 (515 to 515)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	883 (883 to 883)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 06-906 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	n's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	78 - 116	94 (3)
Total Nitrogen (µg/L)	1834 - 2535	2199 (3)
Chlorophyll- uncorrected (μ g/L)	-	(0)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	23 - 23	23 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 06-906
GNIS Number	
Latitude	28.0292
Longitude	-82.4896
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2006 to 2008
Lake Trophic Status (CHL)	
TP Zone	
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	94 (78 to 116)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	2199 (1834 to 2535)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 06-911 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated		
Mean Lake Color and Long-	Geometric	numeric int	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual	
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric	
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total	
		Phosphorus	Nitrogen	Phosphorus	Nitrogen	
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L	
Colored Lakes						
\leq 40 Platinum Cobalt Units						
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L	
or						
>100 µS/cm@25 C						
Clear Hard Water Lakes						
\leq 40 Platinum Cobalt Units						
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L	
or			μg/L			
< 100 µS/cm@25 C						
Clear Soft Water Lakes						

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	47 - 53	50 (2)	
Total Nitrogen (µg/L)	1288 - 2005	1607 (2)	
Chlorophyll- uncorrected (µg/L)	41 - 103	65 (2)	
Secchi (ft)	-	(0)	
Secchi (m)	-	(0)	
Color (Pt-Co Units)	24 - 24	24 (1)	
Specific Conductance (µS/cm@25 C)	129 - 129	129 (1)	
Lake Classification	Clear Hardwater		
The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 06-911
GNIS Number	
Latitude	28.0557
Longitude	-82.5552
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2008 to 2009
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	50 (47 to 53)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1607 (1288 to 2005)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 07-901 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	31 - 49	41 (3)
Total Nitrogen (µg/L)	823 - 1675	1228 (3)
Chlorophyll- uncorrected (µg/L)	53 - 163	81 (3)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	16 - 22	20 (3)
Specific Conductance (µS/cm@25 C)	345 - 635	476 (3)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 07-901
GNIS Number	
Latitude	27.7160
Longitude	-82.3500
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2007 to 2009
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	41 (31 to 49)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1228 (823 to 1675)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 07-904 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	91 - 91	91 (1)
Total Nitrogen (µg/L)	1728 - 1728	1728 (1)
Chlorophyll- uncorrected (µg/L)	43 - 43	43 (1)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	32 - 32	32 (1)
Specific Conductance (µS/cm@25 C)	276 - 276	276 (1)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 07-904
GNIS Number	
Latitude	27.7256
Longitude	-82.3575
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2008 to 2008
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	91 (91 to 91)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1728 (1728 to 1728)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 08-16 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	114 - 144	128 (2)
Total Nitrogen (µg/L)	920 - 1080	997 (2)
Chlorophyll- uncorrected (µg/L)	27 - 46	35 (2)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	36 - 36	36 (1)
Specific Conductance (µS/cm@25 C)	75 - 75	75 (1)
Lake Classification	Clear Softwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 08-16
GNIS Number	
Latitude	28.0479
Longitude	-82.4833
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2008 to 2009
Lake Trophic Status (CHL)	Eutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	128 (114 to 144)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	997 (920 to 1080)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 09-02 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	28 - 28	28 (2)
Total Nitrogen (µg/L)	1062 - 1151	1106 (2)
Chlorophyll- uncorrected (µg/L)	12 - 15	13 (2)
Secchi (ft)	1.8 - 1.8	1.8 (1)
Secchi (m)	0.6 - 0.6	0.6 (1)
Color (Pt-Co Units)	31 - 38	35 (2)
Specific Conductance (µS/cm@25 C)	238 - 302	268 (2)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 09-02
GNIS Number	
Latitude	27.7354
Longitude	-82.3479
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2011 to 2012
Lake Trophic Status (CHL)	Eutrophic
TP Zone	
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	28 (28 to 28)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1106 (1062 to 1151)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 09-03 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department	of Environm	iental Protec	tion's Nun	ieric Nutrie	nt Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	83 - 83	83 (1)
Total Nitrogen (µg/L)	2583 - 2583	2583 (1)
Chlorophyll- uncorrected (µg/L)	52 - 52	52 (1)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	16 - 16	16 (1)
Specific Conductance (µS/cm@25 C)	314 - 314	314 (1)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 09-03
GNIS Number	
Latitude	
Longitude	
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2009 to 2009
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	83 (83 to 83)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	2583 (2583 to 2583)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 09-Sp1 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	30 - 30	30 (1)
Total Nitrogen (µg/L)	1261 - 1261	1261 (1)
Chlorophyll- uncorrected (µg/L)	44 - 44	44 (1)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	44 - 44	44 (1)
Specific Conductance (µS/cm@25 C)	83 - 83	83 (1)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 09-Sp1
GNIS Number	
Latitude	
Longitude	
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2009 to 2009
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	30 (30 to 30)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1261 (1261 to 1261)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 10-02 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department	of Environm	iental Protec	tion's Nun	ieric Nutrie	nt Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	12 - 12	12 (1)
Total Nitrogen (µg/L)	827 - 827	827 (1)
Chlorophyll- uncorrected (µg/L)	42 - 42	42 (1)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 10-02
GNIS Number	
Latitude	
Longitude	
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2009 to 2009
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	12 (12 to 12)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	827 (827 to 827)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 10-07 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	81 - 121	99 (2)
Total Nitrogen (µg/L)	1396 - 1555	1473 (2)
Chlorophyll- uncorrected (µg/L)	27 - 37	32 (2)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	75 - 123	96 (2)
Specific Conductance (µS/cm@25 C)	161 - 207	183 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 10-07
GNIS Number	
Latitude	28.1106
Longitude	-82.5323
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2011 to 2012
Lake Trophic Status (CHL)	Eutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	99 (81 to 121)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1473 (1396 to 1555)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 10-08 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	169 - 169	169 (1)
Total Nitrogen (µg/L)	1855 - 1855	1855 (1)
Chlorophyll- uncorrected (μ g/L)	60 - 60	60 (1)
Secchi (ft)	1.7 - 1.7	1.7 (1)
Secchi (m)	0.5 - 0.5	0.5 (1)
Color (Pt-Co Units)	69 - 69	69 (1)
Specific Conductance (µS/cm@25 C)	194 - 194	194 (1)
Lake Classification	Colored	
The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 10-08
GNIS Number	
Latitude	27.9656
Longitude	-82.2969
Water Body Type	Lake
Surface Area (ha and acre)	ha or acre
Period of Record (year)	2010 to 2010
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	169 (169 to 169)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1855 (1855 to 1855)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 12-04 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	48 - 97	<u>69 (2)</u>
Total Nitrogen (µg/L)	1530 - 1963	1733 (2)
Chlorophyll- uncorrected (µg/L)	13 - 49	26 (2)
Secchi (ft)	0.4 - 2.0	0.9 (2)
Secchi (m)	0.1 - 0.6	0.3 (2)
Color (Pt-Co Units)	44 - 65	53 (2)
Specific Conductance (µS/cm@25 C)	432 - 525	476 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 12-04
GNIS Number	
Latitude	27.7032
Longitude	-82.3506
Water Body Type	Lake
Surface Area (ha and acre)	ha or . acre
Period of Record (year)	2012 to 2013
Lake Trophic Status (CHL)	Eutrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	69 (48 to 97)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1733 (1530 to 1963)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pond 99-19 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum	calculated	Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	69 - 69	69 (1)
Total Nitrogen (µg/L)	545 - 545	545 (1)
Chlorophyll- uncorrected (µg/L)	5 - 5	5 (1)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	15 - 15	15 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pond 99-19
GNIS Number	
Latitude	27.8853
Longitude	-82.2797
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2004 to 2004
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	69 (69 to 69)
TN Zone	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	545 (545 to 545)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Pretty in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum	calculated	Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	13 - 36	26 (23)
Total Nitrogen (µg/L)	713 - 1018	840 (23)
Chlorophyll- uncorrected (µg/L)	4 - 22	9 (23)
Secchi (ft)	2.7 - 7.4	3.8 (23)
Secchi (m)	0.8 - 2.3	1.2 (23)
Color (Pt-Co Units)	60 - 169	100 (19)
Specific Conductance (µS/cm@25 C)	159 - 218	179 (13)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Pretty
GNIS Number	289303
Latitude	28.1117
Longitude	-82.5689
Water Body Type	Lake
Surface Area (ha and acre)	32 ha or 80 acre
Period of Record (year)	1992 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP4
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	26 (13 to 36)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	840 (713 to 1018)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Pretty 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, $R^2 = 0.04$, p = 0.34), total nitrogen (TN No Trend, $R^2 = 0.00$, p = 0.82), chlorophyll (CHL No Trend, $R^2 = 0.01$, p = 0.63) and Secchi depth (Secchi No Trend, $R^2 = 0.00$, p = 0.75).



Florida LAKEWATCH Report for Rainbow in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum	calculated	Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	6 - 22	12 (13)
Total Nitrogen (µg/L)	282 - 810	492 (13)
Chlorophyll- uncorrected (µg/L)	1 - 10	4 (13)
Secchi (ft)	5.7 - 10.7	7.4 (11)
Secchi (m)	1.7 - 3.2	2.3 (11)
Color (Pt-Co Units)	26 - 35	30 (2)
Specific Conductance (µS/cm@25 C)	72 - 79	75 (2)
Lake Classification	Clear Softwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Rainbow
GNIS Number	289442
Latitude	28.1189
Longitude	-82.5966
Water Body Type	Lake
Surface Area (ha and acre)	19 ha or 47 acre
Period of Record (year)	1991 to 2021
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	12 (6 to 22)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	492 (282 to 810)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Rainbow 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, $R^2 = 0.21$, p = 0.12), total nitrogen (TN No Trend, $R^2 = 0.29$, p = 0.06), chlorophyll (CHL Increasing, $R^2 = 0.62$, p = 0.00) and Secchi depth (Secchi No Trend, $R^2 = 0.14$, p = 0.25).



Florida LAKEWATCH Report for Reinheimer in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum	calculated	Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	10 - 27	18 (20)
Total Nitrogen (µg/L)	818 - 1245	997 (20)
Chlorophyll- uncorrected (µg/L)	3 - 19	8 (20)
Secchi (ft)	4.1 - 7.6	5.0 (20)
Secchi (m)	1.2 - 2.3	1.5 (20)
Color (Pt-Co Units)	5 - 107	54 (15)
Specific Conductance (µS/cm@25 C)	113 - 182	153 (9)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Reinheimer
GNIS Number	289634
Latitude	28.1300
Longitude	-82.4856
Water Body Type	Lake
Surface Area (ha and acre)	8 ha or 20 acre
Period of Record (year)	1997 to 2016
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	18 (10 to 27)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	997 (818 to 1245)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Reinheimer 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 = 0.76), total nitrogen (TN Decreasing, $R^2 = 0.41$, p = 0.00), chlorophyll (CHL No Trend, $R^2 = 0.09$, p = 0.21) and Secchi depth (Secchi No Trend, $R^2 = 0.01$, p = 0.72).



Florida LAKEWATCH Report for Richard Muldowney in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	12 - 14	13 (2)
Total Nitrogen (µg/L)	531 - 593	561 (2)
Chlorophyll- uncorrected (μ g/L)	2 - 4	3 (2)
Secchi (ft)	7.8 - 12.0	9.6 (2)
Secchi (m)	2.4 - 3.7	2.9 (2)
Color (Pt-Co Units)	34 - 48	40 (2)
Specific Conductance (µS/cm@25 C)	223 - 251	237 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Richard Muldowney
GNIS Number	
Latitude	28.0729
Longitude	-82.4704
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2016 to 2017
Lake Trophic Status (CHL)	Oligotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	13 (12 to 14)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	561 (531 to 593)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Roberta in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 μg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	89 - 99	94 (2)
Total Nitrogen (µg/L)	1051 - 1092	1071 (2)
Chlorophyll- uncorrected (µg/L)	46 - 59	52 (2)
Secchi (ft)	2.6 - 3.2	2.9 (2)
Secchi (m)	0.8 - 1.0	0.9 (2)
Color (Pt-Co Units)	26 - 30	28 (2)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Roberta
GNIS Number	289773
Latitude	28.0009
Longitude	-82.4499
Water Body Type	Lake
Surface Area (ha and acre)	0.8 ha or 2 acre
Period of Record (year)	2004 to 2005
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	94 (89 to 99)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1071 (1051 to 1092)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Rock in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	n's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	22 - 48	35 (18)
Total Nitrogen (µg/L)	620 - 1297	988 (18)
Chlorophyll- uncorrected (µg/L)	10 - 39	15 (17)
Secchi (ft)	2.2 - 4.0	3.0 (17)
Secchi (m)	0.7 - 1.2	0.9 (17)
Color (Pt-Co Units)	84 - 187	124 (13)
Specific Conductance (µS/cm@25 C)	164 - 258	208 (7)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Rock
GNIS Number	289834
Latitude	28.1152
Longitude	-82.5577
Water Body Type	Lake
Surface Area (ha and acre)	21 ha or 53 acre
Period of Record (year)	1998 to 2020
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP4
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	35 (22 to 48)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	988 (620 to 1297)


- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Rock 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, $R^2 = 0.33$, p = 0.01), total nitrogen (TN No Trend, $R^2 = 0.07$, p = 0.29), chlorophyll (CHL No Trend, $R^2 = 0.09$, p = 0.24) and Secchi depth (Secchi No Trend, $R^2 = 0.05$, p = 0.39).



Florida LAKEWATCH Report for Rogers in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	9 - 9	9(1)
Total Nitrogen (µg/L)	431 - 431	431 (1)
Chlorophyll- uncorrected (µg/L)	4 - 4	4 (1)
Secchi (ft)	10.8 - 10.8	10.8 (1)
Secchi (m)	3.3 - 3.3	3.3 (1)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Rogers
GNIS Number	289927
Latitude	28.1114
Longitude	-82.5885
Water Body Type	Lake
Surface Area (ha and acre)	38 ha or 93 acre
Period of Record (year)	1998 to 1998
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	9 (9 to 9)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	431 (431 to 431)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Roget in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	21 - 35	26 (4)
Total Nitrogen (µg/L)	770 - 1015	883 (4)
Chlorophyll- uncorrected (μ g/L)	5 - 103	14 (5)
Secchi (ft)	2.9 - 4.5	3.7 (5)
Secchi (m)	0.9 - 1.4	1.1 (5)
Color (Pt-Co Units)	61 - 61	61 (1)
Specific Conductance (µS/cm@25 C)	142 - 142	142 (1)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Roget
GNIS Number	
Latitude	28.1083
Longitude	-82.4570
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 2019
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	26 (21 to 35)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	883 (770 to 1015)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Roget 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, $R^2 = 0.57$, p = 0.24), total nitrogen (TN No Trend, $R^2 = 0.00$, p = 0.97), chlorophyll (CHL No Trend, $R^2 = 0.27$, p = 0.37) and Secchi depth (Secchi No Trend, $R^2 = 0.30$, p = 0.34).



Florida LAKEWATCH Report for Round in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	9 - 17	13 (3)
Total Nitrogen (µg/L)	457 - 608	526 (3)
Chlorophyll- uncorrected (µg/L)	2 - 10	4 (3)
Secchi (ft)	4.5 - 5.8	5.2 (3)
Secchi (m)	1.4 - 1.8	1.6 (3)
Color (Pt-Co Units)	14 - 28	19 (3)
Specific Conductance (µS/cm@25 C)	199 - 214	205 (3)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Round
GNIS Number	290004
Latitude	28.1203
Longitude	-82.5009
Water Body Type	Lake
Surface Area (ha and acre)	4 ha or 11 acre
Period of Record (year)	2017 to 2019
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	13 (9 to 17)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	526 (457 to 608)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Round Pond in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	9 - 9	9 (1)	
Total Nitrogen (µg/L)	360 - 360	360 (1)	
Chlorophyll- uncorrected (µg/L)	5 - 5	5 (1)	
Secchi (ft)	9.0 - 9.0	9.0 (1)	
Secchi (m)	2.7 - 2.7	2.7 (1)	
Color (Pt-Co Units)	32 - 32	32 (1)	
Specific Conductance (µS/cm@25 C)	187 - 187	187 (1)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Round Pond
GNIS Number	
Latitude	28.0595
Longitude	-82.4765
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2012 to 2012
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	9 (9 to 9)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	360 (360 to 360)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Russell in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department	of Environm	iental Protec	tion's Nun	ieric Nutrie	nt Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 µg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	23 - 23	23 (1)
Total Nitrogen (µg/L)	374 - 374	374 (1)
Chlorophyll- uncorrected (µg/L)	2 - 2	2 (1)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Russell
GNIS Number	
Latitude	28.0744
Longitude	-82.4646
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 1997
Lake Trophic Status (CHL)	Oligotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	23 (23 to 23)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	374 (374 to 374)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Saddleback North in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	9 - 24	13 (8)
Total Nitrogen (µg/L)	380 - 703	476 (8)
Chlorophyll- uncorrected (µg/L)	2 - 14	4 (8)
Secchi (ft)	4.3 - 8.1	6.3 (8)
Secchi (m)	1.3 - 2.5	1.9 (8)
Color (Pt-Co Units)	48 - 48	48 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Saddleback North
GNIS Number	290118
Latitude	28.1226
Longitude	-82.4968
Water Body Type	Lake
Surface Area (ha and acre)	13 ha or 33 acre
Period of Record (year)	1992 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	13 (9 to 24)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	476 (380 to 703)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Saddleback North 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, $R^2 = 0.47$, p = 0.06), total nitrogen (TN No Trend, $R^2 = 0.50$, p = 0.05), chlorophyll (CHL No Trend, $R^2 = 0.06$, p = 0.57) and Secchi depth (Secchi Decreasing, $R^2 = 0.56$, p = 0.03).



Florida LAKEWATCH Report for Saddleback South in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	n's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	12 - 23	14 (9)
Total Nitrogen (µg/L)	477 - 757	600 (9)
Chlorophyll- uncorrected (µg/L)	3 - 8	5 (9)
Secchi (ft)	3.8 - 8.8	5.6 (7)
Secchi (m)	1.2 - 2.7	1.7 (7)
Color (Pt-Co Units)	10 - 68	25 (6)
Specific Conductance (µS/cm@25 C)	120 - 211	164 (6)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Saddleback South
GNIS Number	290118
Latitude	28.1191
Longitude	-82.4933
Water Body Type	Lake
Surface Area (ha and acre)	13 ha or 33 acre
Period of Record (year)	1993 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	14 (12 to 23)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	600 (477 to 757)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Saddleback South 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, $R^2 = 0.08$, p = 0.46), total nitrogen (TN No Trend, $R^2 = 0.02$, p = 0.70), chlorophyll (CHL No Trend, $R^2 = 0.09$, p = 0.43) and Secchi depth (Secchi Increasing, $R^2 = 0.59$, p = 0.05).



Florida LAKEWATCH Report for September in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	n's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	17 - 23	20 (2)
Total Nitrogen (µg/L)	913 - 920	917 (2)
Chlorophyll- uncorrected (µg/L)	10 - 23	15 (2)
Secchi (ft)	2.7 - 6.3	4.2 (2)
Secchi (m)	0.8 - 1.9	1.3 (2)
Color (Pt-Co Units)	79 - 83	81 (2)
Specific Conductance (µS/cm@25 C)	93 - 101	97 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	September
GNIS Number	
Latitude	28.1043
Longitude	-82.4437
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2011 to 2012
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	20 (17 to 23)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	917 (913 to 920)


- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Shangri-La in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	112 - 149	129 (2)
Total Nitrogen (µg/L)	1589 - 1934	1753 (2)
Chlorophyll- uncorrected (µg/L)	93 - 109	100 (2)
Secchi (ft)	2.0 - 2.1	2.0 (2)
Secchi (m)	0.6 - 0.6	0.6 (2)
Color (Pt-Co Units)	24 - 25	24 (2)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Shangri-La
GNIS Number	
Latitude	28.0071
Longitude	-82.2673
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2004 to 2005
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	129 (112 to 149)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1753 (1589 to 1934)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Silver in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	30 - 45	36 (8)
Total Nitrogen (µg/L)	849 - 1372	1033 (8)
Chlorophyll- uncorrected (µg/L)	1 - 46	16 (8)
Secchi (ft)	2.7 - 5.0	4.0 (8)
Secchi (m)	0.8 - 1.5	1.2 (8)
Color (Pt-Co Units)	20 - 21	20 (3)
Specific Conductance (µS/cm@25 C)	212 - 226	219 (3)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Silver
GNIS Number	291140
Latitude	28.0228
Longitude	-82.4946
Water Body Type	Lake
Surface Area (ha and acre)	7 ha or 17 acre
Period of Record (year)	1996 to 2012
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	36 (30 to 45)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1033 (849 to 1372)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Silver 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, $R^2 = 0.68$, p = 0.01), total nitrogen (TN No Trend, $R^2 = 0.06$, p = 0.56), chlorophyll (CHL No Trend, $R^2 = 0.21$, p = 0.26) and Secchi depth (Secchi No Trend, $R^2 = 0.18$, p = 0.29).



Florida LAKEWATCH Report for Simmons in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	13 - 35	26 (12)
Total Nitrogen (µg/L)	478 - 782	691 (12)
Chlorophyll- uncorrected (µg/L)	2 - 14	5 (12)
Secchi (ft)	4.1 - 7.5	6.0 (12)
Secchi (m)	1.3 - 2.3	1.8 (12)
Color (Pt-Co Units)	12 - 19	16 (7)
Specific Conductance (µS/cm@25 C)	298 - 298	298 (1)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Simmons
GNIS Number	
Latitude	27.7075
Longitude	-82.3504
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1996 to 2007
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP6
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	26 (13 to 35)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	691 (478 to 782)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Simmons 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, $R^2 = 0.28$, p = 0.07), total nitrogen (TN No Trend, $R^2 = 0.27$, p = 0.08), chlorophyll (CHL No Trend, $R^2 = 0.30$, p = 0.07) and Secchi depth (Secchi No Trend, $R^2 = 0.21$, p = 0.14).



Florida LAKEWATCH Report for Sinclair in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department	of Environm	iental Protec	tion's Nun	ieric Nutrie	nt Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	15 - 15	15 (1)
Total Nitrogen (µg/L)	660 - 660	660 (1)
Chlorophyll- uncorrected (µg/L)	2 - 2	2 (1)
Secchi (ft)	-	(0)
Secchi (m)	-	(0)
Color (Pt-Co Units)	20 - 20	20 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Sinclair
GNIS Number	
Latitude	28.0976
Longitude	-82.4449
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2006 to 2006
Lake Trophic Status (CHL)	Oligotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	15 (15 to 15)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	660 (660 to 660)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Snake in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)	
Total Phosphorus (µg/L)	10 - 11	10 (2)	
Total Nitrogen (µg/L)	703 - 747	724 (2)	
Chlorophyll- uncorrected (µg/L)	2 - 2	2 (2)	
Secchi (ft)	-	(0)	
Secchi (m)	-	(0)	
Color (Pt-Co Units)	-	(0)	
Specific Conductance (µS/cm@25 C)	-	(0)	
Lake Classification			

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in **bold** can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Snake
GNIS Number	
Latitude	28.1144
Longitude	-82.4912
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1991 to 1992
Lake Trophic Status (CHL)	Oligotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	10 (10 to 11)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	724 (703 to 747)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for South in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	43 - 58	50 (4)	
Total Nitrogen (µg/L)	695 - 1079	883 (4)	
Chlorophyll- uncorrected (µg/L)	7 - 38	16 (4)	
Secchi (ft)	2.1 - 5.4	3.8 (4)	
Secchi (m)	0.6 - 1.7	1.2 (4)	
Color (Pt-Co Units)	16 - 16	16 (1)	
Specific Conductance (µS/cm@25 C)	297 - 297	297 (1)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	South
GNIS Number	
Latitude	27.7149
Longitude	-82.3592
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1999 to 2018
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	50 (43 to 58)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	883 (695 to 1079)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for St. Clair in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	n's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	18 - 22	20 (3)
Total Nitrogen (µg/L)	457 - 711	600 (3)
Chlorophyll- uncorrected (µg/L)	5 - 11	7 (3)
Secchi (ft)	5.8 - 7.4	6.6 (3)
Secchi (m)	1.8 - 2.3	2.0 (3)
Color (Pt-Co Units)	12 - 16	14 (3)
Specific Conductance (µS/cm@25 C)	96 - 151	113 (3)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	St. Clair
GNIS Number	
Latitude	27.7763
Longitude	-82.3666
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2007 to 2011
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	20 (18 to 22)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	600 (457 to 711)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Stall in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	15 - 18	17 (6)	
Total Nitrogen (µg/L)	453 - 599	513 (6)	
Chlorophyll- uncorrected (µg/L)	6 - 12	9 (6)	
Secchi (ft)	6.6 - 10.5	8.3 (6)	
Secchi (m)	2.0 - 3.2	2.5 (6)	
Color (Pt-Co Units)	14 - 23	18 (2)	
Specific Conductance (µS/cm@25 C)	188 - 197	192 (2)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Stall
GNIS Number	
Latitude	28.0631
Longitude	-82.4909
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1996 to 2017
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	17 (15 to 18)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	513 (453 to 599)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Stall 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, $R^2 = 0.15$, p = 0.45), total nitrogen (TN No Trend, $R^2 = 0.13$, p = 0.48), chlorophyll (CHL No Trend, $R^2 = 0.13$, p = 0.48) and Secchi depth (Secchi Increasing, $R^2 = 0.86$, p = 0.01).


Florida LAKEWATCH Report for Starvation in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	13 - 17	15 (9)
Total Nitrogen (µg/L)	547 - 847	660 (9)
Chlorophyll- uncorrected (µg/L)	1 - 8	5 (9)
Secchi (ft)	3.7 - 7.5	5.4 (9)
Secchi (m)	1.1 - 2.3	1.7 (9)
Color (Pt-Co Units)	37 - 85	57 (8)
Specific Conductance (µS/cm@25 C)	125 - 169	145 (5)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Starvation
GNIS Number	291645
Latitude	28.1250
Longitude	-82.5065
Water Body Type	Lake
Surface Area (ha and acre)	21 ha or 52 acre
Period of Record (year)	2004 to 2021
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	15 (13 to 17)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	660 (547 to 847)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Starvation 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, $R^2 = 0.23$, p = 0.20), total nitrogen (TN Decreasing, $R^2 = 0.76$, p = 0.00), chlorophyll (CHL No Trend, $R^2 = 0.04$, p = 0.59) and Secchi depth (Secchi Decreasing, $R^2 = 0.48$, p = 0.04).



Florida LAKEWATCH Report for Stearns in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	182 - 215	196 (3)
Total Nitrogen (µg/L)	2226 - 2345	2298 (3)
Chlorophyll- uncorrected (µg/L)	98 - 111	104 (3)
Secchi (ft)	1.4 - 1.7	1.6 (3)
Secchi (m)	0.4 - 0.5	0.5 (3)
Color (Pt-Co Units)	59 - 68	63 (2)
Specific Conductance (µS/cm@25 C)	199 - 270	232 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Stearns
GNIS Number	
Latitude	27.9012
Longitude	-82.2042
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2007 to 2022
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	196 (182 to 215)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	2298 (2226 to 2345)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Stemper in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	13 - 32	20 (7)
Total Nitrogen (µg/L)	689 - 1143	894 (7)
Chlorophyll- uncorrected (µg/L)	5 - 24	11 (7)
Secchi (ft)	3.5 - 5.6	4.3 (7)
Secchi (m)	1.1 - 1.7	1.3 (7)
Color (Pt-Co Units)	43 - 56	49 (2)
Specific Conductance (µS/cm@25 C)	116 - 152	133 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Stemper
GNIS Number	291676
Latitude	28.1348
Longitude	-82.4594
Water Body Type	Lake
Surface Area (ha and acre)	51 ha or 126 acre
Period of Record (year)	1996 to 2017
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	20 (13 to 32)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	894 (689 to 1143)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Stemper 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, $R^2 = 0.55$, p = 0.06), total nitrogen (TN No Trend, $R^2 = 0.48$, p = 0.08), chlorophyll (CHL No Trend, $R^2 = 0.24$, p = 0.26) and Secchi depth (Secchi Increasing, $R^2 = 0.77$, p = 0.01).



Florida LAKEWATCH Report for Stillwater in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)	
Total Phosphorus (µg/L)	55 - 63	59 (2)	
Total Nitrogen (µg/L)	937 - 1044	989 (2)	
Chlorophyll- uncorrected (µg/L)	34 - 54	43 (2)	
Secchi (ft)	2.4 - 2.4	2.4 (2)	
Secchi (m)	0.7 - 0.7	0.7 (2)	
Color (Pt-Co Units)	-	(0)	
Specific Conductance (µS/cm@25 C)	-	(0)	
Lake Classification			

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Stillwater
GNIS Number	
Latitude	28.0614
Longitude	-82.5085
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1999 to 2000
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP4
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	59 (55 to 63)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	989 (937 to 1044)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Strawberry in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	15 - 25	20 (13)	
Total Nitrogen (µg/L)	714 - 1260	1026 (13)	
Chlorophyll- uncorrected (µg/L)	5 - 30	15 (13)	
Secchi (ft)	3.0 - 8.3	4.6 (13)	
Secchi (m)	0.9 - 2.5	1.4 (13)	
Color (Pt-Co Units)	14 - 47	30 (11)	
Specific Conductance (µS/cm@25 C)	175 - 249	198 (10)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Strawberry
GNIS Number	287801
Latitude	28.1414
Longitude	-82.4743
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2003 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	20 (15 to 25)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1026 (714 to 1260)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Strawberry 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 Increasing, $R^2 = 0.61$, p = 0.00), total nitrogen (TN Increasing, $R^2 = 0.71$, p = 0.00), chlorophyll (CHL Increasing, $R^2 = 0.79$, p = 0.00) and Secchi depth (Secchi Decreasing, $R^2 = 0.85$, p = 0.00).



Florida LAKEWATCH Report for Strawberry North in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	12 - 22	15 (4)
Total Nitrogen (µg/L)	592 - 830	703 (4)
Chlorophyll- uncorrected (µg/L)	2 - 11	5 (4)
Secchi (ft)	5.1 - 8.7	6.9 (4)
Secchi (m)	1.6 - 2.7	2.1 (4)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Strawberry North
GNIS Number	287801
Latitude	28.1422
Longitude	-82.4733
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 2000
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	15 (12 to 22)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	703 (592 to 830)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Strawberry South in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	n's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	12 - 12	12 (1)
Total Nitrogen (µg/L)	511 - 511	511 (1)
Chlorophyll- uncorrected (µg/L)	2 - 2	2 (1)
Secchi (ft)	10.4 - 10.4	10.4 (1)
Secchi (m)	3.2 - 3.2	3.2 (1)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in **bold** can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Strawberry South
GNIS Number	287801
Latitude	28.1392
Longitude	-82.4763
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 1997
Lake Trophic Status (CHL)	Oligotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	12 (12 to 12)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	511 (511 to 511)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Sunset in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 μg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	9 - 46	20 (29)	
Total Nitrogen (µg/L)	519 - 1243	857 (29)	
Chlorophyll- uncorrected (µg/L)	2 - 31	14 (29)	
Secchi (ft)	2.9 - 5.3	3.7 (29)	
Secchi (m)	0.9 - 1.6	1.1 (29)	
Color (Pt-Co Units)	16 - 184	61 (22)	
Specific Conductance (µS/cm@25 C)	133 - 229	169 (16)	
Lake Classification	Colored		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Sunset
GNIS Number	291876
Latitude	28.1364
Longitude	-82.6259
Water Body Type	Lake
Surface Area (ha and acre)	15 ha or 37 acre
Period of Record (year)	1990 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	20 (9 to 46)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	857 (519 to 1243)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Sunset 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 Increasing, $R^2 = 0.32$, p = 0.00), total nitrogen (TN Increasing, $R^2 = 0.57$, p = 0.00), chlorophyll (CHL Increasing, $R^2 = 0.25$, p = 0.01) and Secchi depth (Secchi Decreasing, $R^2 = 0.17$, p = 0.02).


Florida LAKEWATCH Report for Sunshine in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	27 - 32	29 (2)
Total Nitrogen (µg/L)	947 - 961	954 (2)
Chlorophyll- uncorrected (µg/L)	20 - 29	24 (2)
Secchi (ft)	3.6 - 3.8	3.7 (2)
Secchi (m)	1.1 - 1.1	1.1 (2)
Color (Pt-Co Units)	52 - 78	64 (2)
Specific Conductance (µS/cm@25 C)	93 - 118	105 (2)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Sunshine
GNIS Number	291884
Latitude	28.1205
Longitude	-82.5271
Water Body Type	Lake
Surface Area (ha and acre)	7 ha or 17 acre
Period of Record (year)	2016 to 2017
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP4
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	29 (27 to 32)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	954 (947 to 961)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Swan in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	39 - 55	47 (5)
Total Nitrogen (µg/L)	691 - 968	776 (5)
Chlorophyll- uncorrected (µg/L)	18 - 35	25 (5)
Secchi (ft)	1.7 - 4.0	2.5 (5)
Secchi (m)	0.5 - 1.2	0.8 (5)
Color (Pt-Co Units)	16 - 17	16 (3)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Swan
GNIS Number	
Latitude	27.7169
Longitude	-82.3498
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1999 to 2003
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	47 (39 to 55)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	776 (691 to 968)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Swan 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, $R^2 = 0.50$, p = 0.18), total nitrogen (TN No Trend, $R^2 = 0.01$, p = 0.85), chlorophyll (CHL No Trend, $R^2 = 0.01$, p = 0.87) and Secchi depth (Secchi No Trend, $R^2 = 0.35$, p = 0.29).



Florida LAKEWATCH Report for Taylor in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	12 - 23	18 (6)
Total Nitrogen (µg/L)	493 - 885	681 (6)
Chlorophyll- uncorrected (µg/L)	6 - 10	8 (6)
Secchi (ft)	5.5 - 7.7	6.3 (6)
Secchi (m)	1.7 - 2.3	1.9 (6)
Color (Pt-Co Units)	31 - 35	32 (3)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Taylor
GNIS Number	292079
Latitude	28.1377
Longitude	-82.6137
Water Body Type	Lake
Surface Area (ha and acre)	18 ha or 44 acre
Period of Record (year)	1993 to 2006
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	18 (12 to 23)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	681 (493 to 885)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Taylor 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, $R^2 = 0.62$, p = 0.06), total nitrogen (TN No Trend, $R^2 = 0.49$, p = 0.12), chlorophyll (CHL No Trend, $R^2 = 0.31$, p = 0.25) and Secchi depth (Secchi No Trend, $R^2 = 0.38$, p = 0.19).



Florida LAKEWATCH Report for Taylor 2 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	22 - 63	37 (5)
Total Nitrogen (µg/L)	563 - 1287	764 (5)
Chlorophyll- uncorrected (µg/L)	14 - 141	34 (5)
Secchi (ft)	2.1 - 4.0	2.8 (5)
Secchi (m)	0.6 - 1.2	0.8 (5)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in **bold** can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Taylor 2
GNIS Number	
Latitude	28.1517
Longitude	-82.5434
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1996 to 2000
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	37 (22 to 63)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	764 (563 to 1287)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Taylor 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 Increasing, $R^2 = 0.92$, p = 0.01), total nitrogen (TN Increasing, $R^2 = 0.80$, p = 0.04), chlorophyll (CHL No Trend, $R^2 = 0.62$, p = 0.11) and Secchi depth (Secchi No Trend, $R^2 = 0.67$, p = 0.09).



Florida LAKEWATCH Report for Teakwood in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	102 - 124	114 (3)
Total Nitrogen (µg/L)	1040 - 1429	1275 (3)
Chlorophyll- uncorrected (µg/L)	25 - 55	35 (3)
Secchi (ft)	2.5 - 3.4	2.9 (3)
Secchi (m)	0.8 - 1.0	0.9 (3)
Color (Pt-Co Units)	37 - 45	40 (3)
Specific Conductance (µS/cm@25 C)	212 - 314	253 (3)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Teakwood
GNIS Number	
Latitude	28.0799
Longitude	-82.4703
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2019 to 2021
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	114 (102 to 124)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1275 (1040 to 1429)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Ten Mile in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	42 - 43	42 (2)
Total Nitrogen (µg/L)	1155 - 1293	1222 (2)
Chlorophyll- uncorrected (µg/L)	34 - 44	39 (2)
Secchi (ft)	2.1 - 2.8	2.4 (2)
Secchi (m)	0.6 - 0.8	0.7 (2)
Color (Pt-Co Units)	31 - 31	31 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Ten Mile
GNIS Number	292118
Latitude	27.9416
Longitude	-82.3144
Water Body Type	Lake
Surface Area (ha and acre)	7 ha or 18 acre
Period of Record (year)	1995 to 2001
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	42 (42 to 43)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1222 (1155 to 1293)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Thonotosassa in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum	calculated	Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric in	terpretation
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	129 - 471	<u>316 (13)</u>
Total Nitrogen (µg/L)	1718 - 3594	2524 (13)
Chlorophyll- uncorrected (µg/L)	26 - 149	98 (13)
Secchi (ft)	0.9 - 1.9	1.3 (13)
Secchi (m)	0.3 - 0.6	0.4 (13)
Color (Pt-Co Units)	52 - 86	70 (9)
Specific Conductance (µS/cm@25 C)	109 - 225	185 (9)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Thonotosassa
GNIS Number	294174
Latitude	28.0676
Longitude	-82.2766
Water Body Type	Lake
Surface Area (ha and acre)	331 ha or 819 acre
Period of Record (year)	1998 to 2018
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	316 (129 to 471)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	2524 (1718 to 3594)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Thonotosassa 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 = 0.83), total nitrogen (TN No Trend, $R^2 = 0.06$, p = 0.41), chlorophyll (CHL No Trend, $R^2 = 0.04$, p = 0.51) and Secchi depth (Secchi Decreasing, $R^2 = 0.35$, p = 0.03).



Florida LAKEWATCH Report for Turtle in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum	calculated	Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric in	terpretation
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 μg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	13 - 27	17 (5)
Total Nitrogen (µg/L)	350 - 561	476 (5)
Chlorophyll- uncorrected (µg/L)	2 - 4	3 (5)
Secchi (ft)	5.0 - 8.3	6.7 (5)
Secchi (m)	1.5 - 2.5	2.0 (5)
Color (Pt-Co Units)	12 - 12	12 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in **bold** can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Turtle
GNIS Number	
Latitude	28.0700
Longitude	-82.4710
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 2001
Lake Trophic Status (CHL)	Oligotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	17 (13 to 27)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	476 (350 to 561)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration
Figure 2. Lake Turtle 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, $R^2 = 0.82$, p = 0.03), total nitrogen (TN No Trend, $R^2 = 0.64$, p = 0.10), chlorophyll (CHL No Trend, $R^2 = 0.61$, p = 0.12) and Secchi depth (Secchi Decreasing, $R^2 = 0.99$, p = 0.00).



Florida LAKEWATCH Report for Twin in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	18 - 28	24 (9)
Total Nitrogen (µg/L)	519 - 922	776 (9)
Chlorophyll- uncorrected (µg/L)	4 - 32	16 (9)
Secchi (ft)	2.8 - 10.5	4.1 (9)
Secchi (m)	0.9 - 3.2	1.3 (9)
Color (Pt-Co Units)	12 - 31	19 (4)
Specific Conductance (µS/cm@25 C)	207 - 222	214 (3)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Twin
GNIS Number	300091
Latitude	28.0316
Longitude	-82.4901
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1996 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	24 (18 to 28)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	776 (519 to 922)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Twin 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, $R^2 = 0.00$, p = 0.88), chlorophyll (CHL No Trend, $R^2 = 0.44$, p = 0.05) and Secchi depth (Secchi No Trend, $R^2 = 0.18$, p = 0.25).



Florida LAKEWATCH Report for Valrico in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	32 - 183	67 (16)	
Total Nitrogen (µg/L)	683 - 2567	1096 (16)	
Chlorophyll- uncorrected (µg/L)	5 - 104	22 (15)	
Secchi (ft)	1.5 - 8.3	3.0 (14)	
Secchi (m)	0.5 - 2.5	0.9 (14)	
Color (Pt-Co Units)	14 - 40	25 (13)	
Specific Conductance (µS/cm@25 C)	129 - 186	155 (7)	
Lake Classification	Clear Hardwater		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Valrico
GNIS Number	292726
Latitude	27.9569
Longitude	-82.2579
Water Body Type	Lake
Surface Area (ha and acre)	51 ha or 127 acre
Period of Record (year)	1998 to 2017
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	67 (32 to 183)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1096 (683 to 2567)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Valrico 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 Increasing, $R^2 = 0.27$, p = 0.04), total nitrogen (TN Increasing, $R^2 = 0.43$, p = 0.01), chlorophyll (CHL Increasing, $R^2 = 0.75$, p = 0.00) and Secchi depth (Secchi Decreasing, $R^2 = 0.36$, p = 0.02).



Florida LAKEWATCH Report for Valrico Middle in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)	
Total Phosphorus (µg/L)	179 - 247	219 (4)	
Total Nitrogen (µg/L)	1650 - 2417	2003 (4)	
Chlorophyll- uncorrected (µg/L)	88 - 123	107 (4)	
Secchi (ft)	1.5 - 1.8	1.6 (4)	
Secchi (m)	0.5 - 0.6	0.5 (4)	
Color (Pt-Co Units)	-	(0)	
Specific Conductance (µS/cm@25 C)	-	(0)	
Lake Classification			

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Valrico Middle
GNIS Number	
Latitude	27.9600
Longitude	-82.2558
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1997 to 2006
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	219 (179 to 247)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	2003 (1650 to 2417)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Virginia in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	23 - 57	37 (10)	
Total Nitrogen (µg/L)	897 - 2478	1383 (10)	
Chlorophyll- uncorrected (µg/L)	8 - 63	29 (10)	
Secchi (ft)	1.8 - 6.0	3.1 (10)	
Secchi (m)	0.6 - 1.8	0.9 (10)	
Color (Pt-Co Units)	31 - 81	51 (5)	
Specific Conductance (µS/cm@25 C)	153 - 173	163 (2)	
Lake Classification	Colored		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Virginia
GNIS Number	292784
Latitude	28.1620
Longitude	-82.4894
Water Body Type	Lake
Surface Area (ha and acre)	9 ha or 21 acre
Period of Record (year)	1998 to 2012
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	37 (23 to 57)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1383 (897 to 2478)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Virginia 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, $R^2 = 0.55$, p = 0.01), total nitrogen (TN No Trend, $R^2 = 0.27$, p = 0.13), chlorophyll (CHL Decreasing, $R^2 = 0.48$, p = 0.03) and Secchi depth (Secchi No Trend, $R^2 = 0.27$, p = 0.12).



Florida LAKEWATCH Report for Walden in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean	
	Annual Geometric Means	(Sampling years)	
Total Phosphorus (µg/L)	267 - 308	287 (2)	
Total Nitrogen (µg/L)	1200 - 1560	1368 (2)	
Chlorophyll- uncorrected (µg/L)	14 - 69	31 (2)	
Secchi (ft)	1.7 - 2.1	1.9 (2)	
Secchi (m)	0.5 - 0.6	0.6 (2)	
Color (Pt-Co Units)	83 - 83	83 (1)	
Specific Conductance (µS/cm@25 C)	210 - 210	210 (1)	
Lake Classification	Colored		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Walden
GNIS Number	287402
Latitude	27.9912
Longitude	-82.1489
Water Body Type	Lake
Surface Area (ha and acre)	24 ha or 60 acre
Period of Record (year)	2007 to 2016
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP6
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	287 (267 to 308)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1368 (1200 to 1560)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Wastena in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	8 - 23	16 (7)
Total Nitrogen (µg/L)	500 - 905	697 (7)
Chlorophyll- uncorrected (µg/L)	1 - 14	5 (7)
Secchi (ft)	5.0 - 13.2	8.4 (7)
Secchi (m)	1.5 - 4.0	2.6 (7)
Color (Pt-Co Units)	9 - 9	9 (1)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Wastena
GNIS Number	292915
Latitude	28.1636
Longitude	-82.5926
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1991 to 2002
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	16 (8 to 23)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	697 (500 to 905)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Wastena 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 = 0.96), total nitrogen (TN No Trend, $R^2 = 0.06$, p = 0.61), chlorophyll (CHL No Trend, $R^2 = 0.01$, p = 0.83) and Secchi depth (Secchi No Trend, $R^2 = 0.00$, p = 0.97).



Florida LAKEWATCH Report for Wee in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 μg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	40 - 64	51 (5)
Total Nitrogen (µg/L)	913 - 1237	1003 (5)
Chlorophyll- uncorrected (μ g/L)	7 - 27	11 (5)
Secchi (ft)	3.1 - 3.5	3.4 (5)
Secchi (m)	1.0 - 1.1	1.0 (5)
Color (Pt-Co Units)	76 - 91	82 (3)
Specific Conductance (µS/cm@25 C)	129 - 151	137 (3)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Wee
GNIS Number	292979
Latitude	27.9523
Longitude	-82.2959
Water Body Type	Lake
Surface Area (ha and acre)	0.4 ha or 1 acre
Period of Record (year)	2018 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	51 (40 to 64)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1003 (913 to 1237)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Wee 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, $R^2 = 0.31$, p = 0.33), total nitrogen (TN No Trend, $R^2 = 0.36$, p = 0.28), chlorophyll (CHL No Trend, $R^2 = 0.60$, p = 0.12) and Secchi depth (Secchi No Trend, $R^2 = 0.17$, p = 0.49).



Florida LAKEWATCH Report for Weeks in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	n's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	159 - 301	223 (9)
Total Nitrogen (µg/L)	1410 - 3590	2392 (9)
Chlorophyll- uncorrected (µg/L)	84 - 205	123 (9)
Secchi (ft)	0.8 - 1.8	1.3 (9)
Secchi (m)	0.3 - 0.5	0.4 (9)
Color (Pt-Co Units)	41 - 73	55 (3)
Specific Conductance (µS/cm@25 C)	130 - 130	130(1)
Lake Classification	Colored	
The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Weeks
GNIS Number	292993
Latitude	27.9901
Longitude	-82.2672
Water Body Type	Lake
Surface Area (ha and acre)	20 ha or 49 acre
Period of Record (year)	1998 to 2020
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	223 (159 to 301)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	2392 (1410 to 3590)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Weeks 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, $R^2 = 0.04$, p = 0.58), total nitrogen (TN No Trend, $R^2 = 0.08$, p = 0.46), chlorophyll (CHL No Trend, $R^2 = 0.09$, p = 0.44) and Secchi depth (Secchi No Trend, $R^2 = 0.28$, p = 0.14).



Florida LAKEWATCH Report for West Meadows-3 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	11 - 59	24 (16)
Total Nitrogen (µg/L)	480 - 2648	1116 (16)
Chlorophyll- uncorrected (µg/L)	2 - 19	6 (16)
Secchi (ft)	1.0 - 5.1	2.2 (15)
Secchi (m)	0.3 - 1.6	0.7 (15)
Color (Pt-Co Units)	12 - 37	20 (15)
Specific Conductance (µS/cm@25 C)	104 - 270	136 (14)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	West Meadows-3
GNIS Number	
Latitude	28.1520
Longitude	-82.3586
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2006 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	24 (11 to 59)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1116 (480 to 2648)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake West Meadows-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 Decreasing, $R^2 = 0.51$, p = 0.00), total nitrogen (TN Decreasing, $R^2 = 0.61$, p = 0.00), chlorophyll (CHL Decreasing, $R^2 = 0.38$, p = 0.01) and Secchi depth (Secchi Increasing, $R^2 = 0.64$, p = 0.00).



Florida LAKEWATCH Report for West Meadows-15 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or	or				
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or		μg/L			
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	11 - 30	15 (19)
Total Nitrogen (µg/L)	386 - 914	577 (19)
Chlorophyll- uncorrected (µg/L)	0 - 8	2 (19)
Secchi (ft)	2.6 - 9.8	5.4 (17)
Secchi (m)	0.8 - 3.0	1.6 (17)
Color (Pt-Co Units)	4 - 16	11 (18)
Specific Conductance (µS/cm@25 C)	110 - 194	150 (16)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	West Meadows-15
GNIS Number	
Latitude	28.1507
Longitude	-82.3711
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2004 to 2022
Lake Trophic Status (CHL)	Oligotrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	15 (11 to 30)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	577 (386 to 914)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake West Meadows-15 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, $R^2 = 0.44$, p = 0.00), total nitrogen (TN Decreasing, $R^2 = 0.48$, p = 0.00), chlorophyll (CHL No Trend, $R^2 = 0.18$, p = 0.07) and Secchi depth (Secchi Increasing, $R^2 = 0.43$, p = 0.00).



Florida LAKEWATCH Report for White Trout in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum	calculated
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 µg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or	or				
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or		μg/L			
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	10 - 16	13 (14)
Total Nitrogen (µg/L)	380 - 545	478 (14)
Chlorophyll- uncorrected (µg/L)	1 - 8	4 (14)
Secchi (ft)	7.9 - 10.2	9.3 (13)
Secchi (m)	2.4 - 3.1	2.8 (13)
Color (Pt-Co Units)	10 - 16	12 (9)
Specific Conductance (µS/cm@25 C)	208 - 230	219 (3)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	White Trout
GNIS Number	293235
Latitude	28.0410
Longitude	-82.4930
Water Body Type	Lake
Surface Area (ha and acre)	31 ha or 77 acre
Period of Record (year)	1997 to 2022
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	13 (10 to 16)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	478 (380 to 545)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake White Trout 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 = 0.76), total nitrogen (TN Decreasing, $R^2 = 0.66$, p = 0.00), chlorophyll (CHL Decreasing, $R^2 = 0.59$, p = 0.00) and Secchi depth (Secchi No Trend, $R^2 = 0.09$, p = 0.32).



Florida LAKEWATCH Report for Wilford in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Grand Geometric M	
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	23 - 24	23 (2)
Total Nitrogen (µg/L)	612 - 648	629 (2)
Chlorophyll- uncorrected (µg/L)	5 - 6	6 (2)
Secchi (ft)	5.9 - 7.3	6.6 (2)
Secchi (m)	1.8 - 2.2	2.0 (2)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Wilford
GNIS Number	
Latitude	28.0813
Longitude	-82.4755
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	1998 to 1999
Lake Trophic Status (CHL)	Mesotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	23 (23 to 24)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	629 (612 to 648)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Wilson in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	8 - 26	17 (30)
Total Nitrogen (µg/L)	579 - 911	721 (30)
Chlorophyll- uncorrected (µg/L)	4 - 16	7 (30)
Secchi (ft)	5.2 - 9.4	7.4 (30)
Secchi (m)	1.6 - 2.9	2.3 (30)
Color (Pt-Co Units)	10 - 53	31 (22)
Specific Conductance (µS/cm@25 C)	165 - 262	207 (16)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Wilson
GNIS Number	292216
Latitude	28.1452
Longitude	-82.4860
Water Body Type	Lake
Surface Area (ha and acre)	25 ha or 62 acre
Period of Record (year)	1993 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	17 (8 to 26)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	721 (579 to 911)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Wilson 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, $R^2 = 0.05$, p = 0.22), total nitrogen (TN Decreasing, $R^2 = 0.51$, p = 0.00), chlorophyll (CHL Decreasing, $R^2 = 0.17$, p = 0.02) and Secchi depth (Secchi No Trend, $R^2 = 0.08$, p = 0.13).



Florida LAKEWATCH Report for Wimauma in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (ug/L)	12 - 20	17 (7)
Total Nitrogen (µg/L)	355 - 523	435 (7)
Chlorophyll- uncorrected (μ g/L)	4 - 15	8 (7)
Secchi (ft)	5.0 - 11.3	6.5 (7)
Secchi (m)	1.5 - 3.4	2.0 (7)
Color (Pt-Co Units)	5 - 14	8 (6)
Specific Conductance (µS/cm@25 C)	150 - 150	150(1)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Wimauma
GNIS Number	293392
Latitude	27.7098
Longitude	-82.3141
Water Body Type	Lake
Surface Area (ha and acre)	54 ha or 135 acre
Period of Record (year)	2000 to 2007
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP4
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	17 (12 to 20)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	435 (355 to 523)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Wimauma 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, $R^2 = 0.48$, p = 0.08), total nitrogen (TN Decreasing, $R^2 = 0.90$, p = 0.00), chlorophyll (CHL Decreasing, $R^2 = 0.68$, p = 0.02) and Secchi depth (Secchi No Trend, $R^2 = 0.32$, p = 0.19).



Florida LAKEWATCH Report for Winthrop in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 μg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Grand Geometric M	
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	90 - 138	117 (4)
Total Nitrogen (µg/L)	1018 - 1363	1253 (4)
Chlorophyll- uncorrected (µg/L)	18 - 52	36 (4)
Secchi (ft)	1.3 - 3.5	1.8 (4)
Secchi (m)	0.4 - 1.1	0.5 (4)
Color (Pt-Co Units)	16 - 25	19 (4)
Specific Conductance (µS/cm@25 C)	122 - 246	157 (4)
Lake Classification	Clear Hardwater	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Winthrop
GNIS Number	
Latitude	27.8903
Longitude	-82.3166
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2015 to 2018
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	117 (90 to 138)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	1253 (1018 to 1363)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.
Florida LAKEWATCH Report for Wood in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **vears of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	8 - 10	9 (2)
Total Nitrogen (µg/L)	303 - 435	363 (2)
Chlorophyll- uncorrected (µg/L)	2 - 4	2 (2)
Secchi (ft)	11.6 - 14.3	12.9 (2)
Secchi (m)	3.5 - 4.4	3.9 (2)
Color (Pt-Co Units)	-	(0)
Specific Conductance (µS/cm@25 C)	-	(0)
Lake Classification		

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration (µg/L: min and max): Grand Geometric Means of all annual geometric means (µg/L) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Wood
GNIS Number	293493
Latitude	28.1567
Longitude	-82.5772
Water Body Type	Lake
Surface Area (ha and acre)	7 ha or 18 acre
Period of Record (year)	1992 to 1996
Lake Trophic Status (CHL)	Oligotrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	9 (8 to 10)
TN Zone	TN3
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	363 (303 to 435)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Woodberry 2 in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum	Grand Geometric Mean
	Annual Geometric Means	(Sampling years)
Total Phosphorus (µg/L)	35 - 35	35 (1)
Total Nitrogen (µg/L)	897 - 897	897 (1)
Chlorophyll- uncorrected (µg/L)	12 - 12	12 (1)
Secchi (ft)	2.5 - 2.5	2.5 (1)
Secchi (m)	0.8 - 0.8	0.8 (1)
Color (Pt-Co Units)	42 - 42	42 (1)
Specific Conductance (µS/cm@25 C)	128 - 128	128 (1)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Woodberry 2
GNIS Number	
Latitude	27.9557
Longitude	-82.3161
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2016 to 2016
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP5
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	35 (35 to 35)
TN Zone	TN5
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	897 (897 to 897)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.

Florida LAKEWATCH Report for Zambito in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	ı's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated	
Mean Lake Color and Long-	Geometric	numeric int	erpretation	numeric interpretation	
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total
		Phosphorus	Nitrogen	Phosphorus	Nitrogen
> 40 Platinum Cobalt Units	20 µg/L	50 μg/L	1270 μg/L	160 μg/L ¹	2230 µg/L
Colored Lakes					
\leq 40 Platinum Cobalt Units					
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L
or					
>100 µS/cm@25 C					
Clear Hard Water Lakes					
\leq 40 Platinum Cobalt Units					
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L
or			μg/L		
< 100 µS/cm@25 C					
Clear Soft Water Lakes					

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	19 - 28	24 (6)
Total Nitrogen (µg/L)	674 - 1027	849 (6)
Chlorophyll- uncorrected (µg/L)	6 - 12	9 (6)
Secchi (ft)	5.3 - 6.8	5.8 (6)
Secchi (m)	1.6 - 2.1	1.8 (6)
Color (Pt-Co Units)	47 - 68	56 (6)
Specific Conductance (µS/cm@25 C)	148 - 194	172 (6)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough
Name	Zambito
GNIS Number	
Latitude	28.1147
Longitude	-82.4971
Water Body Type	Lake
Surface Area (ha and acre)	. ha or . acre
Period of Record (year)	2016 to 2022
Lake Trophic Status (CHL)	Eutrophic
TP Zone	TP3
Grand TP Geometric Mean Concentration (μ g/L, min. and max.)	24 (19 to 28)
TN Zone	TN4
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	849 (674 to 1027)



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration

Figure 2. Lake Zambito 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, $R^2 = 0.06$, p = 0.64), total nitrogen (TN No Trend, $R^2 = 0.19$, p = 0.38), chlorophyll (CHL No Trend, $R^2 = 0.04$, p = 0.72) and Secchi depth (Secchi No Trend, $R^2 = 0.11$, p = 0.53).



Florida LAKEWATCH Report for Zambito East in Hillsborough County Using Data Downloaded 12/9/2022

Introduction for Lakes

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. Part one allows the comparison of data with Florida Department of Environmental Protection's Numeric Nutrient Criteria. Part two allows a comparison of the long-term mean nutrient concentrations with nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; https://lakewatch.ifas.ufl.edu/resources/bibliography/). Finally, this report examines data for long-term trends that may be occurring in individual systems but only for systems with <u>five or more</u> **years of data.** Step by step instructions on how to use the data tables are provided on page 4 of this report.

Florida Department of Environmental Protection (FDEP) Nutrient Criteria for Lakes (Table 1)

For lakes, the numeric interpretations of the nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., based on chlorophyll are shown in Table 1. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability and concentration of chlorophyll data for the lake. The numeric interpretations for TN, TP, and chlorophyll shall not be exceeded more than once in any consecutive three year period.

a. If annual geometric mean chlorophyll does not exceed the chlorophyll value for one of three lake classification groups listed in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of the maximum calculated numeric interpretation in Table 1.

b. If there are insufficient data to calculate the annual geometric mean chlorophyll for a given year or the annual geometric mean chlorophyll exceeds the values in Table 1 for the correct lake classification group, then the applicable numeric interpretations for TN and TP shall be the minimum values in Table 1.

- Total Phosphorus (µg/L): Nutrient most often limiting growth of plant/algae.
- Total Nitrogen (µg/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 (µg/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 (µS/cm@25°C): Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolved materials in water.
- Lake Classification: Numeric nutrient criteria for Florida require that lakes must first be classified into one of three group based on color and alkalinity or specific conductance; colored lakes (color greater than 40 Pt-Co units), clear soft water lakes (color less than or equal to 40 Pt-Co units and alkalinity less than or equal to 20 mg/L as CaCO₃ or specific conductance less than or equal to 100 µs/cm @25 C), and clear hard water lakes (color less than 40 Pt-Co units and alkalinity greater than 20 mg/L as CaCO₃ or specific conductance greater 100 µS/cm @ 25 C).

Table 1.	Florida	Department of	of Environmen	tal Protection	n's Numeric	Nutrient	Criteria	for lakes.
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Long Term Geometric	Annual	Minimum calculated		Maximum calculated		
Mean Lake Color and Long-	Geometric	numeric interpretation		numeric interpretation		
Term Geometric Mean	Mean	Annual	Annual	Annual	Annual	
Color, Alkalinity and	Chlorophyll-	Geometric	Geometric	Geometric	Geometric	
Specific Conductance	corrected	Mean Total	Mean Total	Mean Total	Mean Total	
		Phosphorus	Nitrogen	Phosphorus	Nitrogen	
> 40 Platinum Cobalt Units	20 µg/L	50 µg/L	1270 μg/L	160 μg/L ¹	2230 µg/L	
Colored Lakes						
\leq 40 Platinum Cobalt Units						
and $> 20 \text{ mg/L CaCO}_3$	20 µg/L	30 µg/L	1050 μg/L	90 μg/L	1910 µg/L	
or						
>100 µS/cm@25 C						
Clear Hard Water Lakes						
\leq 40 Platinum Cobalt Units						
and $\leq 20 \text{ mg/L CaCO}_3$	6 µg/L	10 µg/L	510	30 µg/L	930 μg/L	
or			μg/L			
< 100 µS/cm@25 C						
Clear Soft Water Lakes						

For the purpose of subparagraph 62-302.531(2)(b)1., F.A.C., color shall be assessed as true color and shall be free from turbidity. Lake color and alkalinity shall be the long-term geometric mean, based on a minimum of ten data points over at least three years with at least one data point in each year. If insufficient alkalinity data are available, long-term geometric mean specific conductance values shall be used, with a value of <100 μ S/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	14 - 20	18 (4)
Total Nitrogen (µg/L)	814 - 1197	909 (4)
Chlorophyll- uncorrected (μ g/L)	5 - 7	6 (4)
Secchi (ft)	5.3 - 6.1	5.7 (3)
Secchi (m)	1.6 - 1.9	1.7 (3)
Color (Pt-Co Units)	46 - 74	62 (4)
Specific Conductance (µS/cm@25 C)	153 - 180	171 (4)
Lake Classification	Colored	

The long-term data summary will include the following parameters listed with a definition after each one:

- **County:** Name of county in which the lake resides.
- Name: Lake name that LAKEWATCH uses for the system.
- GNIS Number: Number created by USGS's Geographic Names Information System.
- Latitude and Longitude: Coordinates identifying the exact location of station 1 for each system.
- Water Body Type: Four different types of systems; lakes, estuaries, river/streams and springs.
- Surface Area (ha and acre): LAKEWATCH lists the surface area of a lake if it is available.
- Mean Depth (m and ft): This mean depth is calculated from multiple depth finder transects across a lake that LAKEWATCH uses for estimating plant abundances.
- **Period of Record (year):** Years a lake has been in the LAKEWATCH program.
- **TP Zone and TN Zone:** Nutrient zones defined by Bachmann et al (2012).
- Long-Term TP and TN Geometric Mean Concentration ($\mu g/L$: min and max): Grand Geometric Means of all annual geometric means ($\mu g/L$) with minimum and maximum annual geometric means.
- Lake Trophic Status (CHL): Tropic state classification using the long-term chlorophyll average.

Table 3. Base File Data, long-term nutrient grand geometric means and Nutrient Zone classification listing the 90th percentile concentrations in Figure 1. Values in bold can be used for Nutrient Zone comparisons.

County	Hillsborough	
Name	Zambito East	
GNIS Number		
Latitude	28.1151	
Longitude	-82.4923	
Water Body Type	Lake	
Surface Area (ha and acre)	. ha or . acre	
Period of Record (year)	2018 to 2022	
Lake Trophic Status (CHL)	Mesotrophic	
TP Zone	TP3	
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	18 (14 to 20)	
TN Zone	TN4	
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	909 (814 to 1197)	



- 1. Identify your lake's *Lake Classification* in Table 2 (Colored, Clear Hard Water, or Clear Soft Water) (if no classification is listed then there is not enough data available to classify your lake).
 - a. The *Lake Classification* tells you which row to use in Table 1.
- 2. Identify your waterbody's Grand Geometric Mean Chlorophyll-uncorrected in Table 2.
 - a. Compare this number to the Annual Geometric Mean Chlorophyll-corrected (2nd column) in Table 1.
 - b. If your lake's Chlorophyll-uncorrected concentration is greater than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Minimum calculated numeric interpretation* columns.
 - c. If your lake's *Chlorophyll-uncorrected* concentration is less than the *Annual Geometric Mean Chlorophyll-corrected* concentration use the *Maximum calculated numeric interpretation* columns.
- 3. Identify your lake's Total Phosphorus and Total Nitrogen *Grand Geometric Mean* concentration in Table 2 and compare them to the appropriate *Annual Geometric Mean Total Phosphorus* and *Annual Geometric Mean Total Nitrogen* values in Table 1.
- 4. If your lake's concentrations from Table 2 are greater than FDEP's NNC values from Table 1, your lake may be considered impaired. If they are below, it may be considered unimpaired.

Nutrient Zones and "Natural Background"

Administrative code definitions 62-302.200 (19): "Natural background" shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered waterbody may be based upon a similar unaltered waterbody, historical pre-alteration data, paleolimnological examination of sediment cores, or examination of geology and soils. When determining natural background conditions for a lake, the lake's location and regional characteristics as described and depicted in the U.S. Environmental Protection Agency document titled Lake Regions of Florida (EPA/R-97/127, dated 1997, U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR) (http://www.flrules.org/Gateway/reference.asp?No=Ref-06267), which is incorporated by reference herein, shall also be considered. The lake regions in this document are grouped Nutrient Zones according to ambient total phosphorus and total nitrogen concentrations listed in Table 1 found in Bachmann, R. W., Bigham D. L., Hoyer M. V., Canfield D. E, Jr. 2012. A strategy for establishing numeric nutrient criteria for Florida lakes. Lake Reservoir Management. 28:84-92.

- 1. Identify your lake's TP Zone in Table 3.
 - a. Locate this TP Zone (left map) and its corresponding nutrient concentration in Figure 1.
- 2. Locate your lake's Long-Term Grand Geometric Mean TP Concentration value in Table 3.
- 3. Compare your lake's Long-Term Grand Geometric Mean TP Concentration from Table 3 to the appropriate TP Zone nutrient concentration from Figure 1.
 - a. If your lake's Long-Term Grand Geometric Mean TP Concentration number is higher than the TP zone nutrient concentration, your lake's nutrient concentration is above "Natural Background".
 - b. If your lake's Long-Term Grand Geometric Mean TP Concentration number is lower than the TP zone nutrient concentration, your lake's nutrient concentration is within "Natural Background".
- 4. Repeat these same steps with the TN Zone and Long-term Grand Geometric Mean TN Concentration.