LAKEWATCH Report for Ajay in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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- **County**: Name of county in which the lake resides.
- **Name**: Lake name that LAKEWATCH uses for the system.
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- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three groups based on color and alkalinity or specific conductance; colored (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 than 100 µS/cm @ 25 C).
LAKEWATCH Report for Ajay in Osceola County
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Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Ajay</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.3373</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.2233</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>59.1 ha or 145 acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2003 to 2012</td>
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<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Mesotrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>26 (20 to 30)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1360 (1100 to 1747)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
LAKEWATCH Report for Ajay in Osceola County
Using Data Downloaded 10/17/2016

FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll $a$ and the mean does not exceed the chlorophyll $a$ value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color $> 40$ PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll $a$ for a given year or the annual geometric mean chlorophyll $a$ exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L):** Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L):** Chlorophyll concentrations are used to measure relative abundances of open water algal population.
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LAKEWATCH Report for Ajay in Osceola County
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<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>20 - 30</td>
<td>26 (7)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>1100 - 1747</td>
<td>1360 (7)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>3.0 - 8.6</td>
<td>6.1 (7)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>1.4 - 2.7</td>
<td>2.0 (7)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.4 - 0.8</td>
<td>0.6 (7)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>56 - 233</td>
<td>169 (6)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>118 - 152</td>
<td>134 (4)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
</tr>
</tbody>
</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>Colored Lakes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>Clear Hard Water Lakes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
<tr>
<td>Clear Soft Water Lakes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
LAKEWATCH Report for Ajay in Osceola County
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Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
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- **Coefficient of determination \((R^2)\):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
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<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Intercept (a)</td>
<td>-1591</td>
<td>-103502</td>
<td>-419</td>
<td>128</td>
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<tr>
<td>Slope (b)</td>
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<td>52.22</td>
<td>0.21</td>
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<tr>
<td>Coefficient of Determination ((R^2))</td>
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<tr>
<td>Probability of Significance (p)</td>
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<td>0.37</td>
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<tr>
<td>Potential Trend</td>
<td>Increasing</td>
<td>Increasing</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Ajay in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
Ajay (Osceola)

Total Phosphorus (μg/L)

\[ y = 0.81x + 1591 \]
\[ R^2 = 0.79 \]

Year

Total Nitrogen (μg/L)

\[ y = 52.22x - 103502.2 \]
\[ R^2 = 0.65 \]

Year
Ajay (Osceola)

**Total Chlorophyll (µg/L)**

- Equation: $y = 0.21x + 418.92$
- $R^2 = 0.16$

**Year**


Ajay (Osceola)

**Secchi depth (ft)**

- Equation: $y = -0.06x + 127.61$
- $R^2 = 0.2$

**Year**

LAKEWATCH Report for Alligator in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

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LAKEWATCH Report for Alligator in Osceola County
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Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Alligator</td>
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<tr>
<td>Latitude</td>
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<td>Longitude</td>
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<tr>
<td>Water Body</td>
<td>Lake</td>
</tr>
<tr>
<td>Type</td>
<td></td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>1417 ha or 3501 acre</td>
</tr>
<tr>
<td>Mean Depth</td>
<td>3.2 m or 10.6 ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>1990 to 2016</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Mesotrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term  TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>16 (9 to 23)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term  TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>712 (457 to 1035)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
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LAKEWATCH Report for Alligator in Osceola County
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<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
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<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>9 - 23</td>
<td>16 (27)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>457 - 1035</td>
<td>712 (27)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>2.4 - 6.3</td>
<td>4.0 (27)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>3.1 - 7.4</td>
<td>5.1 (27)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.9 - 2.3</td>
<td>1.6 (27)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>9 - 127</td>
<td>66 (15)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>133 - 183</td>
<td>146 (9)</td>
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<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
</tr>
</tbody>
</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
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<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

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Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

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<tr>
<th>Statistic</th>
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<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>27</td>
<td>27</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>Intercept (a)</td>
<td>-581</td>
<td>-22561</td>
<td>-77</td>
<td>119</td>
</tr>
<tr>
<td>Slope (b)</td>
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<td>11.62</td>
<td>0.04</td>
<td>-0.06</td>
</tr>
<tr>
<td>Coefficient of Determination (R²)</td>
<td>0.37</td>
<td>0.28</td>
<td>0.12</td>
<td>0.12</td>
</tr>
<tr>
<td>Probability of Significance (p)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.08</td>
<td>0.07</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>Increasing</td>
<td>Increasing</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Alligator in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
Alligator (Osceola)

**Total Chlorophyll (µg/L)**

\[ y = 0.04x - 77.03 \]

\[ R^2 = 0.12 \]

Year


Alligator (Osceola)

**Secchi depth (ft)**

\[ y = -0.06x + 118.75 \]

\[ R^2 = 0.12 \]

Year

LAKEWATCH Report for Boggy Cove in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

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Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Boggy Cove in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Boggy Cove</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.3327</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.3118</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>ha or acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2005 to 2015</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>39 (25 to 60)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>748 (545 to 1113)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
LAKEWATCH Report for Boggy Cove in Osceola County
Using Data Downloaded 10/17/2016

FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll $a$ and the mean does not exceed the chlorophyll $a$ value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color $> 40$ PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll $a$ for a given year or the annual geometric mean chlorophyll $a$ exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L)**: The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L)**: Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L)**: Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m)**: Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units)**: LAKEWATCH measures true color, which is the color of the water after particles have been filter out.
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LAKEWATCH Report for Boggy Cove in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>25 - 60</td>
<td>39 (6)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>545 - 1113</td>
<td>748 (6)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>7.0 - 10.7</td>
<td>9.3 (6)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>3.3 - 5.0</td>
<td>3.8 (6)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>1.0 - 1.5</td>
<td>1.1 (6)</td>
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<tr>
<td>Color (Pt-Co Units)</td>
<td>52 - 202</td>
<td>89 (6)</td>
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<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>97 - 159</td>
<td>135 (4)</td>
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<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
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</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

¹ For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
LAKEWATCH Report for Boggy Cove in Osceola County
Using Data Downloaded 10/17/2016

Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R²):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Intercept (a)</td>
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<td>Slope (b)</td>
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<td>Coefficient of Determination (R²)</td>
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<td>0.22</td>
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<tr>
<td>Probability of Significance (p)</td>
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<td>0.35</td>
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<td>Potential Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Boggy Cove in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
LAKEWATCH Report for Brick in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
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- **Water Body Type**: Four different types of systems; lakes, estuaries, 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.
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- **Long-Term TP and TN Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Brick</td>
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<td>Latitude</td>
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<tr>
<td>Longitude</td>
<td>-81.198</td>
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<tr>
<td>Water Body Type</td>
<td>Lake</td>
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<tr>
<td>Surface Area (ha and acre)</td>
<td>249 ha or 616 acre</td>
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<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>1991 to 2016</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Mesotrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>21 (13 to 45)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1110 (731 to 1757)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \(a\) and the mean does not exceed the chlorophyll \(a\) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \(a\) for a given year or the annual geometric mean chlorophyll \(a\) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

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LAKEWATCH Report for Brick in Osceola County
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<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>13 - 45</td>
<td>21 (23)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>731 - 1757</td>
<td>1110 (23)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>3.7 - 10.7</td>
<td>6.6 (23)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>1.4 - 2.6</td>
<td>1.8 (23)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.4 - 0.8</td>
<td>0.6 (23)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
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<td>281 (11)</td>
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<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
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<td>143 (5)</td>
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<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
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</tbody>
</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>90 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt;100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>30 µg/L</td>
</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
LAKEWATCH Report for Brick in Osceola County
Using Data Downloaded 10/17/2016

Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

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- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
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<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Intercept (a)</td>
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<td>-31609</td>
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</tr>
<tr>
<td>Slope (b)</td>
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<td>16.34</td>
<td>0.06</td>
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<td>Coefficient of Determination (R²)</td>
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<td>0.22</td>
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<td>0.97</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>No Trend</td>
<td>Increasing</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Brick in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
Brick (Osceola)

**Total Chlorophyll (µg/L)**

- Equation: $y = 0.06x - 117.2$
- $R^2 = 0.09$

Year: 1990 to 2015

---

Brick (Osceola)

**Secchi depth (ft)**

- Equation: $y = 0x + 1.38$
- $R^2 = 0$

Year: 1990 to 2015
Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

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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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Buck in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Buck</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.2062</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.1476</td>
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<tr>
<td>Water Body Type</td>
<td>Lake</td>
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<td>Surface Area (ha and acre)</td>
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</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2003 to 2013</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>33 (26 to 39)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>827 (645 to 967)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll $a$ and the mean does not exceed the chlorophyll $a$ value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color $> 40$ PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll $a$ for a given year or the annual geometric mean chlorophyll $a$ exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L):** Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
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- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter out.
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LAKEWATCH Report for Buck in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>26 - 39</td>
<td>33 (6)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>645 - 967</td>
<td>827 (6)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>8.2 - 14.4</td>
<td>11.1 (6)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>1.5 - 2.8</td>
<td>1.9 (6)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.5 - 0.8</td>
<td>0.6 (6)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>44 - 129</td>
<td>97 (6)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>105 - 138</td>
<td>122 (3)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
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</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

₁ For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
LAKEWATCH Report for Buck in Osceola County
Using Data Downloaded 10/17/2016

Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R²):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Intercept (a)</td>
<td>-1359</td>
<td>-46753</td>
<td>-62</td>
<td>78</td>
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<tr>
<td>Slope (b)</td>
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<td>23.70</td>
<td>0.04</td>
<td>-0.04</td>
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<tr>
<td>Coefficient of Determination (R²)</td>
<td>0.35</td>
<td>0.52</td>
<td>0.00</td>
<td>0.11</td>
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<tr>
<td>Probability of Significance (p)</td>
<td>0.22</td>
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<td>0.91</td>
<td>0.51</td>
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<tr>
<td>Potential Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Buck in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
Buck (Osceola)

Total Chlorophyll (µg/L)

\[ y = 0.04x - 61.63 \]
\[ R^2 = 0 \]

Buck (Osceola)

Secchi depth (ft)

\[ y = -0.04x + 77.85 \]
\[ R^2 = 0.11 \]
LAKEWATCH Report for Cat in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Cat in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Cat</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.2025</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.1257</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>829 ha or 2080 acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2003 to 2013</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>26 (20 to 30)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1007 (850 to 1157)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \(a\) and the mean does not exceed the chlorophyll \(a\) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color \(> 40\) PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \(a\) for a given year or the annual geometric mean chlorophyll \(a\) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

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

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- **Secchi (ft), Secchi (m)**: Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
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LAKEWATCH Report for Cat in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
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<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>20 - 30</td>
<td>26 (6)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>850 - 1157</td>
<td>1007 (6)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>5.8 - 21.4</td>
<td>10.5 (6)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>1.1 - 2.5</td>
<td>1.8 (6)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.3 - 0.8</td>
<td>0.6 (6)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
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<td>151 (5)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>68 - 82</td>
<td>74 (3)</td>
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<td>Lake Classification</td>
<td>Colored Lake</td>
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</table>

<table>
<thead>
<tr>
<th>FDEP Numeric Nutrient Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</td>
</tr>
<tr>
<td>Annual Geometric Mean Chlorophyll-corrected</td>
</tr>
<tr>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units</td>
</tr>
<tr>
<td>Colored Lakes</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C</td>
</tr>
<tr>
<td>Clear Hard Water Lakes</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C</td>
</tr>
<tr>
<td>Clear Soft Water Lakes</td>
</tr>
</tbody>
</table>

¹ For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

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<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Intercept (a)</td>
<td>-1193</td>
<td>-42112</td>
<td>-1770</td>
<td>151</td>
</tr>
<tr>
<td>Slope (b)</td>
<td>0.61</td>
<td>21.48</td>
<td>0.89</td>
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</tr>
<tr>
<td>Coefficient of Determination ( (R^2) )</td>
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<td>0.58</td>
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<tr>
<td>Probability of Significance (p)</td>
<td>0.14</td>
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<td>0.17</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Cat in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
LAKEWATCH Report for Cecile in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

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- **Long-Term TP and TN Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
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LAKEWATCH Report for Cecile in Osceola County
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Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Cecile</td>
</tr>
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</tr>
<tr>
<td>Longitude</td>
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</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>47 ha or 117 acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>1990 to 1991</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>15 (15 to 15)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>524 (482 to 566)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll $a$ and the mean does not exceed the chlorophyll $a$ value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color $> 40$ PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll $a$ for a given year or the annual geometric mean chlorophyll $a$ exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

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LAKEWATCH Report for Cecile in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
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</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
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<td>15 (2)</td>
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<td>Total Nitrogen (µg/L)</td>
<td>482 - 566</td>
<td>524 (2)</td>
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<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
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<tr>
<td>Secchi (ft)</td>
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<tr>
<td>Secchi (m)</td>
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<td>2.0 (2)</td>
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<tr>
<td>Color (Pt-Co Units)</td>
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<td>()</td>
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<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>-</td>
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<tr>
<td>Lake Classification</td>
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</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td></td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Nitrogen</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>1270 µg/L</td>
<td>2230 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>1050 µg/L</td>
<td>1910 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>51 µg/L</td>
<td>930 µg/L</td>
</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
LAKEWATCH Report for Cecile in Osceola County
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Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

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<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (a)</td>
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<tr>
<td>Slope (b)</td>
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<tr>
<td>Coefficient of Determination (R²)</td>
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<tr>
<td>Probability of Significance (p)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential Trend</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Cecile in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
LAKEWATCH Report for Center in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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- **Water Body Type**: Four different types of systems; lakes, estuaries, streams and springs.
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- **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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 CaCO$_3$ or specific conductance less the 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 CaCO$_3$ or specific conductance greater 100 µS/cm @ 25 C).
LAKEWATCH Report for Center in Osceola County
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Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Center</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.2831</td>
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<tr>
<td>Longitude</td>
<td>-81.1902</td>
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<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>120 ha or 298 acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>1.7 m or 5.6 ft</td>
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<tr>
<td>Period of Record (year)</td>
<td>1990 to 2016</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>55 (29 to 94)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1622 (872 to 2261)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll $a$ and the mean does not exceed the chlorophyll $a$ value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color $> 40$ PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll $a$ for a given year or the annual geometric mean chlorophyll $a$ exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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<table>
<thead>
<tr>
<th>Parameter</th>
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<tbody>
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<td>55 (27)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>872 - 2261</td>
<td>1622 (27)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>1.1 - 18.2</td>
<td>9.1 (27)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>0.7 - 1.6</td>
<td>1.2 (27)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.2 - 0.5</td>
<td>0.4 (27)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
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<td>292 (15)</td>
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<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>96 - 156</td>
<td>136 (9)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
</tr>
</tbody>
</table>

**FDEP Numeric Nutrient Criteria**

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
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</tr>
<tr>
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<tr>
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<td>30 µg/L</td>
<td>1050 µg/L</td>
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<td>51 µg/L</td>
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Trend Analyses Lakes

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<th>Total Nitrogen</th>
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<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>27</td>
<td>27</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>Intercept (a)</td>
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</tr>
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<td>Coefficient of Determination (R²)</td>
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<td>Potential Trend</td>
<td>No Trend</td>
<td>Increasing</td>
<td>No Trend</td>
<td>No Trend</td>
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</tbody>
</table>

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Center (Osceola)

**Total Phosphorus (µg/L)**

- Equation: $y = -0.73x + 1511.45$
- $R^2 = 0.12$

Year:
- 1990
- 1995
- 2000
- 2005
- 2010
- 2015

---

Center (Osceola)

**Total Nitrogen (µg/L)**

- Equation: $y = 42.44x - 83379.98$
- $R^2 = 0.68$

Year:
- 1990
- 1995
- 2000
- 2005
- 2010
- 2015
LAKEWATCH Report for Civic Center Pond in Osceola County  
Using Data Downloaded 10/17/2016

Introduction for Lakes

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LAKEWATCH Report for Civic Center Pond in Osceola County
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Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Civic Center Pond</td>
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<tr>
<td>Latitude</td>
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<tr>
<td>Longitude</td>
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</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
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<tr>
<td>Surface Area (ha and acre)</td>
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<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2014 to 2014</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Clear Hard Water Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP5</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>70 (70 to 70)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN5</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>816 (816 to 816)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
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<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>70 - 70</td>
<td>70 (1)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>816 - 816</td>
<td>816 (1)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>30.2 - 30.2</td>
<td>30.2 (1)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>3.5 - 3.5</td>
<td>3.5 (1)</td>
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<tr>
<td>Secchi (m)</td>
<td>1.1 - 1.1</td>
<td>1.1 (1)</td>
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<td>Color (Pt-Co Units)</td>
<td>26 - 26</td>
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<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>169 - 169</td>
<td>169 (1)</td>
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<td>Lake Classification</td>
<td>Clear Hard Water Lake</td>
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</tr>
</tbody>
</table>

FDEP Numeric Nutrient Criteria

| Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance | Annual Geometric Mean Chlorophyll-corrected | Minimum calculated numeric interpretation | Maximum calculated numeric interpretation |
|------------------------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------|
|                                                                                                           | Annual Geometric Mean Total Phosphorus    | Annual Geometric Mean Total Nitrogen      |                                            |
|                                                                                                           | Annual Geometric Mean Total Phosphorus    | Annual Geometric Mean Total Nitrogen      | Annual Geometric Mean Total Nitrogen      |
| > 40 Platinum Cobalt Units Colored Lakes                                                                 | 20 µg/L                                   | 50 µg/L                                   | 1270 µg/L                                 |
|                                                                                                           |                                            |                                           | 160 µg/L<sup>1</sup>                      | 2230 µg/L                                 |
| ≤ 40 Platinum Cobalt Units and > 20 mg/L CaCO<sub>3</sub> or >100 µS/cm@25 C Clear Hard Water Lakes     | 20 µg/L                                   | 30 µg/L                                   | 1050 µg/L                                 |
|                                                                                                           |                                            |                                           | 90 µg/L                                   | 1910 µg/L                                 |
| ≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO<sub>3</sub> or < 100 µS/cm@25 C Clear Soft Water Lakes  | 6 µg/L                                    | 10 µg/L                                   | 51 µg/L                                   |
|                                                                                                           |                                            |                                           | 30 µg/L                                   | 930 µg/L                                  |

<sup>1</sup> For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO<sub>3</sub> alkalinity concentration until such time that alkalinity data are available.
LAKEWATCH Report for Civic Center Pond in Osceola County
Using Data Downloaded 10/17/2016

Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R²):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slope (b)</td>
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<tr>
<td>Coefficient of Determination (R²)</td>
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<tr>
<td>Probability of Significance (p)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Potential Trend</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Civic Center Pond in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
LAKEWATCH Report for Coon in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Coon in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Coon</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.269</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.1828</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>51 ha or 126 acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>1.7 m or 5.5 ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>1990 to 2016</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>33 (23 to 46)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1239 (798 to 1890)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
LAKEWATCH Report for Coon in Osceola County
Using Data Downloaded 10/17/2016

FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \( a \) and the mean does not exceed the chlorophyll \( a \) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \( a \) for a given year or the annual geometric mean chlorophyll \( a \) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L):** Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L):** Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
## LAKEWATCH Report for Coon in Osceola County
### Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>23 - 46</td>
<td>33 (27)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>798 - 1890</td>
<td>1239 (27)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>4.7 - 20.6</td>
<td>9.4 (27)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>1.5 - 2.8</td>
<td>1.9 (27)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.5 - 0.8</td>
<td>0.6 (27)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>46 - 292</td>
<td>181 (15)</td>
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<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>102 - 148</td>
<td>129 (9)</td>
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<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
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</table>

### FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
LAKEWATCH Report for Coon in Osceola County
Using Data Downloaded 10/17/2016

Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

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<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>27</td>
<td>27</td>
<td>27</td>
<td>27</td>
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<tr>
<td>Intercept (a)</td>
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<tr>
<td>Slope (b)</td>
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<tr>
<td>Coefficient of Determination (R^2)</td>
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<tr>
<td>Probability of Significance (p)</td>
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<td>0.03</td>
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<td>Potential Trend</td>
<td>Decreasing</td>
<td>Increasing</td>
<td>No Trend</td>
<td>Increasing</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Coon in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
Coon (Osceola)

**Total Phosphorus (μg/L)**

- Equation: $y = -0.38x + 800.11$
- $R^2 = 0.19$

Coon (Osceola)

**Total Nitrogen (μg/L)**

- Equation: $y = 25.68x - 50189.79$
- $R^2 = 0.51$
Coon (Osceola)

**Total Chlorophyll (µg/L)**

- Equation: \( y = -0.17x + 352.16 \)
- \( R^2 = 0.14 \)

Year:
- 1990
- 1995
- 2000
- 2005
- 2010
- 2015

---

Coon (Osceola)

**Secchi depth (ft)**

- Equation: \( y = 0.02x - 41.27 \)
- \( R^2 = 0.17 \)

Year:
- 1990
- 1995
- 2000
- 2005
- 2010
- 2015
LAKEWATCH Report for Cypress in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

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- **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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
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LAKEWATCH Report for Cypress in Osceola County  
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
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<tr>
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<tr>
<td>Longitude</td>
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<tr>
<td>Water Body Type</td>
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<td>Surface Area (ha and acre)</td>
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<td>Mean Depth (m and ft)</td>
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<td>Lake Classification</td>
<td>Colored Lake</td>
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<td>Lake Trophic Status (CHL)</td>
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<tr>
<td>TP Zone</td>
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<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>79 (38 to 136)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN5</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1629 (1004 to 2167)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll $a$ and the mean does not exceed the chlorophyll $a$ value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color $> 40$ PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the $490$ µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll $a$ for a given year or the annual geometric mean chlorophyll $a$ exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

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- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter out.
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LAKEWATCH Report for Cypress in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>38 - 136</td>
<td>79 (8)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>1004 - 2167</td>
<td>1629 (8)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>26.2 - 81.0</td>
<td>54.8 (8)</td>
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<tr>
<td>Secchi (ft)</td>
<td>1.4 - 2.6</td>
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<tr>
<td>Secchi (m)</td>
<td>0.4 - 0.8</td>
<td>0.6 (8)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
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<td>Specific Conductance (µS/cm@25 C)</td>
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<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
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</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>Colored Lakes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>Clear Hard Water Lakes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
<tr>
<td>Clear Soft Water Lakes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
LAKEWATCH Report for Cypress in Osceola County
Using Data Downloaded 10/17/2016

Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination ($R^2$):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Intercept (a)</td>
<td>-85</td>
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<td>-5164</td>
<td>193</td>
</tr>
<tr>
<td>Slope (b)</td>
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<td>67.04</td>
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<td>-0.10</td>
</tr>
<tr>
<td>Coefficient of Determination ($R^2$)</td>
<td>0.00</td>
<td>0.31</td>
<td>0.13</td>
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</tr>
<tr>
<td>Probability of Significance (p)</td>
<td>0.98</td>
<td>0.15</td>
<td>0.38</td>
<td>0.08</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Cypress in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
LAKEWATCH Report for Cypress East in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Cypress East in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Cypress East</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.0778</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.3267</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>1658 ha or 4097 acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td></td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2002 to 2002</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Hypereutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP5</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>131 (131 to 131)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN5</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>2232 (2232 to 2232)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll  \(a\) and the mean does not exceed the chlorophyll  \(a\) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll  \(a\) for a given year or the annual geometric mean chlorophyll  \(a\) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L):** Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L):** Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
LAKEWATCH Report for Cypress East in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>131 - 131</td>
<td>131 (1)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>2232 - 2232</td>
<td>2232 (1)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>51.7 - 51.7</td>
<td>51.7 (1)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>2.2 - 2.2</td>
<td>2.2 (1)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.7 - 0.7</td>
<td>0.7 (1)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>55 - 55</td>
<td>55 (1)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>-</td>
<td>(0)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
</tr>
</tbody>
</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Total Phosphorus</th>
<th>Annual Geometric Mean Total Nitrogen</th>
<th>Annual Geometric Mean Total Phosphorus</th>
<th>Annual Geometric Mean Total Nitrogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 40 Platinum Cobalt Units</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
<td>160 µg/L</td>
</tr>
<tr>
<td>Colored Lakes</td>
<td></td>
<td></td>
<td></td>
<td>2230 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
<td>90 µg/L</td>
</tr>
<tr>
<td>Clear Hard Water Lakes</td>
<td></td>
<td></td>
<td></td>
<td>1910 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt;100 µS/cm@25 C</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
<td>30 µg/L</td>
</tr>
<tr>
<td>Clear Soft Water Lakes</td>
<td></td>
<td></td>
<td></td>
<td>930 µg/L</td>
</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
LAKEWATCH Report for Cypress East in Osceola County
Using Data Downloaded 10/17/2016

Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R²):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
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<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slope (b)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coefficient of Determination (R²)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probability of Significance (p)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential Trend</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Cypress East in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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- **County**: Name of county in which the lake resides.
- **Name**: Lake name that LAKEWATCH uses for the 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, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 CaCO$_3$ or specific conductance less the 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 CaCO$_3$ or specific conductance greater 100 µS/cm @ 25 C).
LAKEWATCH Report for Fells Cove in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Fells Cove</td>
</tr>
<tr>
<td>Latitude</td>
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</tr>
<tr>
<td>Longitude</td>
<td>-81.2503</td>
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<tr>
<td>Water Body Type</td>
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</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>ha or acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2003 to 2015</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
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</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>26 (17 to 34)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1158 (731 to 1422)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \( a \) and the mean does not exceed the chlorophyll \( a \) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \( a \) for a given year or the annual geometric mean chlorophyll \( a \) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus** (µg/L): The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen** (µg/L): Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected** (µg/L): Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi** (ft), **Secchi** (m): Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color** (Pt-Co Units): LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
LAKEWATCH Report for Fells Cove in Osceola County  
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>17 - 34</td>
<td>26 (11)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>731 - 1422</td>
<td>1158 (11)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>3.1 - 9.3</td>
<td>5.8 (11)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>1.7 - 6.0</td>
<td>3.0 (11)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.5 - 1.8</td>
<td>0.9 (11)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>38 - 257</td>
<td>134 (9)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>125 - 173</td>
<td>145 (6)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
</tr>
</tbody>
</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Total Phosphorus</th>
<th>Annual Geometric Mean Total Nitrogen</th>
<th>Annual Geometric Mean Total Phosphorus</th>
<th>Annual Geometric Mean Total Nitrogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
<td>160 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
<td>90 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
<td>30 µg/L</td>
</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis where zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R²):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
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<td>11</td>
<td>11</td>
<td>11</td>
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<td>Intercept (a)</td>
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<td>Slope (b)</td>
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<td>Coefficient of Determination (R²)</td>
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<td>Potential Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Fells Cove in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
Fells Cove (Osceola)

Total Chlorophyll (μg/L)

\[ y = -0.05x + 114.26 \]
\[ R^2 = 0.01 \]

Year

Fells Cove (Osceola)

Secchi depth (ft)

\[ y = -0.01x + 21.47 \]
\[ R^2 = 0 \]

Year
Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Fish in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Fish</td>
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<tr>
<td>Latitude</td>
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<td>Longitude</td>
<td>-81.3393</td>
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<td>Water Body Type</td>
<td>Lake</td>
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<tr>
<td>Surface Area (ha and acre)</td>
<td>725 ha or 1791 acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>1.9 m or 6.2 ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2003 to 2016</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Hypereutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>50 (39 to 61)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1442 (1111 to 1643)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll $a$ and the mean does not exceed the chlorophyll $a$ value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color $> 40$ PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll $a$ for a given year or the annual geometric mean chlorophyll $a$ exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L):** Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L):** Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
## Parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>39 - 61</td>
<td>50 (13)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>1111 - 1643</td>
<td>1442 (13)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>29.6 - 57.2</td>
<td>41.8 (13)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>2.1 - 3.2</td>
<td>2.6 (13)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.6 - 1.0</td>
<td>0.8 (13)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>30 - 73</td>
<td>48 (12)</td>
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<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>172 - 255</td>
<td>200 (10)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
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</table>

### FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
</tbody>
</table>

- **> 40 Platinum Cobalt Units**
  - **Colored Lakes**
    - 20 µg/L
    - 50 µg/L
    - 1270 µg/L
    - 160 µg/L
    - 2230 µg/L

- **≤ 40 Platinum Cobalt Units**
  - **and > 20 mg/L CaCO₃**
    - **Clear Hard Water Lakes**
      - 20 µg/L
      - 30 µg/L
      - 1050 µg/L
      - 90 µg/L
      - 1910 µg/L

- **≤ 40 Platinum Cobalt Units**
  - **and ≤ 20 mg/L CaCO₃**
    - **or < 100 µS/cm@25 C**
      - **Clear Soft Water Lakes**
        - 6 µg/L
        - 10 µg/L
        - 51 µg/L
        - 30 µg/L
        - 930 µg/L

1. For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R²):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
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<tr>
<td>Intercept (a)</td>
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<tr>
<td>Slope (b)</td>
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</tr>
<tr>
<td>Coefficient of Determination (R²)</td>
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<td>0.33</td>
<td>0.01</td>
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<td>Probability of Significance (p)</td>
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<td>0.22</td>
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<td>0.80</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Fish in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
Fish (Osceola)

Total Phosphorus (μg/L)

$y = -0.49x + 1040.23$

$R^2 = 0.15$

Year

Fish (Osceola)

Total Nitrogen (μg/L)

$y = 12.83x - 24336.75$

$R^2 = 0.13$

Year
LAKEWATCH Report for Gentry in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Gentry in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
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<td>Longitude</td>
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<tr>
<td>Water Body Type</td>
<td>Lake</td>
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<tr>
<td>Surface Area (ha and acre)</td>
<td>725 ha or 1791 acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>2.6 m or 8.6 ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>1993 to 2016</td>
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<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
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<tr>
<td>Lake Trophic Status (CHL)</td>
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<td>TP Zone</td>
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<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
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</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>791 (525 to 1074)</td>
</tr>
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</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \(a\) and the mean does not exceed the chlorophyll \(a\) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \(a\) for a given year or the annual geometric mean chlorophyll \(a\) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L):** Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L):** Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
**LAKEWATCH Report for Gentry in Osceola County**  
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>12 - 30</td>
<td>21 (17)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>525 - 1074</td>
<td>791 (17)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>2.0 - 6.5</td>
<td>4.1 (17)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>3.1 - 6.6</td>
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<td>Secchi (m)</td>
<td>1.0 - 2.0</td>
<td>1.2 (17)</td>
</tr>
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<td>Color (Pt-Co Units)</td>
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<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
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<td>164 (9)</td>
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<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
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</table>

**FDEP Numeric Nutrient Criteria**

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

¹ For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R²):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
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<tr>
<th>Statistic</th>
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<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Intercept (a)</td>
<td>-949</td>
<td>-24458</td>
<td>-216</td>
<td>260</td>
</tr>
<tr>
<td>Slope (b)</td>
<td>0.48</td>
<td>12.58</td>
<td>0.11</td>
<td>-0.13</td>
</tr>
<tr>
<td>Coefficient of Determination (R²)</td>
<td>0.37</td>
<td>0.31</td>
<td>0.31</td>
<td>0.47</td>
</tr>
<tr>
<td>Probability of Significance (p)</td>
<td>0.01</td>
<td>0.02</td>
<td>0.02</td>
<td>0.01</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>Increasing</td>
<td>Increasing</td>
<td>Increasing</td>
<td>Decreasing</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Gentry in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
Gentry (Osceola)

**Total Chlorophyll (µg/L)**

- Equation: \( y = 0.11x - 215.67 \)
- \( R^2 = 0.31 \)

Year


---

Gentry (Osceola)

**Secchi depth (ft)**

- Equation: \( y = -0.13x + 259.71 \)
- \( R^2 = 0.47 \)

Year

LAKEWATCH Report for Harmony Estates-Retention Pond in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Harmony Estates-Retention Pond in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Harmony Estates-Retention Pond</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.2034</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.1453</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>ha or acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2012 to 2013</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>218 (166 to 271)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>929 (858 to 1000)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
LAKEWATCH Report for Harmony Estates-Retention Pond in Osceola County
Using Data Downloaded 10/17/2016

FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \( a \) and the mean does not exceed the chlorophyll \( a \) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \( a \) for a given year or the annual geometric mean chlorophyll \( a \) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L):** Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L):** Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
LAKEWATCH Report for Harmony Estates-Retention Pond in Osceola County Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>166 - 271</td>
<td>218 (2)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>858 - 1000</td>
<td>929 (2)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>18.0 - 54.5</td>
<td>36.3 (2)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>2.2 - 4.4</td>
<td>3.3 (2)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.7 - 1.3</td>
<td>1.0 (2)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>37 - 65</td>
<td>51 (2)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>361 - 405</td>
<td>383 (2)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
</tr>
</tbody>
</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R²):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slope (b)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coefficient of Determination (R²)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Probability of Significance (p)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential Trend</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Harmony Estates-Retention Pond in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
LAKEWATCH Report for Hatchineha in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Hatchineha in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Hatchineha</td>
</tr>
<tr>
<td>Latitude</td>
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</tr>
<tr>
<td>Longitude</td>
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</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
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</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>1995 to 2012</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP5</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>46 (34 to 69)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN5</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1362 (1093 to 1855)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \( a \) and the mean does not exceed the chlorophyll \( a \) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \( a \) for a given year or the annual geometric mean chlorophyll \( a \) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

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- **Total Nitrogen (µg/L)**: Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L)**: Chlorophyll concentrations are used to measure relative abundances of open water algal population.
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LAKEWATCH Report for Hatchineha in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>34 - 69</td>
<td>46 (9)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>1093 - 1855</td>
<td>1362 (9)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>10.9 - 42.0</td>
<td>22.9 (9)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>1.9 - 3.4</td>
<td>2.5 (9)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.6 - 1.0</td>
<td>0.7 (9)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>51 - 332</td>
<td>123 (5)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>171 - 207</td>
<td>194 (4)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
</tr>
</tbody>
</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

¹ For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R^2):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Intercept (a)</td>
<td>-1439</td>
<td>-38954</td>
<td>-2802</td>
<td>88</td>
</tr>
<tr>
<td>Slope (b)</td>
<td>0.74</td>
<td>20.13</td>
<td>1.41</td>
<td>-0.04</td>
</tr>
<tr>
<td>Coefficient of Determination (R^2)</td>
<td>0.20</td>
<td>0.30</td>
<td>0.67</td>
<td>0.28</td>
</tr>
<tr>
<td>Probability of Significance (p)</td>
<td>0.23</td>
<td>0.13</td>
<td>0.01</td>
<td>0.15</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>Increasing</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Hatchineha in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
LAKEWATCH Report for Hinden in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

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- **TP Zone and TN Zone**: Nutrient zones defined by Bachmann et al (2012).
- **Long-Term TP and TN Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Hinden in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Hinden</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.3225</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.23</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>ha or acre</td>
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<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2009 to 2016</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Clear Hard Water Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Mesotrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>16 (13 to 17)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>361 (309 to 418)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \( a \) and the mean does not exceed the chlorophyll \( a \) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \( a \) for a given year or the annual geometric mean chlorophyll \( a \) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L)**: The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L)**: Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L)**: Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m)**: Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
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LAKEWATCH Report for Hinden in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>13 - 17</td>
<td>16 (7)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>309 - 418</td>
<td>361 (7)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>3.0 - 7.3</td>
<td>4.9 (7)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>5.2 - 6.5</td>
<td>5.8 (7)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>1.6 - 2.0</td>
<td>1.8 (7)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>6 - 15</td>
<td>10 (6)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>107 - 147</td>
<td>136 (6)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td></td>
<td>Clear Hard Water Lake</td>
</tr>
</tbody>
</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Total Phosphorus</th>
<th>Annual Geometric Mean Total Nitrogen</th>
<th>Annual Geometric Mean Total Phosphorus</th>
<th>Annual Geometric Mean Total Nitrogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
<td>160 µg/L¹</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
<td>90 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
<td>30 µg/L</td>
</tr>
</tbody>
</table>

¹ For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
LAKEWATCH Report for Hinden in Osceola County
Using Data Downloaded 10/17/2016

Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis where zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R²):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
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<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Intercept (a)</td>
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<td>-1206</td>
<td>1063</td>
<td>102</td>
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<tr>
<td>Slope (b)</td>
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<td>0.78</td>
<td>-0.53</td>
<td>-0.05</td>
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<tr>
<td>Coefficient of Determination (R²)</td>
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<td>0.03</td>
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<td>Probability of Significance (p)</td>
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<td>Potential Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>Decreasing</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Hinden in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
**Hinden (Osceola)**

**Total Phosphorus (µg/L)**

- Equation: $y = 0.36x - 715.16$
- $R^2 = 0.37$


---

**Hinden (Osceola)**

**Total Nitrogen (µg/L)**

- Equation: $y = 0.78x - 1206.36$
- $R^2 = 0$

Hinden (Osceola)

Total Chlorophyll (μg/L)

$y = -0.53x + 1063.13$
$R^2 = 0.78$

Year

Hinden (Osceola)

Secchi depth (ft)

$y = -0.05x + 101.9$
$R^2 = 0.03$

Year
LAKEWATCH Report for Hole #2 Pond in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

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LAKEWATCH Report for Hole #2 Pond in Osceola County
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Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Hole #2 Pond</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.2</td>
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<tr>
<td>Longitude</td>
<td>-81.156</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>ha or acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2003 to 2013</td>
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<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>78 (25 to 203)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1191 (720 to 1673)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
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Using Data Downloaded 10/17/2016

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LAKEWATCH Report for Hole #2 Pond in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>25 - 203</td>
<td>78 (6)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>720 - 1673</td>
<td>1191 (6)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>6.5 - 44.0</td>
<td>29.0 (6)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>1.6 - 4.5</td>
<td>2.7 (6)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.5 - 1.4</td>
<td>0.8 (6)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>41 - 59</td>
<td>49 (4)</td>
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<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>340 - 367</td>
<td>350 (3)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
</tr>
</tbody>
</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

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- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R^2):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Intercept (a)</td>
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<td>-181959</td>
<td>55</td>
<td>296</td>
</tr>
<tr>
<td>Slope (b)</td>
<td>-12.71</td>
<td>91.23</td>
<td>-0.01</td>
<td>-0.15</td>
</tr>
<tr>
<td>Coefficient of Determination (R^2)</td>
<td>0.53</td>
<td>0.80</td>
<td>0.00</td>
<td>0.24</td>
</tr>
<tr>
<td>Probability of Significance (p)</td>
<td>0.10</td>
<td>0.02</td>
<td>0.99</td>
<td>0.33</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>No Trend</td>
<td>Increasing</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Hole #2 Pond in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
Hole #2 Pond (Osceola)

Total Phosphorus (µg/L)

\[ y = -12.71x + 25597.52 \]
\[ R^2 = 0.53 \]

Year

Hole #2 Pond (Osceola)

Total Nitrogen (µg/L)

\[ y = 91.23x - 181959.4 \]
\[ R^2 = 0.8 \]

Year
Hole #2 Pond (Osceola)

Total Chlorophyll (µg/L)

\[ y = -0.01x + 55.37 \]
\[ R^2 = 0 \]

Year


Hole #2 Pond (Osceola)

Secchi depth (ft)

\[ y = -0.15x + 296.01 \]
\[ R^2 = 0.24 \]

Year

LAKEWATCH Report for House of Dreams in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for House of Dreams in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>House of Dreams</td>
</tr>
<tr>
<td>Latitude</td>
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<td>Longitude</td>
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<td>Water Body Type</td>
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</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>ha or acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2003 to 2013</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>35 (18 to 81)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>666 (485 to 778)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll $a$ and the mean does not exceed the chlorophyll $a$ value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll $a$ for a given year or the annual geometric mean chlorophyll $a$ exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L):** Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L):** Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
### LAKEWATCH Report for House of Dreams in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>18 - 81</td>
<td>35 (6)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>485 - 778</td>
<td>666 (6)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>3.7 - 17.3</td>
<td>8.4 (6)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>4.0 - 5.8</td>
<td>4.7 (6)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>1.2 - 1.8</td>
<td>1.4 (6)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>48 - 65</td>
<td>56 (4)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>226 - 301</td>
<td>273 (3)</td>
</tr>
</tbody>
</table>

### FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>160 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>90 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>30 µg/L</td>
</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R²):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
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<tr>
<td>Intercept (a)</td>
<td>7433</td>
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<td>-1379</td>
<td>114</td>
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<tr>
<td>Slope (b)</td>
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<td>20.81</td>
<td>0.69</td>
<td>-0.05</td>
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<tr>
<td>Coefficient of Determination (R²)</td>
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<td>0.47</td>
<td>0.34</td>
<td>0.10</td>
</tr>
<tr>
<td>Probability of Significance (p)</td>
<td>0.16</td>
<td>0.13</td>
<td>0.23</td>
<td>0.54</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for House of Dreams in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
LAKEWATCH Report for Jackson in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Jackson in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Jackson</td>
</tr>
<tr>
<td>Latitude</td>
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<tr>
<td>Longitude</td>
<td>-81.1552</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
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<tr>
<td>Surface Area (ha and acre)</td>
<td>413 ha or 1020 acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2007 to 2011</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP5</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>102 (88 to 125)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN5</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1786 (1313 to 2283)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \(a\) and the mean does not exceed the chlorophyll \(a\) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 \(\mu\)g/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \(a\) for a given year or the annual geometric mean chlorophyll \(a\) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L)**: The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L)**: Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L)**: Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m)**: Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units)**: LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
# LAKEWATCH Report for Jackson in Osceola County

**Using Data Downloaded 10/17/2016**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>88 - 125</td>
<td>102 (3)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>1313 - 2283</td>
<td>1786 (3)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>23.0 - 46.8</td>
<td>35.3 (3)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>2.1 - 2.7</td>
<td>2.4 (3)</td>
</tr>
<tr>
<td>Secchi (m)</td>
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</tr>
<tr>
<td>Color (Pt-Co Units)</td>
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<td>92 (3)</td>
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<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>125 - 165</td>
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<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
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</table>

## FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td></td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Nitrogen</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
LAKEWATCH Report for Jackson in Osceola County
Using Data Downloaded 10/17/2016

Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination \( (R^2) \):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (a)</td>
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</tr>
<tr>
<td>Slope (b)</td>
<td></td>
<td></td>
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<tr>
<td>Coefficient of Determination ( (R^2) )</td>
<td></td>
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<tr>
<td>Probability of Significance (p)</td>
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<tr>
<td>Potential Trend</td>
<td></td>
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</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Jackson in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
LAKEWATCH Report for Kissimmee in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Kissimmee in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
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<tbody>
<tr>
<td>Name</td>
<td>Kissimmee</td>
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<td>Longitude</td>
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<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
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<tr>
<td>Mean Depth (m and ft)</td>
<td>2.2 m or 7.3 ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>1995 to 2012</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP5</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>53 (36 to 76)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN5</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1325 (998 to 1691)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \(a\) and the mean does not exceed the chlorophyll \(a\) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \(a\) for a given year or the annual geometric mean chlorophyll \(a\) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L):** Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L):** Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
LAKEWATCH Report for Kissimmee in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>36 - 76</td>
<td>53 (18)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>998 - 1691</td>
<td>1325 (18)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>13.4 - 58.8</td>
<td>34.6 (18)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>1.9 - 4.4</td>
<td>2.7 (18)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.6 - 1.3</td>
<td>0.8 (18)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>29 - 132</td>
<td>83 (12)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>143 - 192</td>
<td>166 (6)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
</tr>
</tbody>
</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

¹ For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R²):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Intercept (a)</td>
<td>-1177</td>
<td>-27577</td>
<td>-1619</td>
<td>85</td>
</tr>
<tr>
<td>Slope (b)</td>
<td>0.61</td>
<td>14.43</td>
<td>0.83</td>
<td>-0.04</td>
</tr>
<tr>
<td>Coefficient of Determination (R²)</td>
<td>0.07</td>
<td>0.19</td>
<td>0.16</td>
<td>0.13</td>
</tr>
<tr>
<td>Probability of Significance (p)</td>
<td>0.29</td>
<td>0.07</td>
<td>0.10</td>
<td>0.14</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Kissimmee in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
Kissimmee (Osceola)

Total Chlorophyll (µg/L)

\[ y = 0.83x + -1619.23 \]
\[ R^2 = 0.16 \]

Year

Kissimmee (Osceola)

Secchi depth (ft)

\[ y = -0.04x + 84.93 \]
\[ R^2 = 0.13 \]

Year
LAKEWATCH Report for Laurel in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 than 100 µS/cm @ 25 C).
## LAKEWATCH Report for Laurel in Osceola County
### Using Data Downloaded 10/17/2016

### Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Laurel</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.1788</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.4814</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>ha or acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2006 to 2006</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP5</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>18 (18 to 18)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN5</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>797 (797 to 797)</td>
</tr>
</tbody>
</table>

![Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).](image-url)
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \(a\) and the mean does not exceed the chlorophyll \(a\) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \(a\) for a given year or the annual geometric mean chlorophyll \(a\) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L):** Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L):** Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
**LAKEWATCH Report for Laurel in Osceola County**
**Using Data Downloaded 10/17/2016**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>18 - 18</td>
<td>18 (1)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>797 - 797</td>
<td>797 (1)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>7.3 - 7.3</td>
<td>7.3 (1)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>-</td>
<td>(1)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>-</td>
<td>(1)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>-</td>
<td>()</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>-</td>
<td>()</td>
</tr>
</tbody>
</table>

**Lake Classification**

**FDEP Numeric Nutrient Criteria**

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

1. For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

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<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slope (b)</td>
<td></td>
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<td>Coefficient of Determination (R²)</td>
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<td>Probability of Significance (p)</td>
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</tr>
<tr>
<td>Potential Trend</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Laurel in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
Introduction for Lakes

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- **TP Zone and TN Zone**: Nutrient zones defined by Bachmann et al (2012).
- **Long-Term TP and TN Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Live Oak in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Live Oak</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.2341</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.2407</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>152 ha or 375 acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>2.6 m or 8.5 ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>1997 to 2013</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Clear Hard Water Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Mesotrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>14 (11 to 16)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>502 (382 to 574)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll $a$ and the mean does not exceed the chlorophyll $a$ value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll $a$ for a given year or the annual geometric mean chlorophyll $a$ exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L)**: The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
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- **Chlorophyll-uncorrected (µg/L)**: Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m)**: Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units)**: LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>11 - 16</td>
<td>14 (4)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>382 - 574</td>
<td>502 (4)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>1.7 - 4.6</td>
<td>3.4 (4)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>4.1 - 8.3</td>
<td>5.9 (4)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>1.2 - 2.5</td>
<td>1.8 (4)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>15 - 26</td>
<td>20 (2)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>181 - 189</td>
<td>185 (2)</td>
</tr>
</tbody>
</table>

| Lake Classification                           | Clear Hard Water Lake            |

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤20 mg/L CaCO₃</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
<tr>
<td>or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R^2):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slope (b)</td>
<td></td>
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<tr>
<td>Coefficient of Determination (R^2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Probability of Significance (p)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential Trend</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Live Oak in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
LAKEWATCH Report for Lizzie in Osceola County  
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three groups based on color and alkalinity or specific conductance; colored (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 than 100 μS/cm @ 25 C).
LAKEWATCH Report for Lizzie in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Lizzie</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.2515</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.1871</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>348 ha or 861 acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>2.1 m or 7 ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>1990 to 2016</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Mesotrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>18 (10 to 24)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>879 (548 to 1384)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \( a \) and the mean does not exceed the chlorophyll \( a \) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color \( > \) 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \( a \) for a given year or the annual geometric mean chlorophyll \( a \) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L):** Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L):** Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
LAKEWATCH Report for Lizzie in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>10 - 24</td>
<td>18 (26)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>548 - 1384</td>
<td>879 (26)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>2.3 - 7.6</td>
<td>4.4 (26)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>2.1 - 5.7</td>
<td>3.6 (26)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.6 - 1.7</td>
<td>1.1 (26)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>10 - 152</td>
<td>87 (13)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>112 - 141</td>
<td>130 (8)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
</tr>
</tbody>
</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

¹ For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

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<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>26</td>
<td>26</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Intercept (a)</td>
<td>-208</td>
<td>-35677</td>
<td>93</td>
<td>110</td>
</tr>
<tr>
<td>Slope (b)</td>
<td>0.11</td>
<td>18.26</td>
<td>-0.04</td>
<td>-0.05</td>
</tr>
<tr>
<td>Coefficient of Determination (R^2)</td>
<td>0.06</td>
<td>0.40</td>
<td>0.09</td>
<td>0.17</td>
</tr>
<tr>
<td>Probability of Significance (p)</td>
<td>0.25</td>
<td>0.00</td>
<td>0.14</td>
<td>0.03</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>No Trend</td>
<td>Increasing</td>
<td>No Trend</td>
<td>Decreasing</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Lizzie in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
Lizzie (Osceola)

**Total Chlorophyll (µg/L)**

\[ y = -0.04x + 92.6 \]
\[ R^2 = 0.09 \]

Year

Lizzie (Osceola)

**Secchi depth (ft)**

\[ y = -0.05x + 110.21 \]
\[ R^2 = 0.17 \]

Year
LAKEWATCH Report for Marian in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

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- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Marian in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Marian</td>
</tr>
<tr>
<td>Latitude</td>
<td>27.8824</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.1117</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>2323 ha or 5739 acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2007 to 2011</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Hypereutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP5</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>124 (115 to 140)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN5</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>2380 (2249 to 2563)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \(a\) and the mean does not exceed the chlorophyll \(a\) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 \(\mu\)g/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \(a\) for a given year or the annual geometric mean chlorophyll \(a\) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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- **Chlorophyll-uncorrected (µg/L)**: Chlorophyll concentrations are used to measure relative abundances of open water algal population.
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- **Color (Pt-Co Units)**: LAKEWATCH measures true color, which is the color of the water after particles have been filter out.
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**LAKEWATCH Report for Marian in Osceola County**  
*Using Data Downloaded 10/17/2016*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>115 - 140</td>
<td>124 (3)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>2249 - 2563</td>
<td>2380 (3)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>88.2 - 113.8</td>
<td>100.0 (3)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>1.5 - 1.9</td>
<td>1.7 (3)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.5 - 0.6</td>
<td>0.5 (3)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>33 - 79</td>
<td>56 (3)</td>
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<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>125 - 149</td>
<td>140 (3)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
</tr>
</tbody>
</table>

**FDEP Numeric Nutrient Criteria**

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
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1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
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The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

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<tr>
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<tr>
<td>Number of Years (n)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (a)</td>
<td></td>
<td></td>
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<tr>
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The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Marian in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
Introduction for Lakes

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LAKEWATCH Report for OHP-CVB in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
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<tbody>
<tr>
<td>Name</td>
<td>OHP-CVB</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.295</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.3638</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>ha or acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2005 to 2013</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Hypereutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP5</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>113 (60 to 206)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN5</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1089 (770 to 1323)</td>
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Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
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For lakes, the applicable numeric interpretations of the narrative nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., for chlorophyll \( a \) are shown in the table below. The applicable interpretations for TN and TP will vary on an annual basis, depending on the availability of chlorophyll \( a \) data and the concentrations of nutrients and chlorophyll \( a \) in the lake, as described below. The applicable numeric interpretations for TN, TP, and chlorophyll \( a \) shall not be exceeded more than once in any consecutive three-year period.

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

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## LAKEWATCH Report for OHP-CVB in Osceola County
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<td>Total Phosphorus (µg/L)</td>
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<td>1089 (7)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>29.5 - 145.0</td>
<td>77.2 (7)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>2.0 - 5.1</td>
<td>2.9 (7)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.6 - 1.5</td>
<td>0.9 (7)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>37 - 61</td>
<td>45 (6)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>97 - 114</td>
<td>107 (4)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
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<tr>
<td>Number of Years (n)</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
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<tr>
<td>Intercept (a)</td>
<td>17213</td>
<td>12017</td>
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<td>-219</td>
</tr>
<tr>
<td>Slope (b)</td>
<td>-8.51</td>
<td>-5.44</td>
<td>-11.92</td>
<td>0.11</td>
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<tr>
<td>Coefficient of Determination (R^2)</td>
<td>0.27</td>
<td>0.01</td>
<td>0.59</td>
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<tr>
<td>Probability of Significance (p)</td>
<td>0.24</td>
<td>0.84</td>
<td>0.04</td>
<td>0.47</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>No Trend</td>
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<td>Decreasing</td>
<td>No Trend</td>
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OHP-CVB (Osceola)

Total Chlorophyll (µg/L)

\[ y = -11.92x + 24021.67 \]
\[ R^2 = 0.59 \]

Year

OHP-CVB (Osceola)

Secchi depth (ft)

\[ y = 0.11x - 219.04 \]
\[ R^2 = 0.11 \]

Year
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<td>TP Zone</td>
<td>TP5</td>
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<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>76 (43 to 106)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN5</td>
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<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1064 (965 to 1236)</td>
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<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>33.5 - 75.9</td>
<td>57.7 (7)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>2.3 - 3.5</td>
<td>2.8 (7)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.7 - 1.1</td>
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<tr>
<td>Color (Pt-Co Units)</td>
<td>32 - 50</td>
<td>42 (5)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
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<td>108 (3)</td>
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LAKEWATCH Report for OHP-Entrance Pond in Osceola County
Using Data Downloaded 10/17/2016

Trend Analyses Lakes

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<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
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<td>7</td>
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<tr>
<td>Intercept (a)</td>
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<td>Slope (b)</td>
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<tr>
<td>Coefficient of Determination (R^2)</td>
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<td>0.05</td>
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<tr>
<td>Probability of Significance (p)</td>
<td>0.83</td>
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<td>Potential Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for OHP-Entrance Pond in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
OHP-Entrance Pond (Osceola)

Total Phosphorus (μg/L)

\[ y = -0.7x + 1478.41 \]
\[ R^2 = 0.01 \]

Year

OHP-Entrance Pond (Osceola)

Total Nitrogen (μg/L)

\[ y = 16.23x + -31537.11 \]
\[ R^2 = 0.33 \]

Year
LAKEWATCH Report for OHP-Mary Beth in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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LAKEWATCH Report for OHP-Mary Beth in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>OHP-Mary Beth</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.3004</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.3719</td>
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<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>ha or acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2005 to 2013</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Clear Hard Water Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP5</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>41 (31 to 51)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN5</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>664 (555 to 845)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \(a\) and the mean does not exceed the chlorophyll \(a\) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \(a\) for a given year or the annual geometric mean chlorophyll \(a\) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L)**: The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
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LAKEWATCH Report for OHP-Mary Beth in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>31 - 51</td>
<td>41 (6)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>555 - 845</td>
<td>664 (6)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>14.7 - 47.0</td>
<td>30.1 (6)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>2.6 - 4.9</td>
<td>3.4 (6)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.8 - 1.5</td>
<td>1.0 (6)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>14 - 16</td>
<td>14 (5)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>111 - 152</td>
<td>129 (3)</td>
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<tr>
<td>Lake Classification</td>
<td>Clear Hard Water Lake</td>
<td></td>
</tr>
</tbody>
</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
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</tr>
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<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
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<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
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LAKEWATCH Report for OHP-Mary Beth in Osceola County
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</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Intercept (a)</td>
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<td>-70172</td>
<td>-5970</td>
<td>393</td>
</tr>
<tr>
<td>Slope (b)</td>
<td>1.58</td>
<td>35.27</td>
<td>2.99</td>
<td>-0.19</td>
</tr>
<tr>
<td>Coefficient of Determination (R²)</td>
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<td>Probability of Significance (p)</td>
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<td>Potential Trend</td>
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<td>Increasing</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
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OHP-Mary Beth (Osceola)

**Total Phosphorus (μg/L)**

\[ y = 1.58x - 3127.09 \]

\[ R^2 = 0.59 \]

Year

OHP-Mary Beth (Osceola)

**Total Nitrogen (μg/L)**

\[ y = 35.27x - 70171.6 \]

\[ R^2 = 0.91 \]

Year
OHP-Mary Beth (Osceola)

**Total Chlorophyll (μg/L)**

- Equation: \( y = 2.99x - 5969.91 \)
- \( R^2 = 0.56 \)

Year

- 2006
- 2008
- 2010
- 2012

OHP-Mary Beth (Osceola)

**Secchi depth (ft)**

- Equation: \( y = -0.19x + 392.73 \)
- \( R^2 = 0.46 \)

Year

- 2006
- 2008
- 2010
- 2012
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LAKEWATCH Report for OHP-Stadium Pond in Osceola County
Using Data Downloaded 10/17/2016

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<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>OHP-Stadium Pond</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.2982</td>
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<tr>
<td>Longitude</td>
<td>-81.3626</td>
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<tr>
<td>Water Body Type</td>
<td>Lake</td>
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<td>Surface Area (ha and acre)</td>
<td>ha or acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2005 to 2013</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Clear Hard Water Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
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</tr>
<tr>
<td>TP Zone</td>
<td>TP5</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>41 (33 to 52)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN5</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1028 (773 to 1138)</td>
</tr>
</tbody>
</table>

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### LAKEWATCH Report for OHP-Stadium Pond in Osceola County

**Using Data Downloaded 10/17/2016**

<table>
<thead>
<tr>
<th>Parameter</th>
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<tr>
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</tr>
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<td>773 - 1138</td>
<td>1028 (6)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>30.3 - 55.9</td>
<td>40.8 (6)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>2.4 - 4.7</td>
<td>3.2 (6)</td>
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<tr>
<td>Secchi (m)</td>
<td>0.7 - 1.4</td>
<td>1.0 (6)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>24 - 31</td>
<td>28 (5)</td>
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<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
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<tr>
<td>Lake Classification</td>
<td>Clear Hard Water Lake</td>
<td></td>
</tr>
</tbody>
</table>

### FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
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<th>Maximum calculated numeric interpretation</th>
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</tr>
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<td>6 µg/L</td>
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</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R²):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Intercept (a)</td>
<td>-1453</td>
<td>-17755</td>
<td>-4469</td>
<td>165</td>
</tr>
<tr>
<td>Slope (b)</td>
<td>0.74</td>
<td>9.35</td>
<td>2.25</td>
<td>-0.08</td>
</tr>
<tr>
<td>Coefficient of Determination (R²)</td>
<td>0.11</td>
<td>0.05</td>
<td>0.60</td>
<td>0.10</td>
</tr>
<tr>
<td>Probability of Significance (p)</td>
<td>0.52</td>
<td>0.67</td>
<td>0.07</td>
<td>0.54</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for OHP-Stadium Pond in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
LAKEWATCH Report for Runnymede in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Runnymede in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Runnymede</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.2614</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.2551</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>121.4 ha or 300 acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2007 to 2012</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>38 (28 to 51)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>961 (763 to 1180)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \( a \) and the mean does not exceed the chlorophyll \( a \) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \( a \) for a given year or the annual geometric mean chlorophyll \( a \) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L):** Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L):** Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
### LAKEWATCH Report for Runnymeade in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>28 - 51</td>
<td>38 (6)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>763 - 1180</td>
<td>961 (6)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>5.8 - 21.8</td>
<td>13.2 (6)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>1.7 - 4.3</td>
<td>3.0 (6)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.5 - 1.3</td>
<td>0.9 (6)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>41 - 121</td>
<td>63 (6)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>186 - 232</td>
<td>206 (6)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
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</tbody>
</table>

#### FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

¹ For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R²):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
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<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Intercept (a)</td>
<td>5974</td>
<td>62905</td>
<td>3575</td>
<td>-1032</td>
</tr>
<tr>
<td>Slope (b)</td>
<td>-2.95</td>
<td>-30.83</td>
<td>-1.77</td>
<td>0.52</td>
</tr>
<tr>
<td>Coefficient of Determination (R²)</td>
<td>0.37</td>
<td>0.12</td>
<td>0.27</td>
<td>0.71</td>
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<tr>
<td>Probability of Significance (p)</td>
<td>0.20</td>
<td>0.50</td>
<td>0.29</td>
<td>0.07</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Runnymeade in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
LAKEWATCH Report for Tohopekaliga in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

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- **County**: Name of county in which the lake resides.
- **Name**: Lake name that LAKEWATCH uses for the 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, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
**LAKEWATCH Report for Tohopekaliga in Osceola County**  
**Using Data Downloaded 10/17/2016**

**Base File Data and Nutrient Zone Comparisons for Lakes**

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Tohopekaliga</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.271</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.3968</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>7612 ha or 18810 acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>1.9 m or 6.1 ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>1997 to 2003</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP5</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>48 (40 to 54)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN5</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1067 (950 to 1261)</td>
</tr>
</tbody>
</table>

![Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).](image)

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll $a$ and the mean does not exceed the chlorophyll $a$ value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color $> 40$ PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the $490 \mu g/L$ TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll $a$ for a given year or the annual geometric mean chlorophyll $a$ exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus ($\mu g/L$)**: The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen ($\mu g/L$)**: Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected ($\mu g/L$)**: Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m)**: Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units)**: LAKEWATCH measures true color, which is the color of the water after particles have been filtered out.
- **Specific Conductance ($\mu S/cm@25^\circ C$)**: Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolve materials in water.
LAKEWATCH Report for Tohopekaliga in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>40 - 54</td>
<td>48 (7)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>950 - 1261</td>
<td>1067 (7)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>15.8 - 40.2</td>
<td>25.6 (7)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>1.8 - 3.9</td>
<td>2.7 (7)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.5 - 1.2</td>
<td>0.8 (7)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>36 - 36</td>
<td>36 (1)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>-</td>
<td>(0)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll- corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
LAKEWATCH Report for Tohopekaliga in Osceola County
Using Data Downloaded 10/17/2016

Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R²):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Intercept (a)</td>
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<td>-9531</td>
<td>5957</td>
<td>137</td>
</tr>
<tr>
<td>Slope (b)</td>
<td>-1.04</td>
<td>5.30</td>
<td>-2.97</td>
<td>-0.07</td>
</tr>
<tr>
<td>Coefficient of Determination (R²)</td>
<td>0.13</td>
<td>0.01</td>
<td>0.49</td>
<td>0.05</td>
</tr>
<tr>
<td>Probability of Significance (p)</td>
<td>0.43</td>
<td>0.82</td>
<td>0.12</td>
<td>0.68</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Tohopekaliga in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
**Tohopekaliga (Osceola)**

**Total Chlorophyll (µg/L)**

- Equation: $y = -2.97x + 5956.61$
- $R^2 = 0.49$

**Year (1997 to 2003)**

**Secchi depth (ft)**

- Equation: $y = -0.07x + 137.38$
- $R^2 = 0.05$

**Year (1997 to 2003)**
Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

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- **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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Tohopekaliga East in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Tohopekaliga East</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.2673</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.2913</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>5541 ha or 13691 acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>2.6 m or 8.6 ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>1997 to 2016</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Mesotrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>20 (16 to 25)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>698 (577 to 877)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \(a\) and the mean does not exceed the chlorophyll \(a\) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \(a\) for a given year or the annual geometric mean chlorophyll \(a\) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L):** Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L):** Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
**LAKEWATCH Report for Tohopekaliga East in Osceola County**
**Using Data Downloaded 10/17/2016**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>16 - 25</td>
<td>20 (20)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>577 - 877</td>
<td>698 (20)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>1.0 - 8.4</td>
<td>5.0 (20)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>4.3 - 9.6</td>
<td>6.0 (20)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>1.3 - 2.9</td>
<td>1.8 (20)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>19 - 88</td>
<td>51 (15)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>105 - 161</td>
<td>137 (9)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
</tr>
</tbody>
</table>

**FDEP Numeric Nutrient Criteria**

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R²):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Intercept (a)</td>
<td>483</td>
<td>-15654</td>
<td>93</td>
<td>-78</td>
</tr>
<tr>
<td>Slope (b)</td>
<td>-0.23</td>
<td>8.15</td>
<td>-0.04</td>
<td>0.04</td>
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<tr>
<td>Coefficient of Determination (R²)</td>
<td>0.22</td>
<td>0.30</td>
<td>0.02</td>
<td>0.03</td>
</tr>
<tr>
<td>Probability of Significance (p)</td>
<td>0.04</td>
<td>0.01</td>
<td>0.54</td>
<td>0.46</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>Decreasing</td>
<td>Increasing</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Tohopekaliga East in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
Tohopekaliga East (Osceola)

**Total Phosphorus (µg/L)**

\[ y = -0.23x + 483.42 \]

\[ R^2 = 0.22 \]


\[ y = 8.15x - 15654.34 \]

\[ R^2 = 0.3 \]

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
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- **Long-Term TP and TN Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
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LAKEWATCH Report for Tohopekaliga-Middle in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>Country</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Tohopekaliga-Middle</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.1761</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.3791</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>ha or acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2000 to 2016</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP5</td>
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<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>41 (27 to 74)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN5</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1147 (874 to 1400)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
LAKEWATCH Report for Tohopekaliga-Middle in Osceola County
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- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter out.
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### FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>160 µg/L¹</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>90 µg/L</td>
</tr>
<tr>
<td>Chlorophyll (µg/L)</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>30 µg/L</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>153 - 201</td>
<td>175 (10)</td>
<td></td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
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- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R²):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Intercept (a)</td>
<td>2637</td>
<td>823</td>
<td>-854</td>
<td>64</td>
</tr>
<tr>
<td>Slope (b)</td>
<td>-1.29</td>
<td>0.16</td>
<td>0.44</td>
<td>-0.03</td>
</tr>
<tr>
<td>Coefficient of Determination (R²)</td>
<td>0.24</td>
<td>0.00</td>
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<td>0.08</td>
</tr>
<tr>
<td>Probability of Significance (p)</td>
<td>0.05</td>
<td>0.98</td>
<td>0.29</td>
<td>0.29</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Tohopekaliga-Middle in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
LAKEWATCH Report for Tohopekaliga-North in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Tohopekaliga-North in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Tohopekaliga-North</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.2906</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.3967</td>
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<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>ha or acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2000 to 2016</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP5</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>58 (45 to 73)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN5</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1051 (800 to 1258)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll $a$ and the mean does not exceed the chlorophyll $a$ value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color $> 40$ PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the $490 \mu g/L$ TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll $a$ for a given year or the annual geometric mean chlorophyll $a$ exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus ($\mu g/L$):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen ($\mu g/L$):** Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected ($\mu g/L$):** Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter out.
- **Specific Conductance ($\mu S/cm@25^\circ C$):** Measurement of the ability of water to conduct electricity and can be used to estimate the amount of dissolve materials in water.
LAKEWATCH Report for Tohopekaliga-North in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>45 - 73</td>
<td>58 (16)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>800 - 1258</td>
<td>1051 (16)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>15.7 - 42.3</td>
<td>26.4 (16)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>2.3 - 5.1</td>
<td>3.0 (16)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.7 - 1.5</td>
<td>0.9 (16)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>41 - 114</td>
<td>70 (13)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>138 - 198</td>
<td>170 (9)</td>
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<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
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</tr>
</tbody>
</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

¹ For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R^2):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Intercept (a)</td>
<td>2335</td>
<td>14732</td>
<td>371</td>
<td>-2</td>
</tr>
<tr>
<td>Slope (b)</td>
<td>-1.13</td>
<td>-6.81</td>
<td>-0.17</td>
<td>0.00</td>
</tr>
<tr>
<td>Coefficient of Determination (R^2)</td>
<td>0.35</td>
<td>0.08</td>
<td>0.01</td>
<td>0.00</td>
</tr>
<tr>
<td>Probability of Significance (p)</td>
<td>0.02</td>
<td>0.29</td>
<td>0.68</td>
<td>0.95</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>Decreasing</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Tohopekaliga-North in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
LAKEWATCH Report for Tohopekaliga-South in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 than 100 µS/cm @25 C).
LAKEWATCH Report for Tohopekaliga-South in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
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<td>Latitude</td>
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<tr>
<td>Longitude</td>
<td>-81.3692</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>ha or acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2000 to 2016</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP5</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>41 (27 to 62)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN5</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1256 (892 to 1528)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll $a$ and the mean does not exceed the chlorophyll $a$ value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color $>$ 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll $a$ for a given year or the annual geometric mean chlorophyll $a$ exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L):** Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L):** Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
### LAKEWATCH Report for Tohopekaliga-South in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>27 - 62</td>
<td>41 (13)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>892 - 1528</td>
<td>1256 (13)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>18.5 - 54.8</td>
<td>31.8 (13)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>2.1 - 4.2</td>
<td>2.9 (13)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.6 - 1.3</td>
<td>0.9 (13)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>24 - 100</td>
<td>48 (9)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>152 - 203</td>
<td>176 (8)</td>
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<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
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</table>

### FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

¹ For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
LAKEWATCH Report for Tohopekaliga-South in Osceola County
Using Data Downloaded 10/17/2016

Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination ($R^2$):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Intercept (a)</td>
<td>2333</td>
<td>-13071</td>
<td>-312</td>
<td>72</td>
</tr>
<tr>
<td>Slope (b)</td>
<td>-1.14</td>
<td>7.14</td>
<td>0.17</td>
<td>-0.03</td>
</tr>
<tr>
<td>Coefficient of Determination ($R^2$)</td>
<td>0.39</td>
<td>0.04</td>
<td>0.01</td>
<td>0.08</td>
</tr>
<tr>
<td>Probability of Significance (p)</td>
<td>0.02</td>
<td>0.56</td>
<td>0.74</td>
<td>0.36</td>
</tr>
<tr>
<td>Potential Trend</td>
<td>Decreasing</td>
<td>No Trend</td>
<td>No Trend</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Tohopekaliga-South in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
Tohopekaliga-South (Osceola)

- Total Phosphorus (μg/L)
  - $y = -1.14x + 2333.14$
  - $R^2 = 0.39$

- Total Nitrogen (μg/L)
  - $y = 7.14x - 13070.9$
  - $R^2 = 0.04$
LAKEWATCH Report for Trout in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Trout in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Trout</td>
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<tr>
<td>Latitude</td>
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<tr>
<td>Longitude</td>
<td>-81.1725</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
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<tr>
<td>Surface Area (ha and acre)</td>
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</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>1.8 m or 5.9 ft</td>
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<tr>
<td>Period of Record (year)</td>
<td>1990 to 2016</td>
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<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
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<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Mesotrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>17 (10 to 25)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>1014 (642 to 1562)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll \( a \) and the mean does not exceed the chlorophyll \( a \) value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll \( a \) for a given year or the annual geometric mean chlorophyll \( a \) exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
- **Total Nitrogen (µg/L):** Another nutrient needed for aquatic plant/algae growth but only limiting when nitrogen to phosphorus ratios are generally less than 10.
- **Chlorophyll-uncorrected (µg/L):** Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
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LAKEWATCH Report for Trout in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>10 - 25</td>
<td>17 (25)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>642 - 1562</td>
<td>1014 (25)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>3.0 - 7.9</td>
<td>5.1 (25)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>1.7 - 4.0</td>
<td>2.7 (25)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.5 - 1.2</td>
<td>0.8 (25)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>42 - 189</td>
<td>104 (13)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>109 - 166</td>
<td>134 (8)</td>
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<tr>
<td>Lake Classification</td>
<td>Colored Lake</td>
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</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>90 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>30 µg/L</td>
</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
LAKEWATCH Report for Trout in Osceola County
Using Data Downloaded 10/17/2016

Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R^2):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Intercept (a)</td>
<td>-161</td>
<td>-32453</td>
<td>137</td>
<td>-36</td>
</tr>
<tr>
<td>Slope (b)</td>
<td>0.09</td>
<td>16.71</td>
<td>-0.07</td>
<td>0.02</td>
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<tr>
<td>Coefficient of Determination (R^2)</td>
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<td>0.40</td>
<td>0.20</td>
<td>0.07</td>
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<tr>
<td>Probability of Significance (p)</td>
<td>0.28</td>
<td>0.00</td>
<td>0.02</td>
<td>0.21</td>
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<td>Potential Trend</td>
<td>No Trend</td>
<td>Increasing</td>
<td>Decreasing</td>
<td>No Trend</td>
</tr>
</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Trout in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
LAKEWATCH Report for Valencia Big in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

Base File Data: Definitions

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.
- **Latitude and Longitude**: Coordinates identifying the exact location of station 1 for each system.
- **Water Body Type**: Four different types of systems; lakes, estuaries, 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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Valencia Big in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Valencia Big</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.3069</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.384</td>
</tr>
<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
<td>ha or acre</td>
</tr>
<tr>
<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2013 to 2015</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Clear Soft Water Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>35 (27 to 51)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>885 (722 to 1184)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
LAKEWATCH Report for Valencia Big in Osceola County
Using Data Downloaded 10/17/2016

FDEP Nutrient Criteria Lakes

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

If there are sufficient data to calculate the annual geometric mean chlorophyll $a$ and the mean does not exceed the chlorophyll $a$ value for the lake type in the table below, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits in the table below. However, for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region; or if there are insufficient data to calculate the annual geometric mean chlorophyll $a$ for a given year or the annual geometric mean chlorophyll $a$ exceeds the values in the table below for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values in the table below.

Long-Term Data Summary Lakes: Definitions

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

- **Total Phosphorus (µg/L):** The nutrient most often limiting growth of plant/algae in Florida’s fresh and saltwater environments.
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- **Chlorophyll-uncorrected (µg/L):** Chlorophyll concentrations are used to measure relative abundances of open water algal population.
- **Secchi (ft), Secchi (m):** Secchi measurements are estimates of water clarity (how far one can see into the water) and are listed with English and metric units.
- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
## LAKEWATCH Report for Valencia Big in Osceola County
**Using Data Downloaded 10/17/2016**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>27 - 51</td>
<td>35 (3)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>722 - 1184</td>
<td>885 (3)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>17.0 - 47.2</td>
<td>28.0 (3)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>2.9 - 6.0</td>
<td>5.0 (3)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.9 - 1.8</td>
<td>1.5 (3)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>17 - 25</td>
<td>21 (3)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>79 - 114</td>
<td>98 (3)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Clear Soft Water Lake</td>
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</tbody>
</table>

### FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

† For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

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<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (a)</td>
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<tr>
<td>Slope (b)</td>
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<tr>
<td>Coefficient of Determination (R^2)</td>
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<td>Probability of Significance (p)</td>
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<tr>
<td>Potential Trend</td>
<td></td>
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</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Valencia Big in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.
LAKEWATCH Report for Valencia Small in Osceola County
Using Data Downloaded 10/17/2016

Introduction for Lakes

In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will allow a comparison of the long-term mean nutrient concentrations with the nutrient zone concentrations published by LAKEWATCH staff (Bachmann et al. 2012; http://lakewatch.ifas.ufl.edu/publications.shtml). The second part of the summary will allow the comparison of data with Florida Department of Environmental Protections Numeric Nutrient Criteria. Finally, this report examines data for any long-term trends that may be occurring in individual systems but only for systems with five or more years of data.

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- **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 Mean Concentration (µg/L: min and max)**: Average of all annual means (µg/L) listed with minimum and maximum annual means.
- **Lake Classification**: The new numeric nutrient criteria for Florida require that lakes must first be classified into three group based on color and alkalinity or specific conductance; colored (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 the 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).
LAKEWATCH Report for Valencia Small in Osceola County
Using Data Downloaded 10/17/2016

Base File Data and Nutrient Zone Comparisons for Lakes

<table>
<thead>
<tr>
<th>County</th>
<th>Osceola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Valencia Small</td>
</tr>
<tr>
<td>Latitude</td>
<td>28.3051</td>
</tr>
<tr>
<td>Longitude</td>
<td>-81.3825</td>
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<tr>
<td>Water Body Type</td>
<td>Lake</td>
</tr>
<tr>
<td>Surface Area (ha and acre)</td>
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<td>Mean Depth (m and ft)</td>
<td>m or ft</td>
</tr>
<tr>
<td>Period of Record (year)</td>
<td>2013 to 2015</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Clear Soft Water Lake</td>
</tr>
<tr>
<td>Lake Trophic Status (CHL)</td>
<td>Eutrophic</td>
</tr>
<tr>
<td>TP Zone</td>
<td>TP3</td>
</tr>
<tr>
<td>Long-Term TP Mean Concentration (µg/L, minimum and maximum)</td>
<td>45 (42 to 50)</td>
</tr>
<tr>
<td>TN Zone</td>
<td>TN4</td>
</tr>
<tr>
<td>Long-Term TN Mean Concentration (µg/L, minimum and maximum)</td>
<td>760 (510 to 1098)</td>
</tr>
</tbody>
</table>

Figure 1. Maps showing Florida phosphorus and nitrogen zones and the nutrient concentrations of the upper 90% of lakes within each zone (Bachmann et al. 2012c).
FDEP Nutrient Criteria Lakes

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

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- **Color (Pt-Co Units):** LAKEWATCH measures true color, which is the color of the water after particles have been filter 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 dissolve materials in water.
LAKEWATCH Report for Valencia Small in Osceola County
Using Data Downloaded 10/17/2016

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum and Maximum Annual Means</th>
<th>Mean of Annual Means (Sampling years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (µg/L)</td>
<td>42 - 50</td>
<td>45 (3)</td>
</tr>
<tr>
<td>Total Nitrogen (µg/L)</td>
<td>510 - 1098</td>
<td>760 (3)</td>
</tr>
<tr>
<td>Chlorophyll- uncorrected (µg/L)</td>
<td>14.7 - 46.4</td>
<td>26.4 (3)</td>
</tr>
<tr>
<td>Secchi (ft)</td>
<td>2.0 - 4.4</td>
<td>3.6 (3)</td>
</tr>
<tr>
<td>Secchi (m)</td>
<td>0.6 - 1.3</td>
<td>1.1 (3)</td>
</tr>
<tr>
<td>Color (Pt-Co Units)</td>
<td>18 - 26</td>
<td>22 (3)</td>
</tr>
<tr>
<td>Specific Conductance (µS/cm@25 C)</td>
<td>62 - 118</td>
<td>96 (3)</td>
</tr>
<tr>
<td>Lake Classification</td>
<td>Clear Soft Water Lake</td>
<td></td>
</tr>
</tbody>
</table>

FDEP Numeric Nutrient Criteria

<table>
<thead>
<tr>
<th>Long Term Geometric Mean Lake Color and Long-Term Geometric Mean Color, Alkalinity and Specific Conductance</th>
<th>Annual Geometric Mean Chlorophyll-corrected</th>
<th>Minimum calculated numeric interpretation</th>
<th>Maximum calculated numeric interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Geometric Mean Total Phosphorus</td>
<td>Annual Geometric Mean Total Nitrogen</td>
<td>Annual Geometric Mean Total Phosphorus</td>
</tr>
<tr>
<td>&gt; 40 Platinum Cobalt Units Colored Lakes</td>
<td>20 µg/L</td>
<td>50 µg/L</td>
<td>1270 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and &gt; 20 mg/L CaCO₃ or &gt;100 µS/cm@25 C Clear Hard Water Lakes</td>
<td>20 µg/L</td>
<td>30 µg/L</td>
<td>1050 µg/L</td>
</tr>
<tr>
<td>≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO₃ or &lt; 100 µS/cm@25 C Clear Soft Water Lakes</td>
<td>6 µg/L</td>
<td>10 µg/L</td>
<td>51 µg/L</td>
</tr>
</tbody>
</table>

1 For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit shall be the 490 µg/L TP streams threshold for the region.

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 µS/cm@25 C used to estimate the mg/L CaCO₃ alkalinity concentration until such time that alkalinity data are available.
Trend Analyses Lakes

The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over time. These analyses define statistics based on the best fit line drawn through the data after plotting them with year on the horizontal line (x-axis) and the data value on the vertical line (y-axis). Figure 2 shows example plots with linear regression statistic of lakes that show significant total phosphorus increases, decreases and no change over time. The statistics that are listed include the following:

- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would cross if the x-axis were zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R^2):** This value is an indication of how much variance above and below the fitted line there is in the data. This value ranges from 0 to 1. A high value means a tight fit and a low value means a loose fit.
- **Probability of Significance (p):** For most statistical analyses a p-value of less than 0.05 means the statistic is significant and analyses with p-values greater than 0.05 are not significant.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Total Phosphorus</th>
<th>Total Nitrogen</th>
<th>Chlorophyll</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Years (n)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slope (b)</td>
<td></td>
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<td></td>
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<tr>
<td>Coefficient of Determination (R^2)</td>
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<tr>
<td>Probability of Significance (p)</td>
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<tr>
<td>Potential Trend</td>
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</tbody>
</table>

The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Valencia Small in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.