

# LAKEWATCH Report for Shingle Creek-1 in Osceola County Using Data Downloaded 10/17/2016

## Introduction Streams

For many decades Florida has had a narrative nutrient water quality criterion in place to protect Florida's waters against nutrient over-enrichment. In 2009, the Florida Department of Environmental Protection (FDEP) initiated rulemaking and, by 2011, adopted what would be the first set of statewide numeric nutrient standards for Florida's waters. By 2015, almost all of the remaining waters in Florida have numeric nutrient standards (see for Florida Department of Environmental Regulation Nutrient Criteria's for: Streams, spring vents: <http://www.dep.state.fl.us/water/wqssp/nutrients/index.htm>).



Figure 1. Map showing nutrient thresholds areas for streams set forth by FDEP.

## 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 stream resides.
- **Name:** Stream 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.
- **Period of Record (year):** Years a stream has been in the LAKEWATCH program.

County	Osceola
Name	Shingle Creek-1
Latitude	28.2666
Longitude	-81.408
Water Body Type	Stream
Period of Record (year)	2011 to 2016
Nutrient Watershed Region	Peninsular

## LAKEWATCH Report for Shingle Creek-1 in Osceola County Using Data Downloaded 10/17/2016

The nutrient thresholds for streams set forth by FDEP are listed in table below along with the map showing zones.

Nutrient Watershed Region	Total Phosphorus Nutrient Threshold <sup>1</sup>	Total Nitrogen Nutrient Threshold <sup>1</sup>
Panhandle West	60 µg/L	670 µg/L
Panhandle East	180 µg/L	1030 µg/L
North Central	300 µ/L	1870 µg/L
Peninsular	120 µg/L	1540 µg/L
West Central	490 µg/L	1650 µg/L
South Florida	No numeric nutrient threshold. The narrative criterion in paragraph 62-302.530(47)(b), F.A.C., applies.	No numeric nutrient threshold. The narrative criterion in paragraph 62-302.530(47)(b), F.A.C., applies.

<sup>1</sup>These values are annual geometric mean concentrations not to be exceeded more than once in any three calendar year periods.

### Long-Term Data Summary Streams: 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.

### Long-Term Data Summary Streams: Data

Parameter	Minimum and Maximum Annual Means	Mean of Annual Means (Sampling years)
Total Phosphorus (µg/L)	41 - 52	45 (6)
Total Nitrogen (µg/L)	868 - 1034	944 (6)
Chlorophyll- uncorrected (µg/L)	3.9 - 8.4	6.8 (6)
Secchi (ft)	2.7 - 3.8	3.1 (6)
Secchi (m)	0.8 - 1.2	0.9 (6)
Color (Pt-Co Units)	118 - 158	144 (6)
Specific Conductance (µS/cm@25 C)	163 - 202	183 (6)

## LAKEWATCH Report for Shingle Creek-1 in Osceola County Using Data Downloaded 10/17/2016

### Trend Analyses Streams

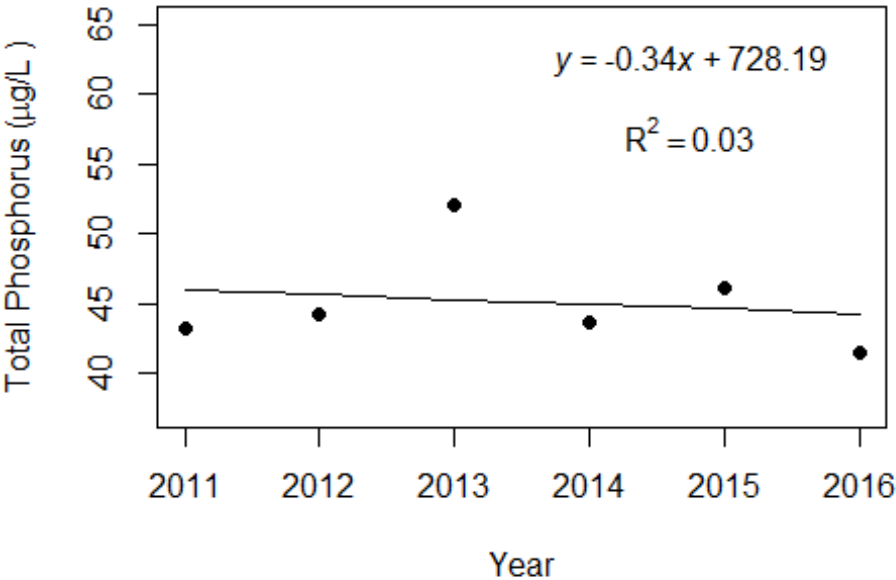
The following data are for linear regression statistics derived by plotting annual average total phosphorus, total nitrogen, chlorophyll, and Secchi data by year of data collection. Linear regression analysis is a common statistical approach used to determine if significant trends are occurring over 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 have 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 (R<sup>2</sup>):** 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.

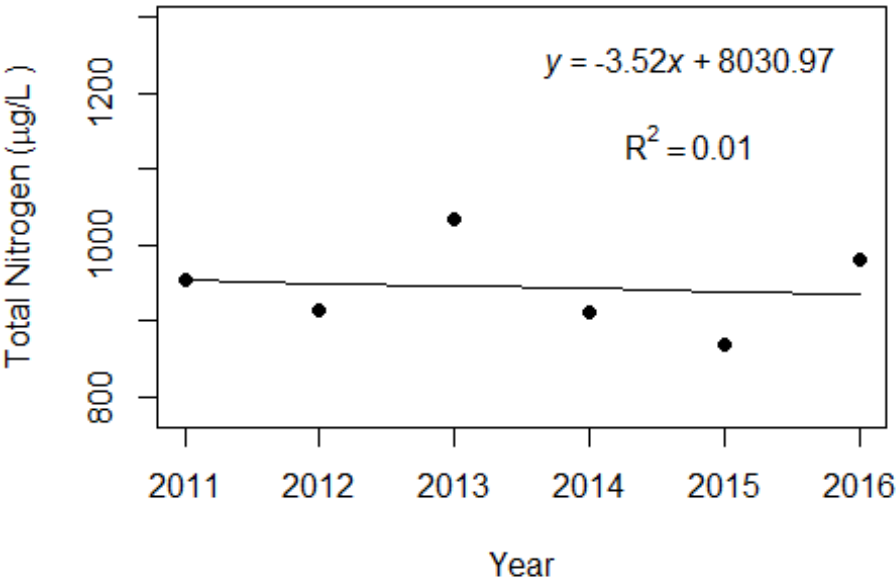
Statistic	Total Phosphorus	Total Nitrogen	Chlorophyll	Secchi
Number of Years (n)	6	6	6	6
Intercept (a)	728	8031	523	261
Slope (b)	-0.34	-3.52	-0.26	-0.13
Coefficient of Determination (R <sup>2</sup> )	0.03	0.01	0.09	0.33
Probability of Significance (p)	0.75	0.83	0.56	0.23
Potential Trend	No Trend	No Trend	No Trend	No Trend

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 Shingle Creek-1 in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.

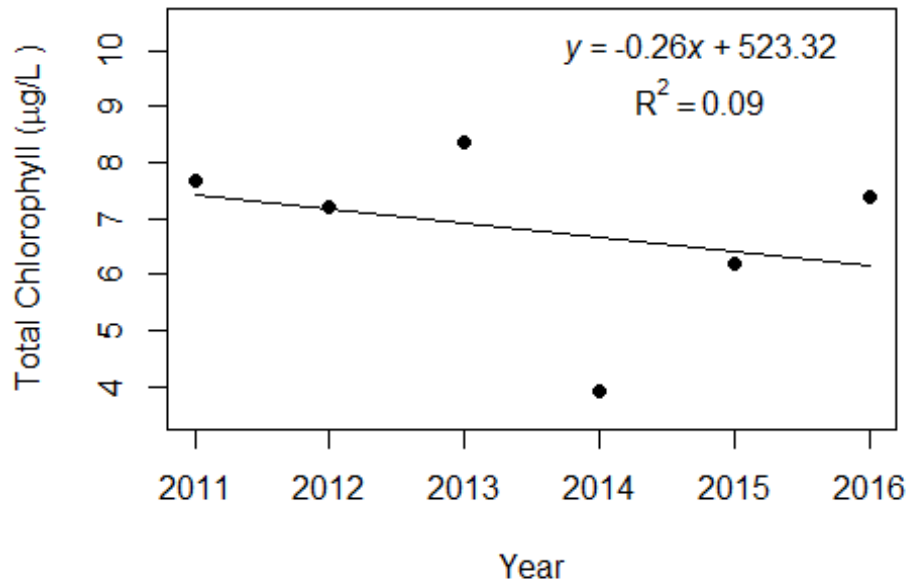
### Shingle Creek-1 (Osceola)



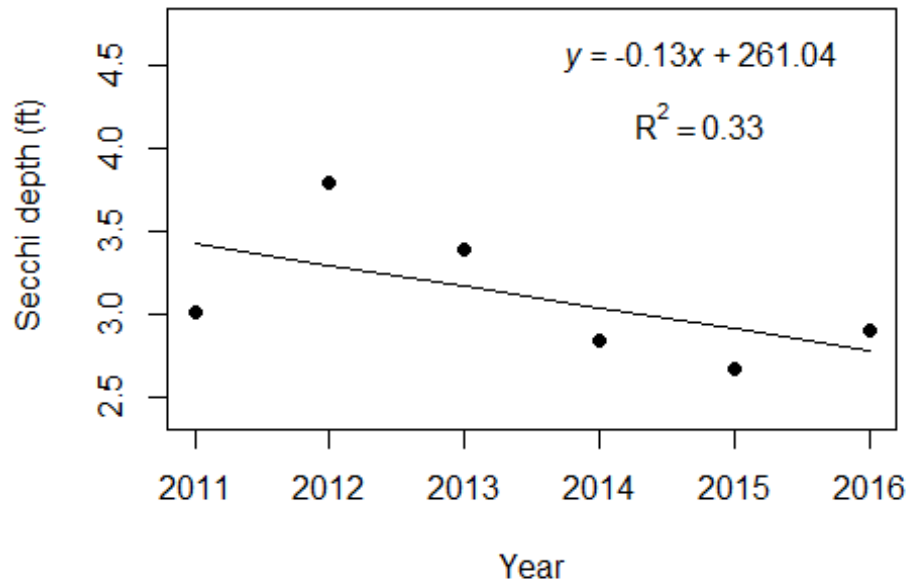
### Shingle Creek-1 (Osceola)



### Shingle Creek-1 (Osceola)



### Shingle Creek-1 (Osceola)



# LAKEWATCH Report for Shingle Creek-2 in Osceola County Using Data Downloaded 10/17/2016

## Introduction Streams

For many decades Florida has had a narrative nutrient water quality criterion in place to protect Florida's waters against nutrient over-enrichment. In 2009, the Florida Department of Environmental Protection (FDEP) initiated rulemaking and, by 2011, adopted what would be the first set of statewide numeric nutrient standards for Florida's waters. By 2015, almost all of the remaining waters in Florida have numeric nutrient standards (see for Florida Department of Environmental Regulation Nutrient Criteria's for: Streams, spring vents: <http://www.dep.state.fl.us/water/wqssp/nutrients/index.htm>).

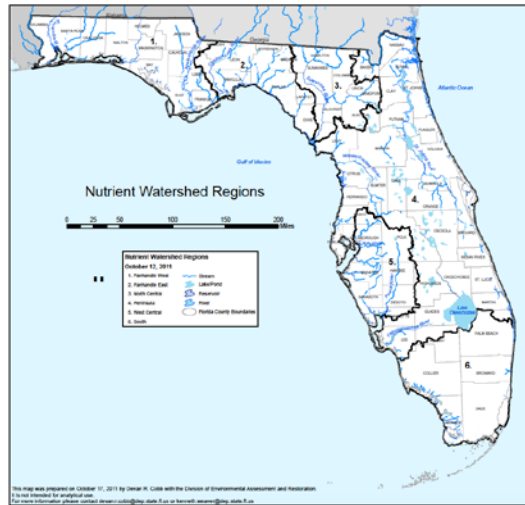


Figure 1. Map showing nutrient thresholds areas for streams set forth by FDEP.

## 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 stream resides.
- **Name:** Stream 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.
- **Period of Record (year):** Years a stream has been in the LAKEWATCH program.

County	Osceola
Name	Shingle Creek-2
Latitude	28.2684
Longitude	-81.4164
Water Body Type	Stream
Period of Record (year)	2011 to 2016
Nutrient Watershed Region	Peninsular

## LAKEWATCH Report for Shingle Creek-2 in Osceola County Using Data Downloaded 10/17/2016

The nutrient thresholds for streams set forth by FDEP are listed in table below along with the map showing zones.

Nutrient Watershed Region	Total Phosphorus Nutrient Threshold <sup>1</sup>	Total Nitrogen Nutrient Threshold <sup>1</sup>
Panhandle West	60 µg/L	670 µg/L
Panhandle East	180 µg/L	1030 µg/L
North Central	300 µ/L	1870 µg/L
Peninsular	120 µg/L	1540 µg/L
West Central	490 µg/L	1650 µg/L
South Florida	No numeric nutrient threshold. The narrative criterion in paragraph 62-302.530(47)(b), F.A.C., applies.	No numeric nutrient threshold. The narrative criterion in paragraph 62-302.530(47)(b), F.A.C., applies.

<sup>1</sup>These values are annual geometric mean concentrations not to be exceeded more than once in any three calendar year periods.

### Long-Term Data Summary Streams: Definitions

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- **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.

### Long-Term Data Summary Streams: Data

Parameter	Minimum and Maximum Annual Means	Mean of Annual Means (Sampling years)
Total Phosphorus (µg/L)	41 - 50	45 (6)
Total Nitrogen (µg/L)	840 - 990	912 (6)
Chlorophyll- uncorrected (µg/L)	1.3 - 6.7	2.6 (6)
Secchi (ft)	2.6 - 4.0	3.3 (6)
Secchi (m)	0.8 - 1.2	1.0 (6)
Color (Pt-Co Units)	131 - 178	150 (6)
Specific Conductance (µS/cm@25 C)	156 - 197	180 (6)

## LAKEWATCH Report for Shingle Creek-2 in Osceola County Using Data Downloaded 10/17/2016

### Trend Analyses Streams

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:

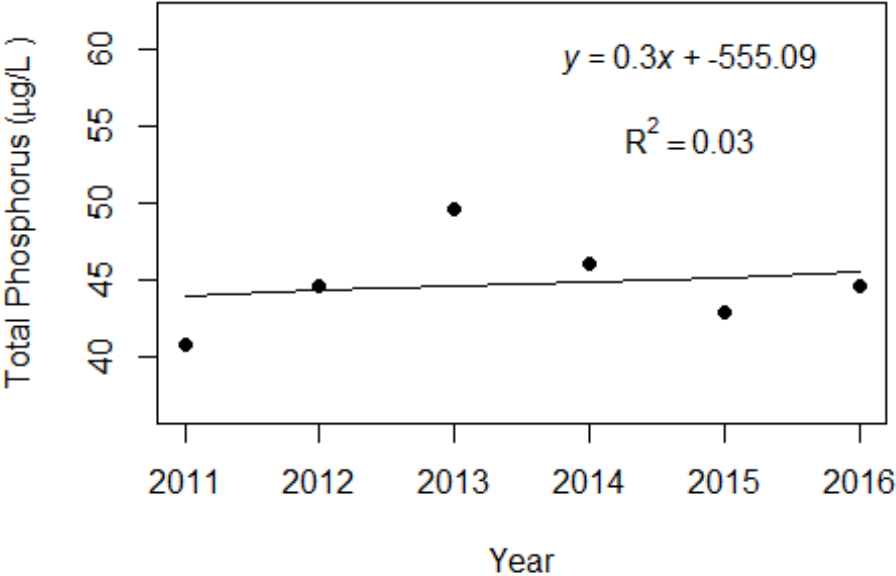
- **Number of years (n):** This is simply the number of years of data that were used to calculate annual means.
- **Intercept (a):** This is the value on the y-axis that the fitted line would have cross if the x-axis where zero.
- **Slope (b):** This is the rate at which the fitted line increases (positive number) or decreases (negative number).
- **Coefficient of determination (R<sup>2</sup>):** 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.

Statistic	Total Phosphorus	Total Nitrogen	Chlorophyll	Secchi
Number of Years (n)	6	6	6	6
Intercept (a)	-555	-30303	1143	523
Slope (b)	0.30	15.50	-0.57	-0.26
Coefficient of Determination (R <sup>2</sup> )	0.03	0.23	0.27	0.63
Probability of Significance (p)	0.72	0.34	0.29	0.06
Potential Trend	No Trend	No Trend	No Trend	No Trend

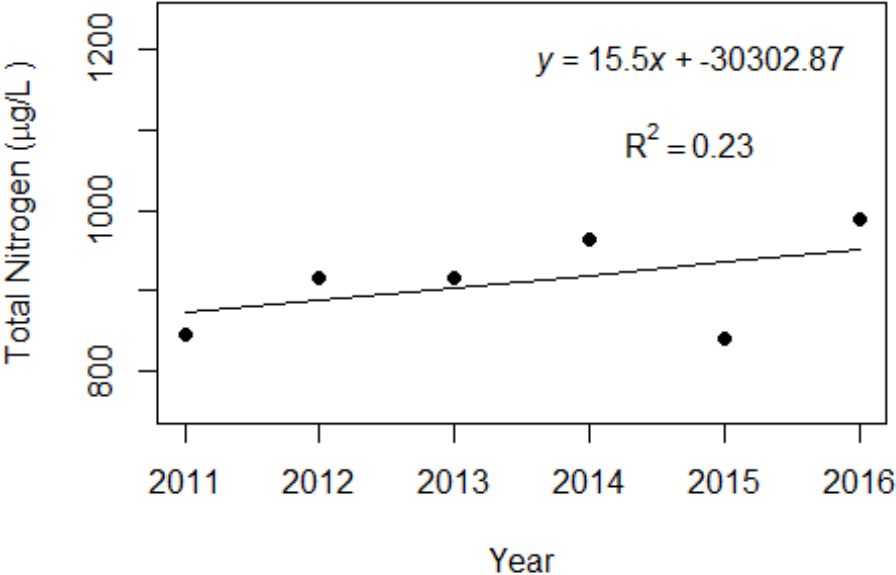
The following graphs on the next two pages are trend analyses examining regression between year and annual means of total phosphorus, total nitrogen, chlorophyll, and Secchi depth for Shingle Creek-2 in Osceola County. If there are no plots then there is less than five years of data, which is not enough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



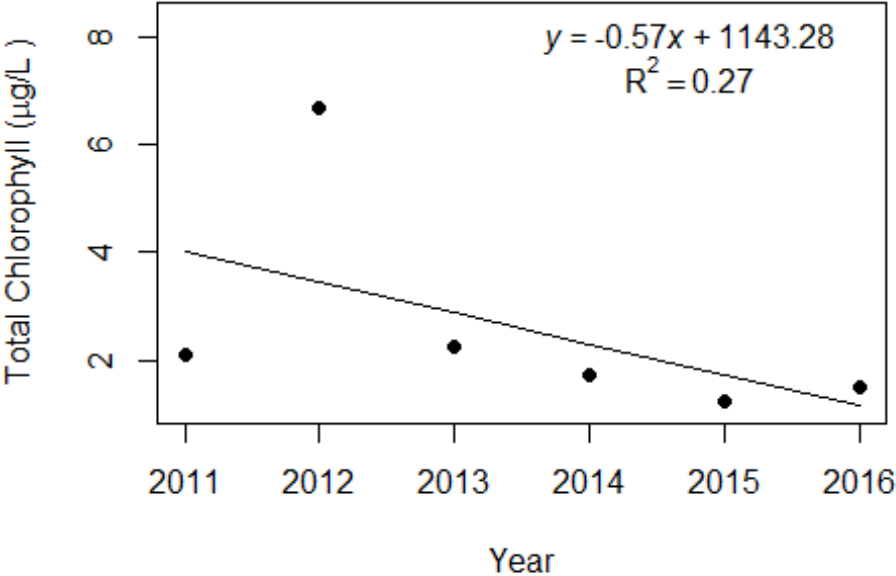
### Shingle Creek-2 (Osceola)



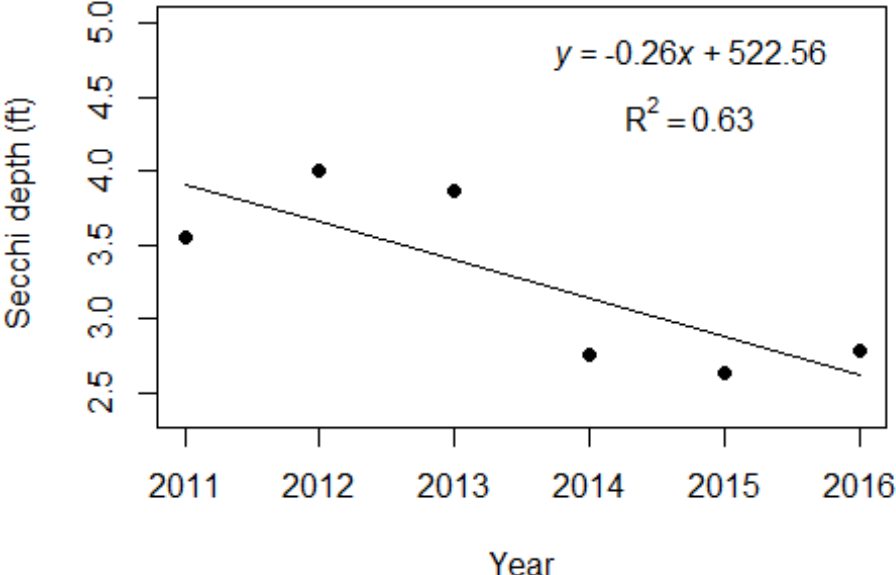
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### Shingle Creek-2 (Osceola)



### Shingle Creek-2 (Osceola)



# LAKEWATCH Report for Shingle Creek-3 in Osceola County Using Data Downloaded 10/17/2016

## Introduction Streams

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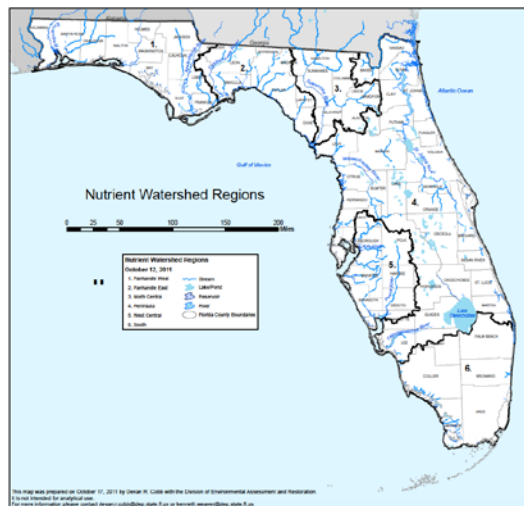


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- **Period of Record (year):** Years a stream has been in the LAKEWATCH program.

County	Osceola
Name	Shingle Creek-3
Latitude	28.2681
Longitude	-81.4249
Water Body Type	Stream
Period of Record (year)	2011 to 2016
Nutrient Watershed Region	Peninsular

## LAKEWATCH Report for Shingle Creek-3 in Osceola County Using Data Downloaded 10/17/2016

The nutrient thresholds for streams set forth by FDEP are listed in table below along with the map showing zones.

Nutrient Watershed Region	Total Phosphorus Nutrient Threshold <sup>1</sup>	Total Nitrogen Nutrient Threshold <sup>1</sup>
Panhandle West	60 µg/L	670 µg/L
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### Long-Term Data Summary Streams: Data

Parameter	Minimum and Maximum Annual Means	Mean of Annual Means (Sampling years)
Total Phosphorus (µg/L)	42 - 51	45 (6)
Total Nitrogen (µg/L)	788 - 944	905 (6)
Chlorophyll- uncorrected (µg/L)	1.4 - 4.3	2.4 (6)
Secchi (ft)	2.3 - 3.6	3.0 (6)
Secchi (m)	0.7 - 1.1	0.9 (6)
Color (Pt-Co Units)	132 - 173	155 (6)
Specific Conductance (µS/cm@25 C)	160 - 209	187 (6)

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### Trend Analyses Streams

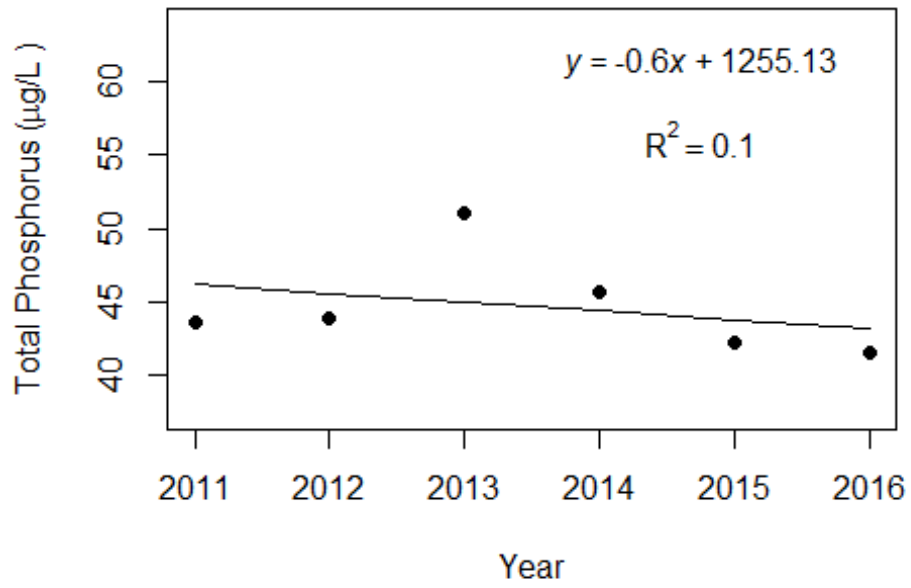
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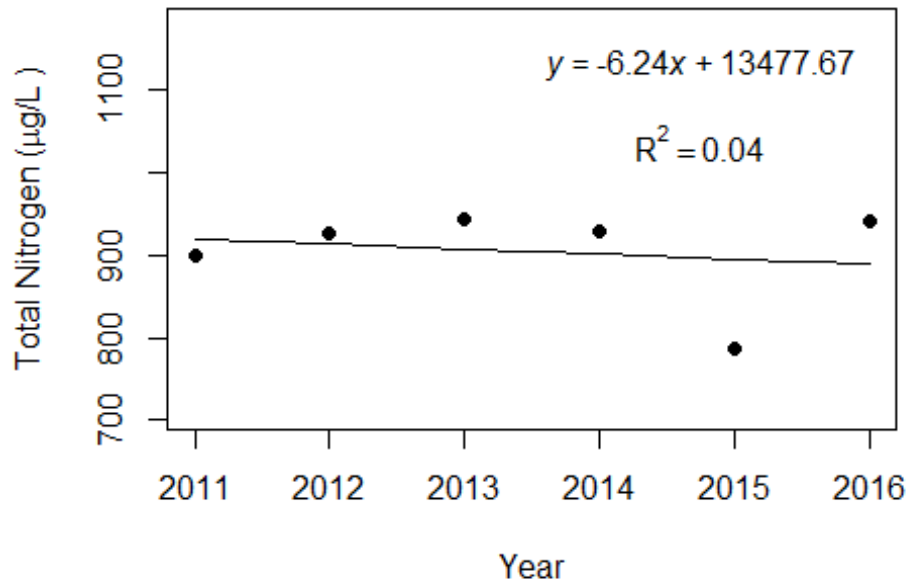
Statistic	Total Phosphorus	Total Nitrogen	Chlorophyll	Secchi
Number of Years (n)	6	6	6	6
Intercept (a)	1255	13478	1056	500
Slope (b)	-0.60	-6.24	-0.52	-0.25
Coefficient of Determination (R <sup>2</sup> )	0.10	0.04	0.69	0.85
Probability of Significance (p)	0.53	0.71	0.04	0.01
Potential Trend	No Trend	No Trend	Decreasing	Decreasing

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 Shingle Creek-3 in Osceola County. If there are no plots then there is less than five years of data, which is not enough for the analysis.

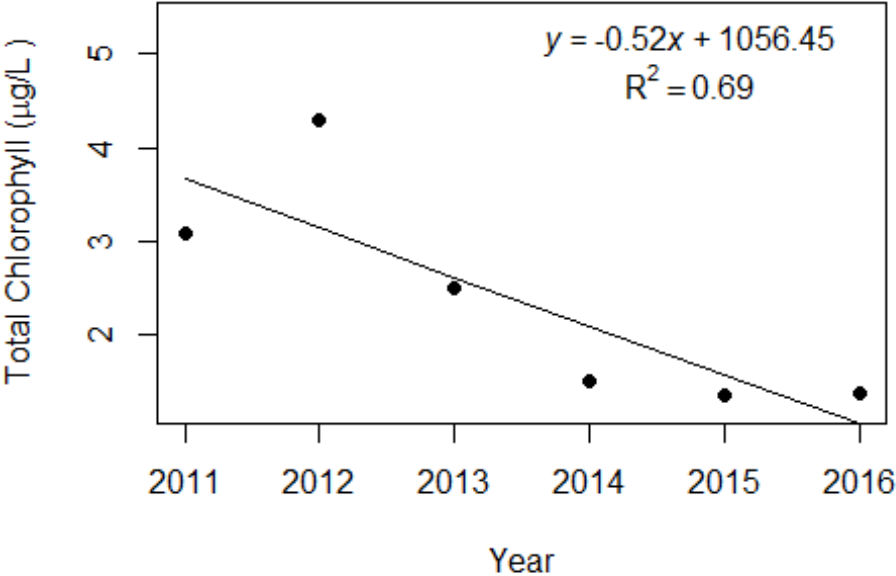
### Shingle Creek-3 (Osceola)



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