Evaluation of FDEP Verified Impaired List for Lakes and Streams within Polk County

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Prepared By:

ATKINS

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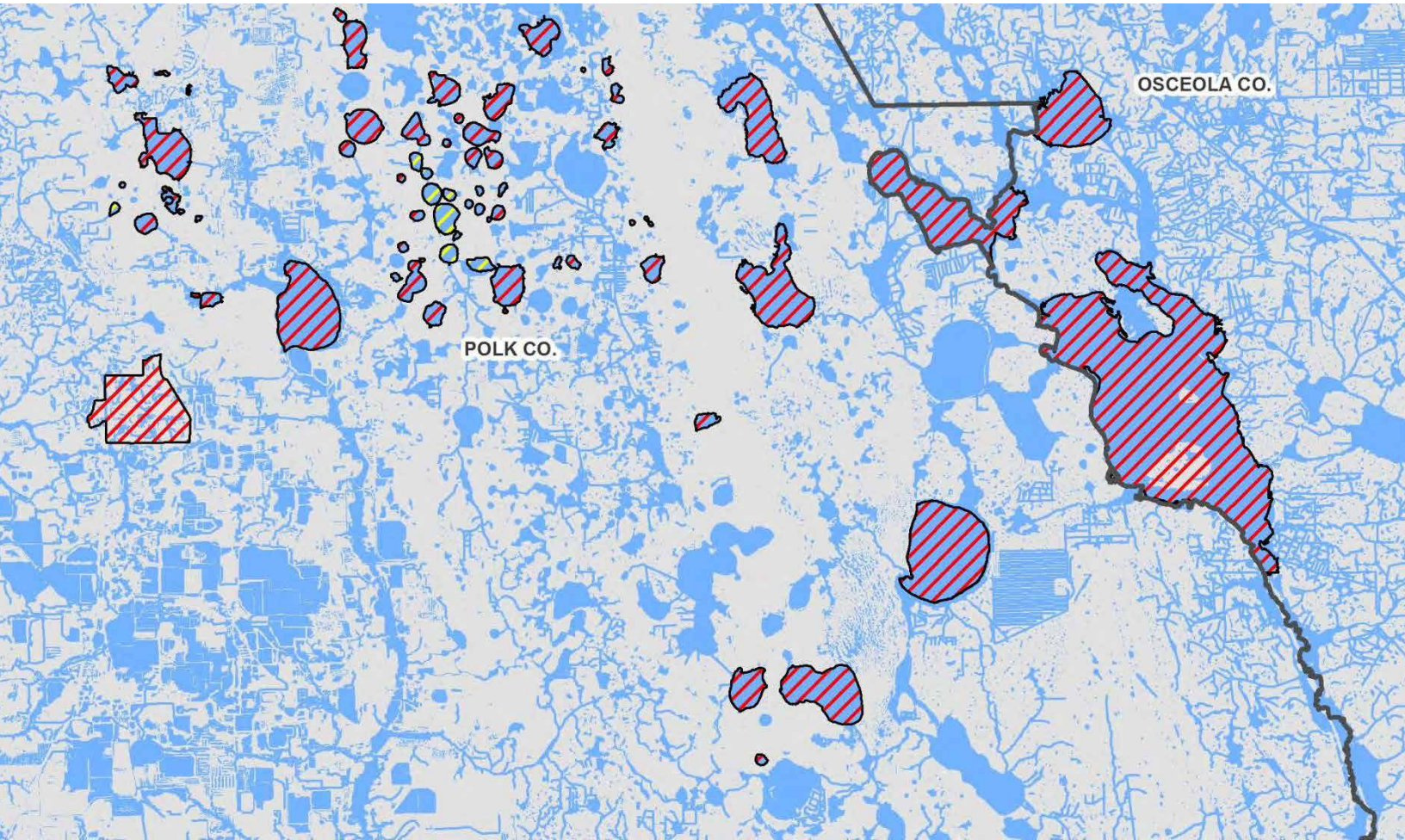

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Executive Summary

Polk County has requested services from Atkins North America in support of evaluating the Florida Department of Environmental Protection"s (FDEP"s) Final Verified List of water quality impairments for the lakes and streams within Polk County impaired for nutrients. Prior to commencing with further steps such as the development of Total Maximum Daily Loads (TMDLs) and the development of Basin Management Action Plans (BMAPs) Polk County wishes to review those WBID-impairment combinations that involve water bodies within the County. Presently, all lakes and streams deemed impaired for elevated nutrients or chlorophyll-a were evaluated based upon outdated water quality standards, either FDEP"s Trophic State Index (now replaced with Numeric Nutrient Concentration Criteria [NNC]) or FDEP"s prior default standard for dissolved oxygen of 5 mg/L. In 2012, FDEP adopted NCC for lakes and streams, and is currently working to replace its dissolved oxygen criteria with more realistic criteria.

A total of 87 waterbodies (67 lakes and 20 streams) were re-evaluated using the updated NNC criteria over the verified period for each WBID. Of the sixty-seven lakes identified as verified impaired by FDEP for elevated TSI, 10 were found not to be impaired for any of the three parameters: chlorophyll-a, TN or TP using NNC guidance (**Table 137**). Thirteen lakes had insufficient data to evaluate at least one of the parameters to determine an impairment designation. For those 13 lakes, parameters with sufficient data for analysis were found to not be impaired. At least one parameter (TN, TP or chlorophyll-a) was found to be impaired in the remaining 44 lakes (**Table 138**). Twenty streams were identified as verified impaired by FDEP for elevated nutrients where evaluated using the NNC. Four streams had sufficient data to be determined impaired for either elevated chlorophyll-a concentrations or exceeding SCI and nutrient thresholds (**Table 180**). Of the 20 streams, none were found to be unimpaired for chlorophyll-a or nutrient and SCI metrics. Sixteen streams had insufficient data to evaluate at least one of the metrics used to determine an impairment designation (**Table 181**).

The waterbodies were also analyzed over a more recent time period (2003 to 2013) to determine if a change in water quality status had occurred. Thirteen lakes were found to be unimpaired for the three parameters: chlorophyll-a, TN or TP (**Table 139**). Four lakes had insufficient data to evaluate at least one of the parameters for to determine an impairment designation. For those 4 lakes, parameters with sufficient data for analysis were found to not be impaired. At least one parameter was found to be impaired in the remaining 50 lakes (**Table 140**). Four streams had sufficient data to be determined impaired for either elevated chlorophyll-a concentrations or exceeding SCI and nutrient thresholds (**Table 182**). None of the streams were found unimpaired for all of the metrics used to determine impairment. Sixteen lakes had insufficient data to evaluate at least one of the metrics used to determine an impairment designation (**Table 183)**.

A number of lakes and streams within Polk County have either draft or final TMDLs produced for them, and all of them are based on the nutrient-chlorophyll-a relationships embedded within the TSI calculations. In those instances, projects and/or permit-related obligations could be designed, permitted and constructed in the TMDL implementation phase that might not bring about the desired response in lake water quality. A more detailed discussion on the implication of existing and future TMDLs on Polk County waterbodies impaired using outdated water quality standards is provided in Section 9.0.

1. Introduction

Polk County has requested services from Atkins North America in support of evaluating the Florida Department of Environmental Protection"s (FDEP"s) Final Verified List of water quality impairments for the lakes and streams within Polk County. Within the Verified Impaired List, there are numerous WBID-impairment combinations for water bodies, including impairments for dissolved oxygen, nutrients in terms of both Trophic State Index (TSI) and TSI trends, as well as fecal coliform bacteria. Prior to commencing with further steps such as the development of Total Maximum Daily Loads (TMDLs) and the development of Basin Management Action Plans (BMAPs) Polk County wishes to review those WBID-impairment combinations that involve water bodies within the County.

This Scope of Work involves the following tasks: 1) review of datasets used to create the verified impairment list, to include an assessment of the appropriateness of locations of sampling locations for ambient water quality characterization for lakes and streams, 2) a comparison of target concentrations of total nitrogen (TN) and total phosphorus (TP) using TSI vs. NNC for each impaired lake where both can be calculated, 3) a comparison of recent (e.g., within the last 10 years) water quality vs. target TN and TP values from NNC, 4) a determination of the data sufficiency for stream impairment determinations that have been made within Polk County, 5) attendance at and presentations to a meeting within Polk County to present draft findings for peer review, 6) preparation of a draft final Technical Memorandum summarizing findings, and 7) after receiving comments from County staff, production of a final draft Technical Memorandum.

2. Review of Datasets used to create FDEP's Verified Impaired List

The purpose of this task is to review the station locations, attribution of stations to appropriate WBIDs, and the appropriateness of sample sites for characterization of ambient water quality for lakes and streams in Polk County that have been determined by FDEP to be impaired for nutrients. Data sets examined included the IWR data set used by FDEP, as well as additional data sets – as available – from Polk County and/or other water quality monitoring efforts. Potential influencing factors examined included station locations (i.e., along shoreline vs. in open water) and general climatic factors (i.e., influences of droughts, hurricanes, El Niño events, or other hydrologic factors).

The list of evaluated lakes and streams were derived from FDEP"s comprehensive 303(d) verified list, FDEP and EPA adopted final nutrient TMDL"s for waterbodies within Polk County. FDEP provides GIS shapefiles for the verified impaired waterbodies (August 2013) and Florida Adopted TMDLs (January 2013). Using ArcGIS, WBIDs with nutrient-related impairments (i.e., TSI, Chlorophyll-a) were selected. In addition, those WBIDs with EPA finalized nutrient TMDLs were included for analysis. In total, 87 WBIDs were evaluated of which 67 are lakes and 20 are streams (**Figures 1 and 2**, **Tables 1 and 2**).

Figure 1. Polk County Impaired lakes included in evaluation.

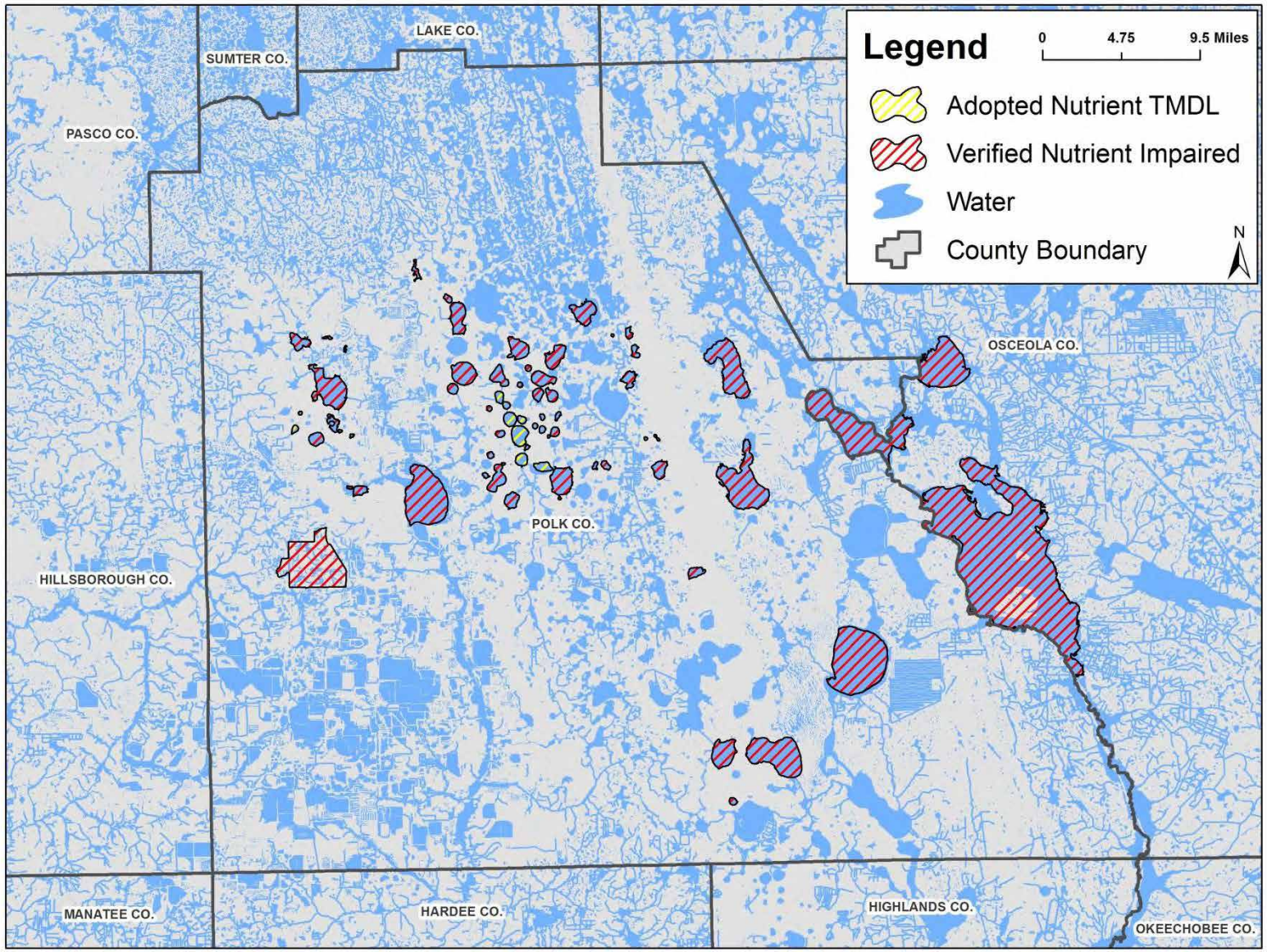


Figure 2. Polk County Impaired streams included in evaluation.

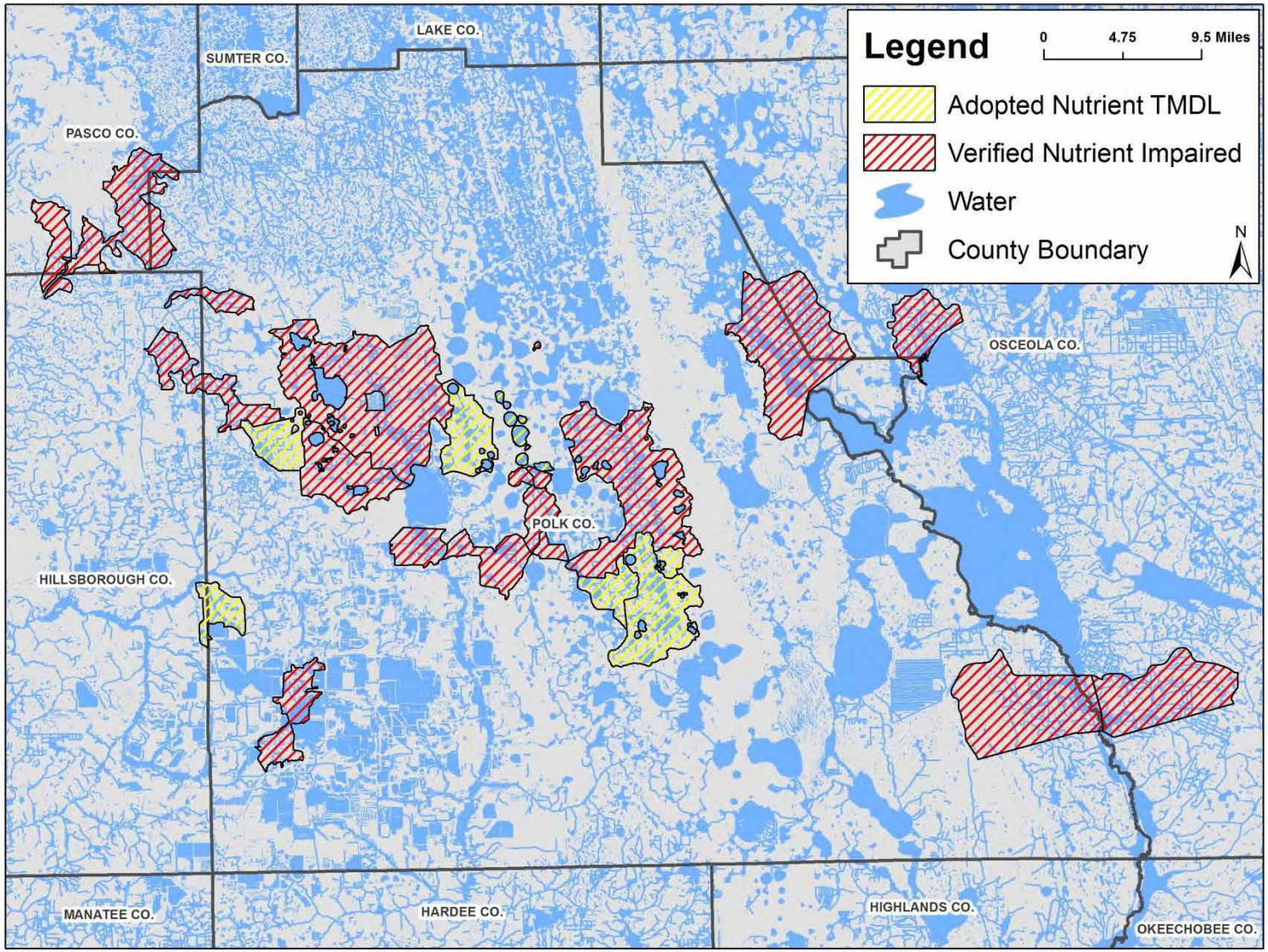


Table 1. List of Polk County Impaired lakes included in evaluation.

WBID	Waterbody Name	Parameter of Concern	TYPE	WBID	Waterbody Name	Parameter of Concern	TYPE
1449A	LAKE DEESON	Nutrients (TSI)	303(d) list	15101	LAKE EVA	Nutrients (TSI)	303(d) list
1467	MUD LAKE	Nutrients (TSI)	303(d) list	1521B	LAKE ELOISE	Nutrients (TSI)	303(d) list
1472B	LAKE HATCHINEHA	Nutrients (TSI Trend)	303(d) list	1521L	LAKE MARIANNA	Nutrients (TSI)	303(d) list
1480	LAKE MARION	Nutrients (TSI)	303(d) list	1521P	DEER LAKE	Nutrients (TSI)	303(d) list
1484A	LAKE TENNESSEE	Nutrients (TSI)	303(d) list	1521Q	LAKE BLUE	Nutrients (TSI)	303(d) list
1484B	LAKE JULIANA	Nutrients (TSI)	303(d) list	1532A	LAKE PIERCE	Nutrients (TSI)	303(d) list
1488A	LAKE SMART	Nutrients (TSI)	TMDL	1532B	LAKE MARIE	Nutrients (TSI)	303(d) list
1488B	LAKE ROCHELLE	Nutrients (TSI)	303(d) list	1537	LAKE WIRE	Nutrients (TSI)	303(d) list
1488C	LAKE HAINES	Nutrients (TSI)	TMDL	1539C	LAKE ANNIE	Nutrients (TSI)	303(d) list
1488D	LAKE ALFRED	Nutrients (TSI)	303(d) list	1539Q	LAKE NED	Nutrients (TSI)	303(d) list
1488G	LAKE SILVER	Nutrients (TSI)	303(d) list	1539R	LAKE DAISY	Nutrients (TSI)	303(d) list
1488P	LAKE MARTHA	Nutrients (TSI)	303(d) list	1539Z	LAKE MENZIE	Nutrients (TSI)	303(d) list
1488Q	LAKE MAUDE	Nutrients (TSI)	303(d) list	1548	LAKE ELBERT	Nutrients (TSI)	303(d) list
1488S	LAKE BUCKEYE	Nutrients (TSI)	303(d) list	1549B	BANANA LAKE	Nutrients (TSI)	303(d) list
1488U	LAKE CONINE	Nutrients (TSI)	303(d) list	1549B1	LAKE STAHL	Nutrients (TSI)	303(d) list
1488V	LAKE SWOOPE	Nutrients (TSI)	303(d) list	1549X	LAKE HOLLINGSWORTH	Nutrients (TSI)	303(d) list
1488Y	LAKE PANSY	Nutrients (TSI)	303(d) list	1573E	LAKE WEOHYAKAPKA	Nutrients (Historical TSI)	303(d) list
1488Z	LAKE ECHO	Nutrients (TSI)	303(d) list	1588A	LAKE MCLEOD	Nutrients (TSI)	303(d) list
14921	LAKE TRACY	Nutrients (TSI)	303(d) list	1610	CARTER ROAD PARK LAKES	Nutrients (Chlorophyll-a)	303(d) list
1497A	CRYSTAL LAKE	Nutrients (TSI)	303(d) list	1619A	LAKE WALES	Nutrients (TSI)	303(d) list
1497B	LAKE PARKER	Nutrients (TSI)	303(d) list	1623L	LAKE HANCOCK	Nutrients (TSI)	303(d) list
1497C	LAKE TENOROC	Nutrients (TSI)	303(d) list	1623M	EAGLE LAKE	Nutrients (TSI)	303(d) list
1497D	LAKE GIBSON	Nutrients (TSI)	303(d) list	1623M1	GRASSY LAKE	Nutrients (TSI)	303(d) list
1497E	LAKE BONNY	Nutrients (TSI)	303(d) list	1685D	REEDY LAKE	Nutrients (TSI)	303(d) list
15001	LITTLE LAKE HAMILTON	Nutrients (TSI)	303(d) list	1706	LAKE CLINCH	Nutrients (TSI)	303(d) list
15003	LAKE CONFUSION	Nutrients (TSI)	303(d) list	1730	HICKORY LAKE	Nutrients (TSI)	303(d) list
1501	LAKE LENA	Nutrients (TSI)	303(d) list	2890A	LAKE LOWERY	Nutrients (TSI)	303(d) list

WBID	Waterbody Name	Parameter of Concern	TYPE	WBID	Waterbody Name	Parameter of Concern	TYPE
1501B	LAKE ARIANA	Nutrients (TSI)	303(d) list	3180A	LAKE CYPRESS	Nutrients (TSI)	303(d) list
1501W	SEARS LAKE	Nutrients (TSI)	303(d) list	3183B	LAKE KISSIMMEE	Nutrients (TSI)	303(d) list
1521	LAKE LULU	Nutrient	TMDL	1521H	LAKE CANNON	Nutrient	TMDL
1521D	LAKE SHIPP	Nutrient	TMDL	1521J	LAKE IDYLWILD	Nutrient	TMDL
1521E	LAKE MAY	Nutrient	TMDL	1521K	LAKE JESSIE	Nutrient	TMDL
1521F	LAKE HOWARD	Nutrient	TMDL	1543	LAKE HUNTER	Nutrient	TMDL
1521G	LAKE MIRROR	Nutrient	TMDL				

Table 2. List of Polk County Impaired streams included in evaluation.

WBID	Waterbody Name	Parameter of Concern	TYPE
1443A	HILLSBOROUGH RIVER	Nutrients (Chlorophyll-a)	303(d) list
1472A1	LAKE MARION CREEK	Nutrients (Chlorophyll-a)	303(d) list
1483	BALD EAGLE CREEK	Nutrients (Chlorophyll-a)	303(d) list
1495B	ITCHEPACKESASSA CREEK	Nutrients (Chlorophyll-a)	303(d) list
1497	SADDLE CREEK	Nutrients (Chlorophyll-a)	303(d) list
1521C	LAKE LULU RUN	Nutrients (Chlorophyll-a)	303(d) list
1539	PEACE CREEK DRAINAGE CANAL	Nutrients (Historical Chlorophyll-a)	303(d) list
1580	WAHNETA FARMS DRAINAGE CANAL	Nutrients (Historical Chlorophyll-a)	303(d) list
1549A	BANANA LAKE CANAL*	Nutrients (Chlorophyll-a)	303(d) list
1623K	SADDLE CREEK BELOW LAKE HANCOCK	Nutrients (Chlorophyll-a)	303(d) list
1673	HOOKERS PRAIRIE	Nutrients (Chlorophyll-a)	303(d) list
3180B	SOUTH PORT CANAL	Nutrients (Chlorophyll-a)	303(d) list
3186E	PACKINGHAM SLOUGH	Nutrients (Chlorophyll-a)	303(d) list
3186G	BLANKET BAY SLOUGH	Nutrients (Chlorophyll-a)	303(d) list
1501A	LAKE LENA RUN	Nutrient	TMDL
1543A	LAKE HUNTER OUTLET	Nutrient	TMDL
1613	PEACE CREEK TRIBUTARY CANAL	Nutrient	TMDL
1617	LAKE EFFIE OUTLET	Nutrient	TMDL
1626	WEST WALES DRAINAGE CANAL	Nutrient	TMDL
1639	THIRTYMILE CREEK	Dissolved Oxygen and Nutrient	TMDL
*also impaired for Historical Chlorophyll-a			

2.1. Water Quality Data

Water quality data were queried from the IWR Run 47 database for the 87 WBIDs of interest. In addition, Polk County water quality data from September 2012 to August 2013 were retrieved from the Florida STOrage and RETrieval (STORET) database to supplement the FDEP IWR database. During the course of this project, it was discovered that a subset of Polk County lake data from October 2010 were not successfully uploaded to STORET and therefore not included in the IWR Run 47 database. The STORET upload error was rectified and missing October 2010 data were added to the analysis. The data were compiled and evaluated consistent with the rules provided in 62-303, F.A.C. (Identification of Impaired Surface Waters). Data were not available for Lake Effie Outlet (WBID 1617).

Based on correspondence with FDEP, IWR data were excluded from analysis if the qualifier (epaVP) value did not equal "1". In addition, data (IWR and STORET) with any of the following qualifiers were excluded: ?, T, J, M and H. Water quality data were reviewed and a daily median value was calculated to eliminate duplicate data entries. A median value was calculated for samples collected at the same location less than four days apart (F.A.C. 62-303.320(4)).

2.2. Sampling Stations

A list of sampling stations was created based on the comprehensive water quality database. All stations sampled within 200 meters of each other were considered the same stations in the absence of a tributary, outfall, or significant change in hydrography of the water (F.A.C. 62-303.320(4e)). In addition, station locations were reviewed to evaluate the appropriateness of sample sites for characterization of ambient water quality for lakes and streams.

3. Impairment Determinations using TSI vs. NNC

Until 2013, FDEP utilized the Trophic State Index (TSI) for the determination of nutrient imbalances in lakes and estuaries in the State of Florida. Recently, the FDEP has developed lake-specific numeric nutrient criteria which was been approved by EPA. The following section addresses the differences in the two methods.

3.1. Trophic State Index (TSI)

The Trophic State Index (TSI) was utilized by FDEP to determine nutrient impairment for lakes and estuaries until the adoption of the Numeric Nutrient Criteria (NNC) in 2012. TSI is calculated based on the calculated nutrient limitation (e.g., nitrogen, phosphorus or co-limited) (**Figure 3**). In order to violate the TSI guidance criteria, a single year‟s exceedance was necessary. In regards to data sufficiency, one sample was required from each quarter of the calendar year. Specific to lakes, TSI targets were allocated based upon color classification. High color lakes (Color > 40 platinum-cobalt units (PCU)) had a TSI threshold of 60 TSI which roughly equates to "do not exceed" values for chlorophyll-a of 20 µg/L, TP of 0.07 mg/L and TN of 1.2 mg/L. A low color lake (color ≤ 20 PCU) had a TSI threshold of 40 TSI which roughly equates to do not exceed values for chlorophyll-a of 5.0 µg/L, TP of 0.02 mg/L and TN of 0.45 mg/L. Low color lakes with paleolimnological work which indicate historically mesotrophic water quality conditions could qualify for a TSI of 60. Several of the lakes within the Winter Haven Chain of Lakes were subject to a revision in TSI based on paleolimnological work.

Figure 3. TSI equations and associated targets (FDEP 1996).

For lakes: 0-59 is good, 60-69 is fair, 70-100 is poor.
For estuaries: 0-49 is good, 50-59 is fair, 60-100 is poor.

Trophic State Index	Chlorophyll CHLA/ micrograms per liter (µg/1)	Total Phosphorus TP/ milligrams of phosphorus per liter (mgP/1)	Total Nitrogen TN/ milligrams of nitrogen per liter (mgN/1)
0	0.3	0.003	0.06
10	0.6	0.005	0.10
20	1.3	0.009	0.16
30	2.5	0.01	0.27
40	5.0	0.02	0.45
50	10.0	0.04	0.70
60	20.0	0.07	1.2
70	40	0.12	2.0
80	80	0.20	3.4
90	160	0.34	5.6
100	320	0.58	9.3

Trophic State Index equations that generate the above criteria (LN = Natural Log):

$CHLA_{TSI} = 16.8 + [14.4 \times LN(CHLA)]$

$TN_{TSI} = 56 + [19.8 \times LN(TN)]$

$TN2_{TSI} = 10 \times [5.96 + 2.15 \times LN(TN + .0001)]$

$TP_{TSI} = [18.6 \times LN(TP \times 1000)] - 18.4$

$TP2_{TSI} = 10 \times [2.36 \times LN(TP \times 1000) - 2.38]$

* *Limiting nutrient considerations for calculating* $NUTR_{TSI}$:

If $TN/TP > 30$ then $NUTR_{TSI} = TP2_{TSI}$

If $TN/TP < 10$ then $NUTR_{TSI} = TN2_{TSI}$

If $10 < TN/TP < 30$ then $NUTR_{TSI} = (TP_{TSI} + TN_{TSI}) / 2$

$TSI = (CHLA_{TSI} + NUTR_{TSI}^{*}) / 2$

3.2. Lake-Specific Numeric Nutrient Criteria

The FDEP Numeric Nutrient Criteria (NNC) was implement in 2013 to determine chlorophyll-a, TN and/or TP impairment for lakes. Each lake must be characterized as a low (color ≤40 PCU) or high color (color > PCU) lake. Low color lakes are further classified as acidic (alkalinity ≤ 20 mg/L) or alkaline (alkalinity > 20 mg/L). The appropriate NNC criteria are assigned based upon the characterization and chlorophyll-a concentration on an annual basis (**Figure 4**). The minimum or maximum criteria are assigned based on the annual geometric chlorophyll-a concentration for a given year. For example, if the annual geometric chlorophyll-a concentration exceeds 20 µg/L for a colored lake, the TP and TN criteria are 0.05 and 1.27 mg/L for that year, respectively. However, if the chlorophyll-a concentration is below the 20 µg/L criteria, the TP and TN criteria are 0.16 and 2.23 mg/L, respectively. The criteria are compared to the annual geometric mean of each parameter. More than one exceedance in any three year period denotes an impaired waterbody. A minimum of four temporally independent sampling events are required in the calendar year to calculate the annual geometric mean, with at least one occurring during the period from May to September and October to April,

Figure 4. Lake NNC chlorophyll-a, total nitrogen and total phosphorus criteria (FDEP 2013).

Long Term Geometric Mean Lake Color and Alkalinity	Annual Geometric Mean Chlorophyll *a*	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
> 40 Platinum Cobalt Units	**20 µg/L**	**0.05 mg/L**	**1.27 mg/L**	**0.16 mg/L[1]**	**2.23 mg/L**
≤ 40 Platinum Cobalt Units and > 20 mg/L $CaCO_3$	**20 µg/L**	**0.03 mg/L**	**1.05 mg/L**	**0.09 mg/L**	**1.91 mg/L**
≤ 40 Platinum Cobalt Units and ≤ 20 mg/L $CaCO_3$	**6 µg/L**	**0.01 mg/L**	**0.51 mg/L**	**0.03 mg/L**	**0.93 mg/L**

[1]For lakes with color > 40 PCU in West Central Nutrient Watershed Region, maximum TP limit shall be 0.49 mg/L

4. Polk County Impaired Lake Review

Using methodology laid out in the State of Florida"s Surface Water Quality Standards (FAC 62-302) and the Impaired Waters Rule (62-303), water quality impairment determinations (for FDEP-determined "impaired" water bodies) were compared using both the Trophic State Index (TSI) and the newly adopted Numeric Nutrient Concentration criteria (NNC). Using the guidance provided in the State of Florida"s NNC derivation process, those lakes with sufficient water quality for determining NNC guidance for TN and TP targets were compared as to their impairment status using TSI. In addition, using the most recent and complete data set from IWR (and supplemented with additional data sets seen as appropriate by Polk County) ambient water quality values for chlorophyll-a, TN and TP were compared to target values for chlorophyll-a, TN and TP within FDEP"s 62-302 guidance. The frequency of exceedances on an annual and individual sampling basis were calculated, and percent reductions (if appropriate) were calculated for those parameters that exceed exiting criteria.

Annual geometric means for corrected, chlorophyll-a, TN and TP, where calculated consistent with the F.A.C 62-303. A minimum of 4 sampling events per year with at least one occurring during the wet (May to September) and dry (October to April) seasons are required to calculate an annual geometric mean.

In order to characterize each lake as colored, clear, alkaline or clear, acidic, the long-term geometric mean alkalinity, color and conductivity values were calculated. For the evaluation performed over the verified period, the long-term geometric mean was calculated using data through the verified period end date in which the lake was deemed impaired. For the evaluation performed over the period of 2003 to 2013, the long-term geometric mean was calculated using data through the period of record. In some instances, lake characterization changed due to the inclusion of more recent data during the most recent data analysis.

For each lake, a map of sampling station locations is provided where sampling locations with the same color-coding indicate data that were combined. Data are reported with one significant digit greater than the respective parameter criteria in order to accurately denote exceedance. For example, the TP concentration criteria for a clear, alkaline lake is 0.03 mg/L when the chlorophyll-a concentrations exceed 20 µg/L. In order

to ascertain the difference between annual geometric TP concentrations of 0.029 and 0.031 mg/L, data are reported to an additional decimal place beyond the standard itself.

4.1. Lake Deeson (WBID 1449A)

Lake Deeson (**Figure 5**) was declared impaired for nutrients due to elevated TSI during the January 1, 2003 to June 30, 2010 verified period as part of the Group 4, Cycle 2 review. The impairment status of Lake Deeson was evaluated using NNC over the verified period used for the initial impairment. Lake Deeson is considered a clear, acidic lake based on a long-term geometric mean color of 25 PCU and alkalinity of 13 mg/L. Based on the clear, acidic characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 6.0 µg/L The results of the analysis support the initial impairment determination and indicate that Lake Deeson was impaired for elevated chlorophyll-a and TN concentrations during the verified period (**Table 3**). There were insufficient TP data to determine impairment status over the initial verified period.

In addition, Lake Deeson water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Deeson was reclassified as a clear, alkaline lake (color=26 PCU, alkalinity=25 mg/L). Due to the change in characterization, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Deeson continues to be impaired for chlorophyll-a and TN with the addition of TP (**Table 4**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 6**). When sufficient data were available for analysis, the percent exceedance was frequently 100 percent for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 7**). The calculated required chlorophyll-a percent concentration reductions ranged from 1 to 60 percent, TN concentration reductions ranged from 0 to 50 percent and TP concentration reductions from 43 to 60 percent to obtain compliance with NNC.

Figure 5. Location of water quality sampling sites in Lake Deeson (WBID 1449A).

Table 3. Results of NNC evaluation for Lake Deeson (WBID 1449A) over verified period for TSI impairment (January 1, 2003 to June 30, 2010).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1449A	LAKE DEESON	2003	-	-	-
1449A	LAKE DEESON	2004	-	-	-
1449A	LAKE DEESON	2005	**12.7**	**0.897**	-
1449A	LAKE DEESON	2006	**39.8**	**1.500**	-
1449A	LAKE DEESON	2007	**51.5**	**1.941**	**0.076**
1449A	LAKE DEESON	2008	-	-	-
1449A	LAKE DEESON	2009	-	-	-
1449A	LAKE DEESON	2010	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 4. Results of NNC evaluation for Lake Deeson (WBID 1449A) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1449A	LAKE DEESON	2003	-	-	-
1449A	LAKE DEESON	2004	-	-	-
1449A	LAKE DEESON	2005	12.7	0.897	-
1449A	LAKE DEESON	2006	**39.8**	**1.500**	-
1449A	LAKE DEESON	2007	**51.5**	**1.941**	**0.076**
1449A	LAKE DEESON	2008	-	-	-
1449A	LAKE DEESON	2009	-	-	-
1449A	LAKE DEESON	2010	-	-	-
1449A	LAKE DEESON	2011	**45.3**	**2.090**	**0.053**
1449A	LAKE DEESON	2012	-	**2.108**	**0.065**
1449A	LAKE DEESON	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 6. Percent of Lake Deeson Samples which Exceed Criteria from 2003-2013.

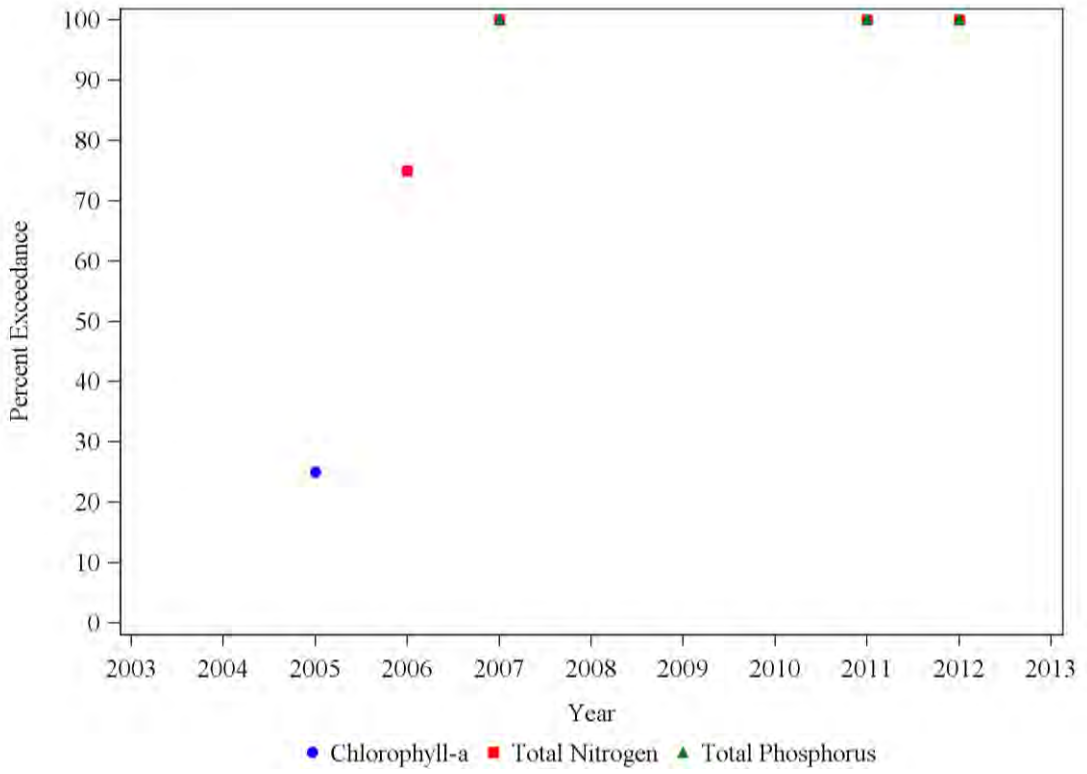
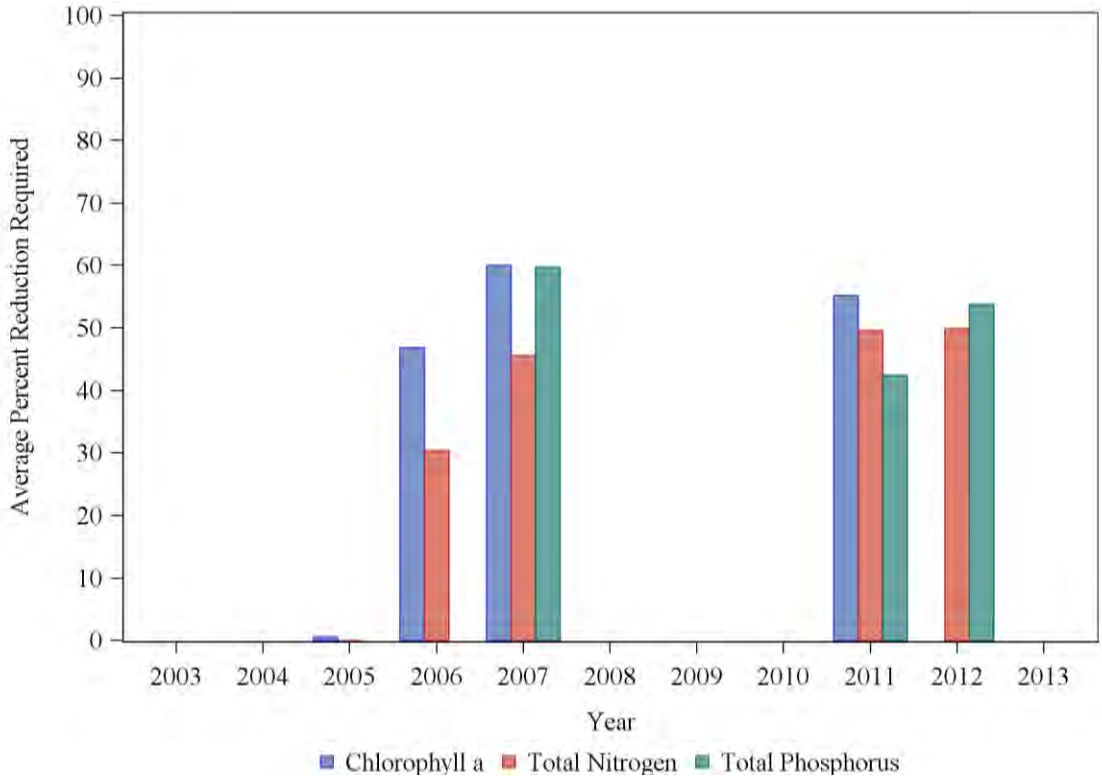


Figure 7. Lake Deeson average percent reduction required to meet the NNC from 2003-2013.



4.2. Mud Lake (WBID 1467)

Mud Lake (**Figure 8**) was declared impaired for nutrients due to elevated TSI during the January 1, 1998 to June 30, 2005 verified period as part of the Group 4, Cycle 1 review. The impairment status of Mud Lake was evaluated using NNC over the verified period used for the initial impairment. Mud Lake is considered a colored lake based on a long-term geometric mean color of 51 PCU. Based on the colored characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L The results of the analysis support the initial impairment determination and indicate that Mud Lake was impaired for elevated chlorophyll-a and TP concentrations during the verified period (**Table 5**).

In addition, Mud Lake water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Mud Lake remained characterized as a colored lake (color=47 PCU). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Mud Lake continues to be impaired for chlorophyll-a and TP with the addition of TN (**Table 6**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 9**). Percent exceedance is frequently 100 percent for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 10**). The calculated required chlorophyll-a percent concentration reductions ranged from 17 to 47 percent, TN concentration reductions ranged from 1 to 49 percent and TP concentration reductions from 5 to 53 percent to obtain compliance with NNC.

Figure 8. Location of water quality sampling sites in Mud Lake (WBID 1467).

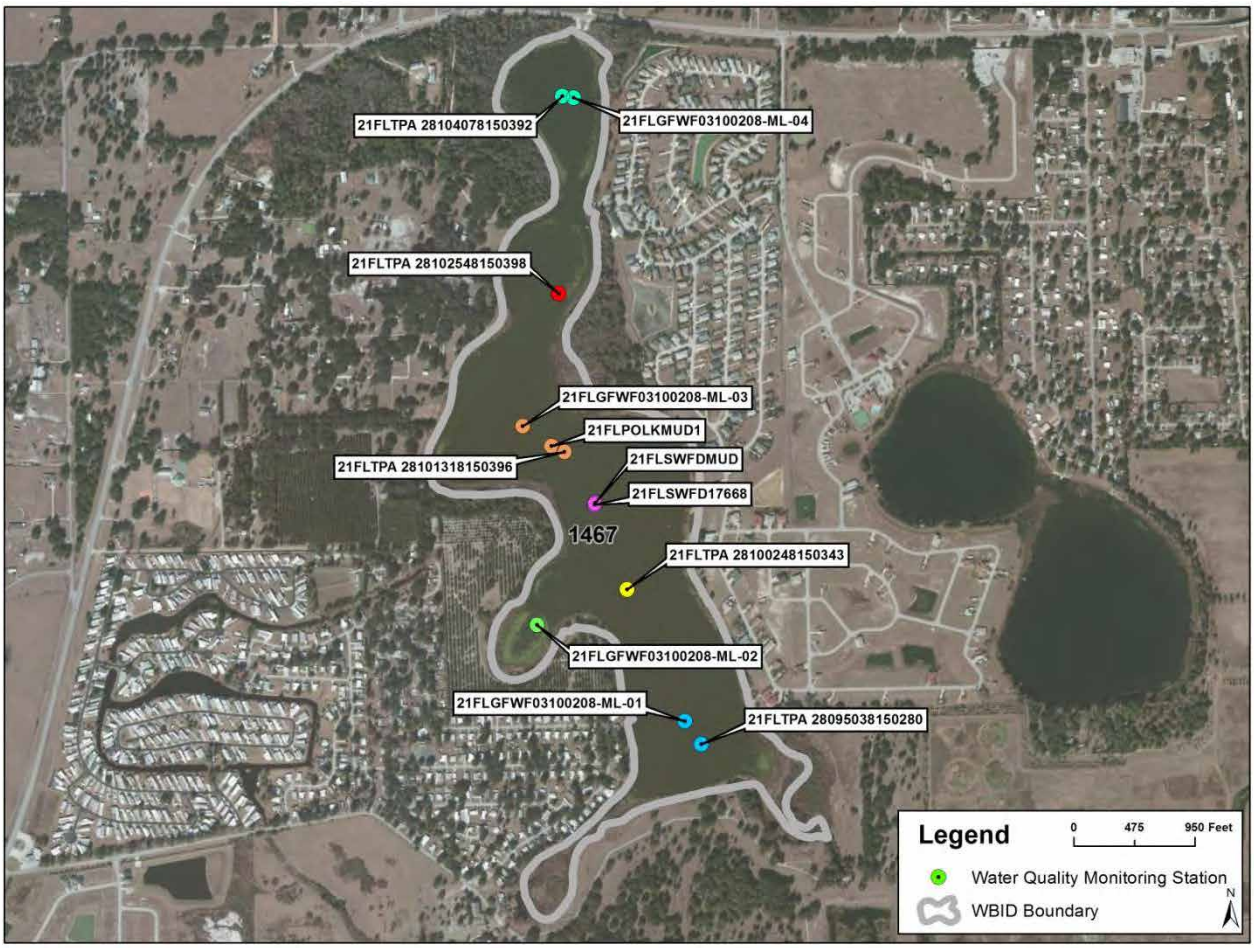


Table 5. Results of NNC evaluation for Mud Lake (WBID 1467) over verified period for TSI impairment (January 1, 1998 to June 30, 2005).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1467	MUD LAKE	1998	-	-	-
1467	MUD LAKE	1999	-	-	-
1467	MUD LAKE	2000	-	-	-
1467	MUD LAKE	2001	-	-	-
1467	MUD LAKE	2002	**39.5**	**1.463**	**0.063**
1467	MUD LAKE	2003	**21.0**	1.094	**0.058**
1467	MUD LAKE	2004	**29.5**	1.202	**0.085**
1467	MUD LAKE	2005	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 6. Results of NNC evaluation for Mud Lake (WBID 1467) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1467	MUD LAKE	2003	**21.0**	1.094	**0.058**
1467	MUD LAKE	2004	**29.5**	1.202	**0.085**
1467	MUD LAKE	2005	**25.0**	1.153	-
1467	MUD LAKE	2006	**23.7**	1.254	-
1467	MUD LAKE	2007	**43.8**	**2.116**	**0.087**
1467	MUD LAKE	2008	-	-	**0.110**
1467	MUD LAKE	2009	-	**2.539**	**0.086**
1467	MUD LAKE	2010	-	**1.680**	0.049
1467	MUD LAKE	2011	-	**2.063**	0.048
1467	MUD LAKE	2012	-	**1.666**	**0.051**
1467	MUD LAKE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 9. Percent of Mud Lake Samples which Exceed Criteria from 2003-2013.

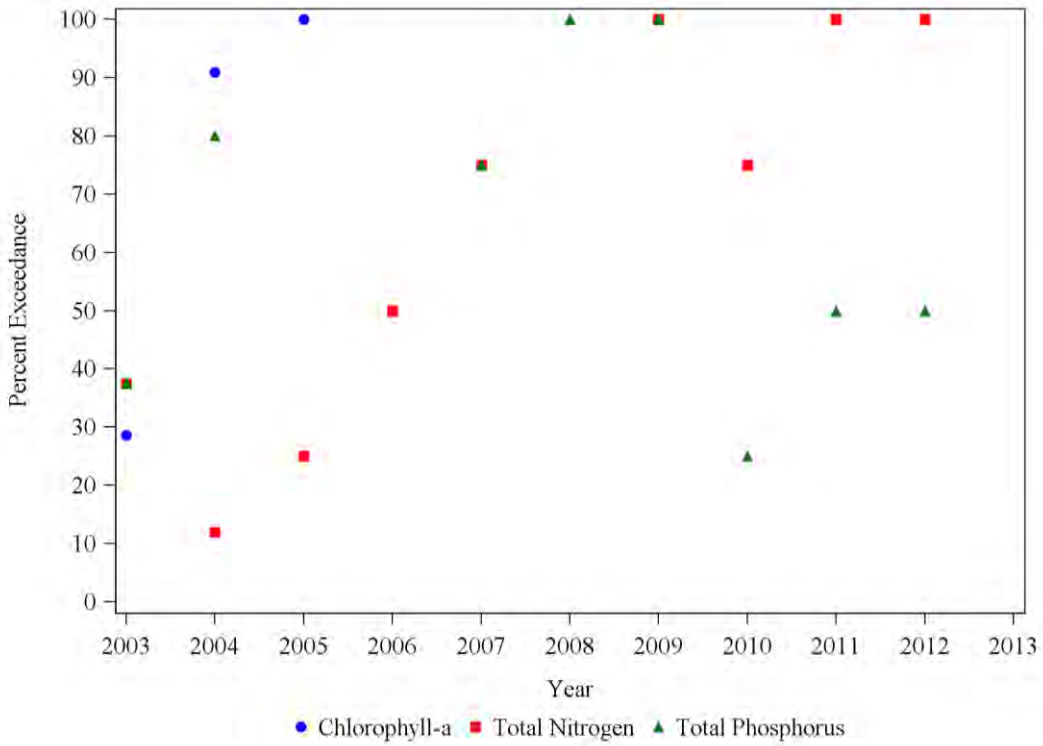
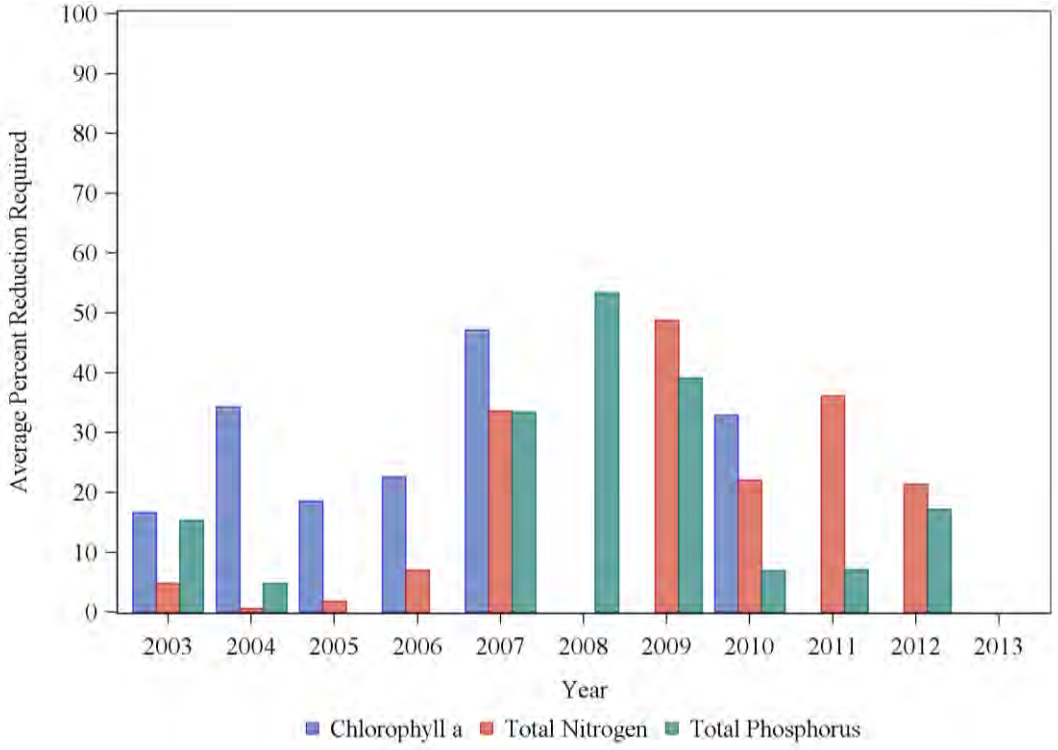


Figure 10. Mud Lake average percent concentration reduction required to meet the NNC from 2003-2013.



4.3. Lake Hatchineha (WBID 1472B)

Lake Hatchineha (**Figure 11**) was declared impaired for nutrients due to TSI trend during the January 1, 2003 to June 30, 2010 verified period as part of the Group 4, Cycle 2 review. The impairment status of Lake Hatchineha was evaluated using NNC over the verified period used for the initial impairment. Lake Hatchineha is considered a colored lake based on a long-term geometric mean color of 144 PCU. Based on the colored characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Hatchineha was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period (**Table 7**).

In addition, Lake Hatchineha water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Hatchineha remained characterized as a colored lake (color=144 PCU). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Hatchineha continues to be impaired for chlorophyll-a, TN and TP (**Table 8**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 12**). The percent exceedance ranged from approximately 20 to 80 percent for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 13**). The calculated required chlorophyll-a percent concentration reductions ranged from 4 to 29 percent, TN concentration reductions ranged from 1 to 19 percent and TP concentration reductions from 1 to 15 percent to obtain compliance with NNC.

Figure 11. Location of water quality sampling sites in Lake Hatchineha (WBID 1472B).

Table 7. Results of NNC evaluation for Lake Hatchineha (WBID 1472B) over verified period for TSI impairment (January 1, 2003 to June 30, 2010).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1472B	LAKE HATCHINEHA	2003	9.6	1.402	0.051
1472B	LAKE HATCHINEHA	2004	11.1	1.250	0.057
1472B	LAKE HATCHINEHA	2005	15.2	1.200	0.083
1472B	LAKE HATCHINEHA	2006	**23.1**	**1.298**	**0.067**
1472B	LAKE HATCHINEHA	2007	**26.7**	**1.502**	**0.056**
1472B	LAKE HATCHINEHA	2008	**27.7**	**1.744**	**0.060**
1472B	LAKE HATCHINEHA	2009	**21.3**	**1.660**	**0.060**
1472B	LAKE HATCHINEHA	2010	14.7	1.365	0.054
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 8. Results of NNC evaluation for Lake Hatchineha (WBID 1472B) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1472B	LAKE HATCHINEHA	2003	9.6	1.402	0.051
1472B	LAKE HATCHINEHA	2004	11.1	1.250	0.057
1472B	LAKE HATCHINEHA	2005	15.2	1.200	0.083
1472B	LAKE HATCHINEHA	2006	**23.1**	**1.298**	**0.067**
1472B	LAKE HATCHINEHA	2007	**26.7**	**1.502**	**0.056**
1472B	LAKE HATCHINEHA	2008	**27.7**	**1.744**	**0.060**
1472B	LAKE HATCHINEHA	2009	**21.3**	**1.660**	**0.060**
1472B	LAKE HATCHINEHA	2010	16.4	1.360	0.055
1472B	LAKE HATCHINEHA	2011	16.5	1.334	0.048
1472B	LAKE HATCHINEHA	2012	-	**1.520**	0.040
1472B	LAKE HATCHINEHA	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 12. Percent of Lake Hatchineha Samples which Exceed Criteria from 2003-2013.

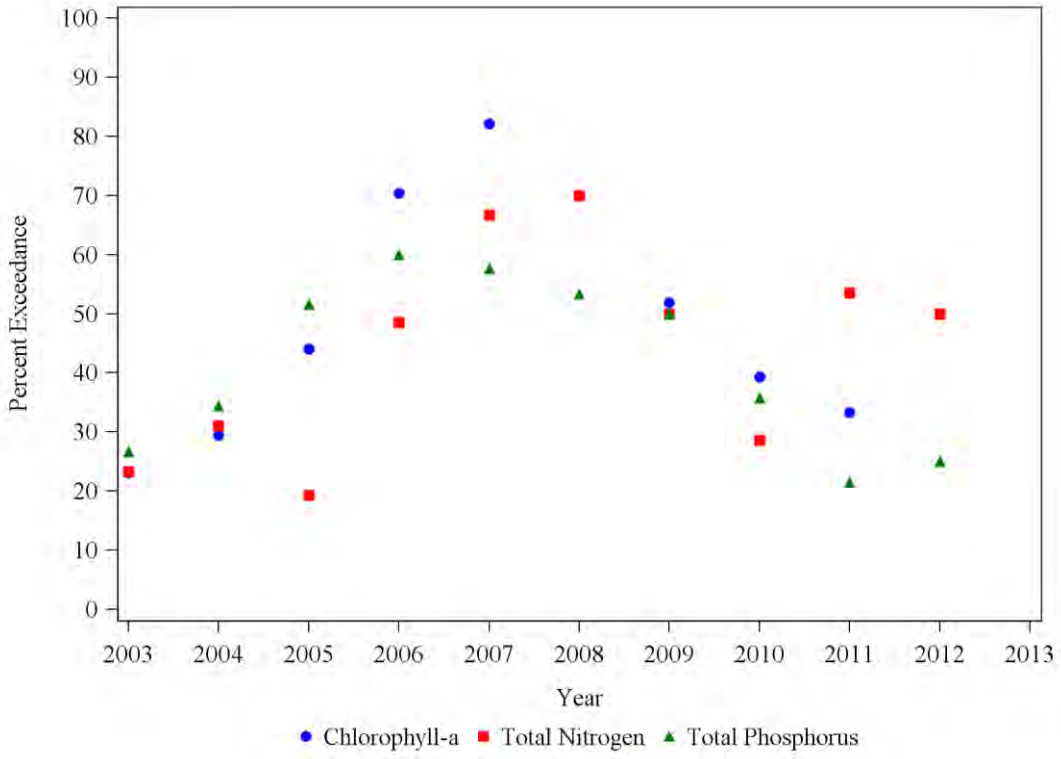
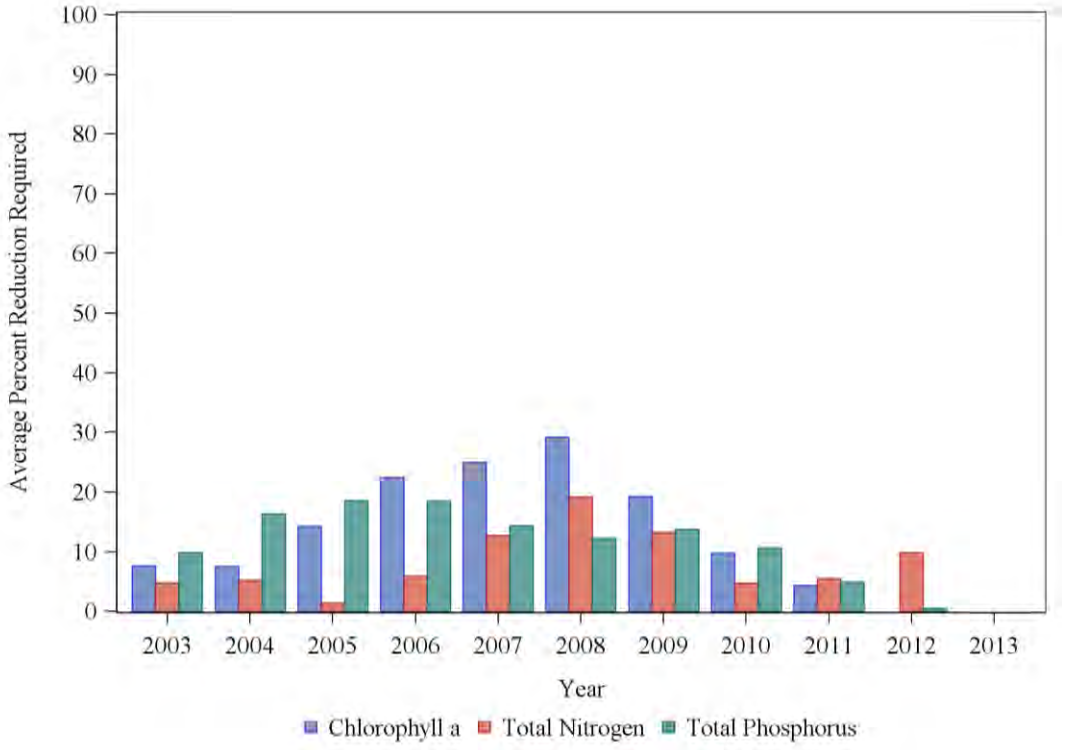


Figure 13. Lake Hatchineha average percent concentration reduction required to meet the NNC from 2003-2013.



4.4. Lake Marion (WBID 1480)

Lake Marion (**Figure 14**) was declared impaired for nutrients due to elevated TSI during the January 1, 2003 to June 30, 2010 verified period as part of the Group 4, Cycle 2 review. The impairment status of Lake Marion was evaluated using NNC over the verified period used for the initial impairment. Lake Marion is considered a colored lake based on a long-term geometric mean color of 41 PCU. Based on the colored characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Marion was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period (**Table 9**).

In addition, Lake Marion water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Marion remained characterized as a colored lake (color=41 PCU). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Marion continues to be impaired for chlorophyll-a, TN and TP (**Table 10**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 15**). The percent exceedance was frequently 100 percent for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 16**). The calculated required chlorophyll-a percent concentration reductions ranged from 38 to 71 percent, TN concentration reductions ranged from 11 to 47 percent and TP concentration reductions from 14 to 36 percent to obtain compliance with NNC.

Figure 14. Location of water quality sampling sites in Lake Marion (WBID 1480).

Table 9. Results of NNC evaluation for Lake Marion (WBID 1480) over verified period for TSI impairment (January 1, 2003 to June 30, 2010).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1480	LAKE MARION	2003	-	-	**0.058**
1480	LAKE MARION	2004	**34.0**	**1.866**	-
1480	LAKE MARION	2005	**36.1**	1.265	-
1480	LAKE MARION	2006	**49.7**	**1.965**	-
1480	LAKE MARION	2007	**43.7**	**1.888**	**0.075**
1480	LAKE MARION	2008	**72.1**	**2.443**	**0.076**
1480	LAKE MARION	2009	**51.4**	**2.283**	**0.068**
1480	LAKE MARION	2010	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 10. Results of NNC evaluation for Lake Marion (WBID 1480) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1480	LAKE MARION	2003	-	-	**0.058**
1480	LAKE MARION	2004	**34.0**	**1.866**	-
1480	LAKE MARION	2005	**36.1**	1.265	-
1480	LAKE MARION	2006	**49.7**	**1.965**	-
1480	LAKE MARION	2007	**43.7**	**1.888**	**0.075**
1480	LAKE MARION	2008	**72.1**	**2.443**	**0.076**
1480	LAKE MARION	2009	**51.4**	**2.283**	**0.068**
1480	LAKE MARION	2010	**61.5**	**2.026**	**0.063**
1480	LAKE MARION	2011	**65.9**	**2.327**	**0.080**
1480	LAKE MARION	2012	-	**2.386**	**0.079**
1480	LAKE MARION	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 15. Percent of Lake Marion Samples which Exceed Criteria from 2003-2013.

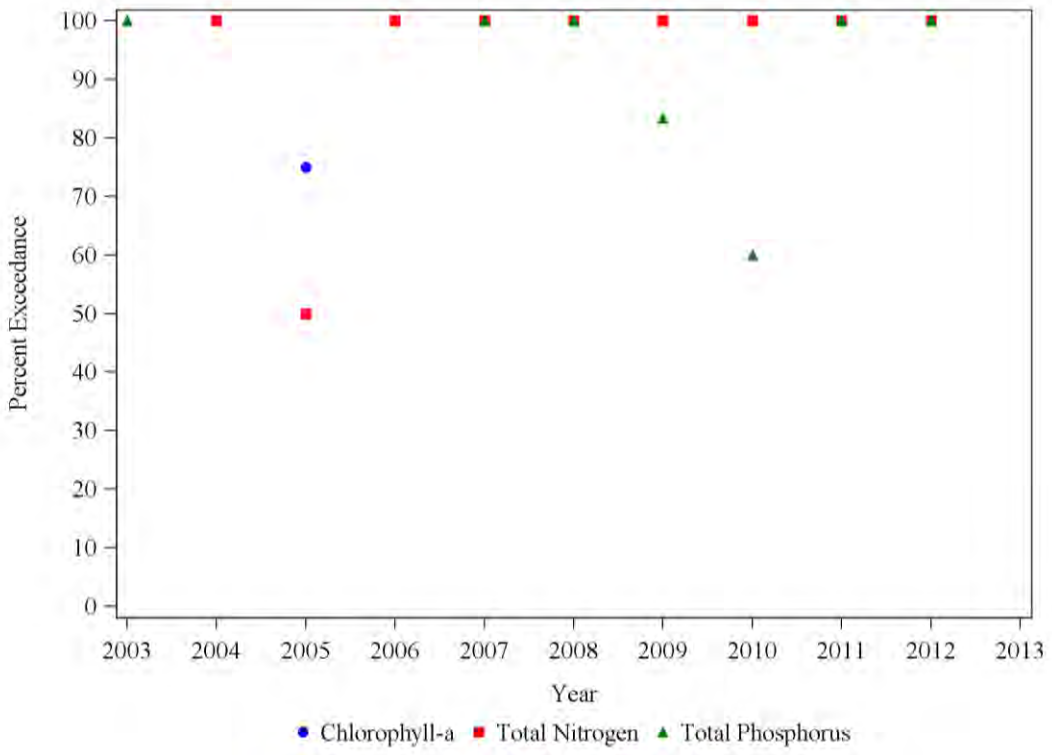
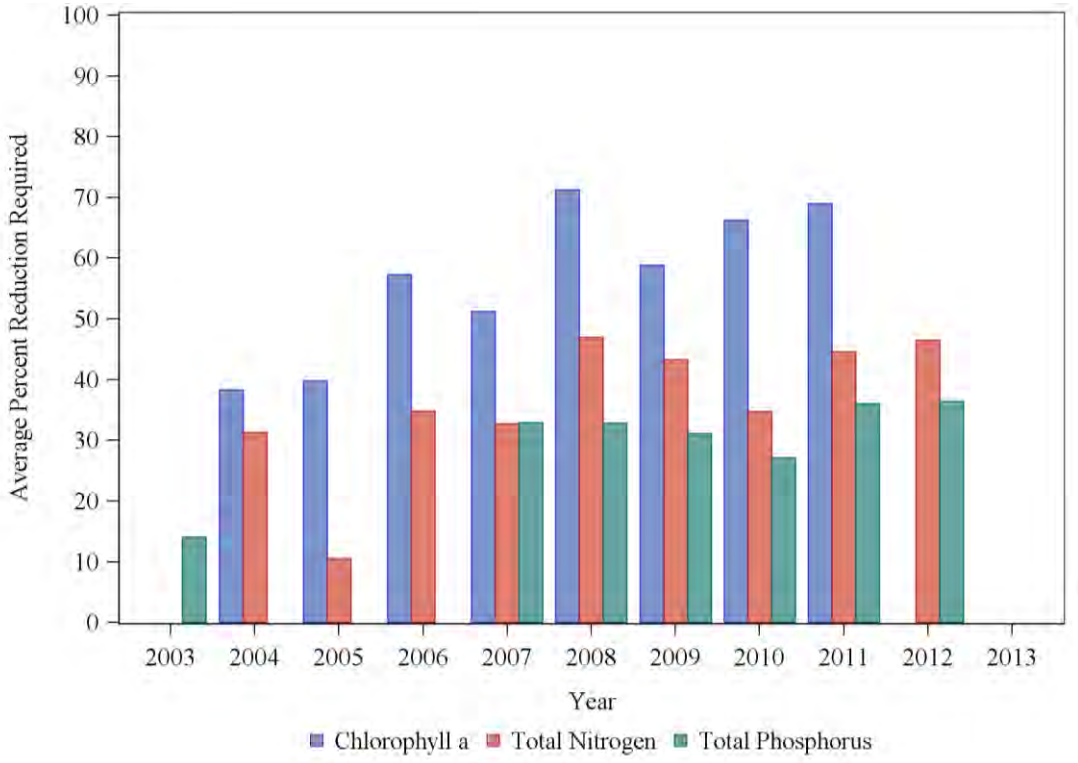


Figure 16. Lake Marion average percent concentration reduction required to meet the NNC from 2003-2013.



4.5. Lake Tennessee (WBID 1484A)

Lake Tennessee (**Figure 17**) was declared impaired for nutrients due to elevated TSI during the January 1, 2003 to June 30, 2010 verified period as part of the Group 4, Cycle 2 review. The impairment status of Lake Tennessee was evaluated using NNC over the verified period used for the initial impairment. Lake Tennessee is considered a clear, acidic lake based on a long-term geometric mean color of 9 PCU and alkalinity of 15 mg/L. Based on the clear, acidic characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 6.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Tennessee was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period (**Table 11**).

In addition, Lake Tennessee water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Tennessee remained classified as a clear, acidic lake (color=9 PCU, alkalinity=15 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 6.0 µg/L. Results of the water quality comparison using current data indicate that Lake Tennessee continues to be impaired for chlorophyll-a, TN and TP (**Table 12**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 18**). Percent exceedance was frequently 100 percent for TN from 2003 to 2007 with reduction in frequency of exceedance since 2008. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 19**). The calculated required chlorophyll-a percent concentration reductions ranged from 0 to 71 percent, TN concentration reductions ranged from 0 to 57 percent and TP concentration reductions from 0 to 67 percent to obtain compliance with NNC.

Figure 17. Location of water quality sampling sites in Lake Tennessee (WBID 1484A).

Table 11. Results of NNC evaluation for Lake Tennessee (WBID 1484A) over verified period for TSI impairment (January 1, 2003 to June 30, 2010).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1484A	LAKE TENNESSEE	2003	-	-	-
1484A	LAKE TENNESSEE	2004	-	-	-
1484A	LAKE TENNESSEE	2005	**21.5**	**1.072**	-
1484A	LAKE TENNESSEE	2006	**17.6**	**0.816**	-
1484A	LAKE TENNESSEE	2007	**21.3**	**1.236**	**0.026**
1484A	LAKE TENNESSEE	2008	**8.6**	-	**0.026**
1484A	LAKE TENNESSEE	2009	-	**0.551**	**0.020**
1484A	LAKE TENNESSEE	2010	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 12. Results of NNC evaluation for Lake Tennessee (WBID 1449A) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1484A	LAKE TENNESSEE	2003	-	-	-
1484A	LAKE TENNESSEE	2004	-	-	-
1484A	LAKE TENNESSEE	2005	**21.5**	**1.072**	-
1484A	LAKE TENNESSEE	2006	**17.6**	**0.816**	-
1484A	LAKE TENNESSEE	2007	**21.3**	**1.236**	**0.026**
1484A	LAKE TENNESSEE	2008	**8.6**	-	**0.026**
1484A	LAKE TENNESSEE	2009	-	**0.551**	**0.020**
1484A	LAKE TENNESSEE	2010	4.8	0.624	0.019
1484A	LAKE TENNESSEE	2011	4.5	0.704	0.019
1484A	LAKE TENNESSEE	2012	3.3	0.566	0.020
1484A	LAKE TENNESSEE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 18. Percent of Lake Tennessee Samples which Exceed Criteria from 2003-2013.

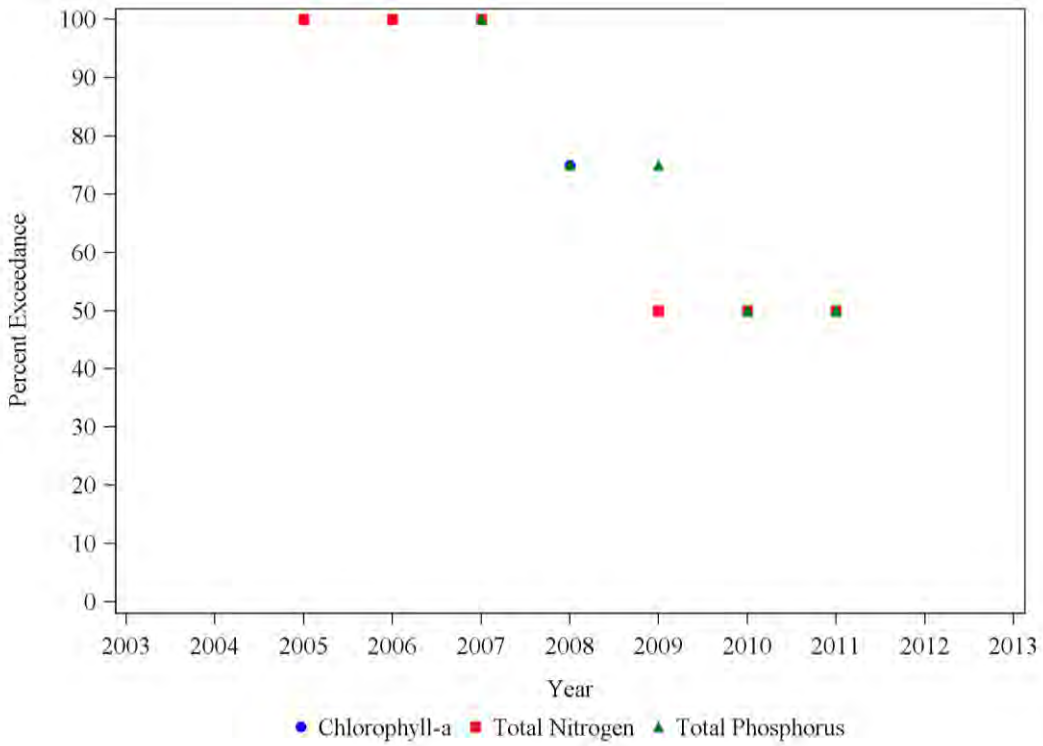
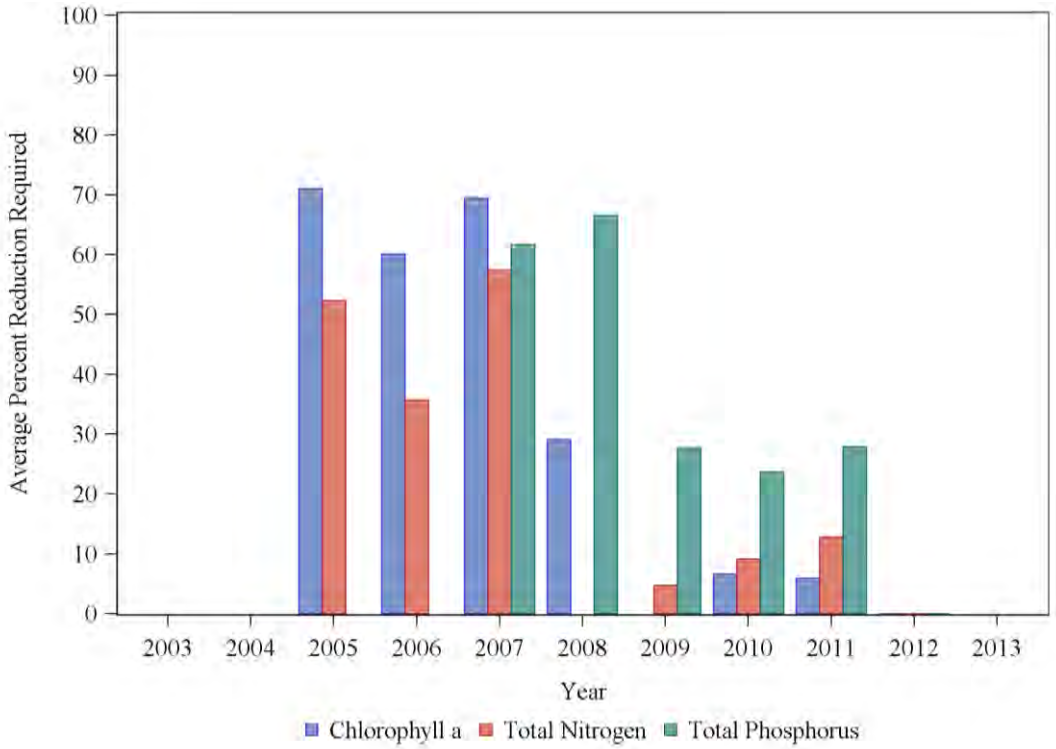


Figure 19. Lake Tennessee average percent reduction required to meet the NNC from 2003-2013.



4.6. Lake Juliana (WBID 1484B)

Lake Juliana (**Figure 20**) was declared impaired for nutrients due to elevated TSI during the January 1, 2003 to June 30, 2010 verified period as part of the Group 4, Cycle 2 review. The impairment status of Lake Juliana was evaluated using NNC over the verified period used for the initial impairment. Lake Juliana is considered a clear, alkaline lake based on a long-term geometric mean color of 13 PCU and alkalinity of 24 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Juliana was impaired for elevated chlorophyll-a concentrations during the verified period (**Table 13**).

In addition, Lake Juliana water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Juliana remained classified as a clear, alkaline lake (color=13 PCU, alkalinity=31 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Juliana continues to be impaired for chlorophyll-a with the addition of TN and TP (**Table 14**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 21**). Percent exceedance was variable for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 22**). The calculated required chlorophyll-a percent concentration reductions ranged from 5 to 53 percent, TN concentration reductions ranged from 1 to 38 percent and TP concentration reductions ranged from 0 to 31 percent to obtain compliance with NNC.

Figure 20. Location of water quality sampling sites in Lake Juliana (WBID 1484B).

Table 13. Results of NNC evaluation for Lake Juliana (WBID 1484B) over verified period for TSI impairment (January 1, 2003 to June 30, 2010).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1484B	LAKE JULIANA	2003	**40.2**	**1.433**	0.026
1484B	LAKE JULIANA	2004	-	-	-
1484B	LAKE JULIANA	2005	12.2	0.838	-
1484B	LAKE JULIANA	2006	**21.5**	0.821	-
1484B	LAKE JULIANA	2007	19.5	0.908	0.022
1484B	LAKE JULIANA	2008	**28.1**	-	0.029
1484B	LAKE JULIANA	2009	-	**1.326**	0.026
1484B	LAKE JULIANA	2010	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 14. Results of NNC evaluation for Lake Juliana (WBID 1449B) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1484B	LAKE JULIANA	2003	**40.2**	**1.433**	0.026
1484B	LAKE JULIANA	2004	-	-	-
1484B	LAKE JULIANA	2005	12.2	0.838	-
1484B	LAKE JULIANA	2006	**21.5**	0.821	-
1484B	LAKE JULIANA	2007	19.5	0.908	0.022
1484B	LAKE JULIANA	2008	**28.1**	-	0.029
1484B	LAKE JULIANA	2009	-	**1.326**	0.026
1484B	LAKE JULIANA	2010	**26.2**	**1.355**	**0.031**
1484B	LAKE JULIANA	2011	**43.3**	**1.722**	**0.031**
1484B	LAKE JULIANA	2012	16.4	1.005	0.026
1484B	LAKE JULIANA	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 21. Percent of Lake Juliana Samples which Exceed Criteria from 2003-2013.

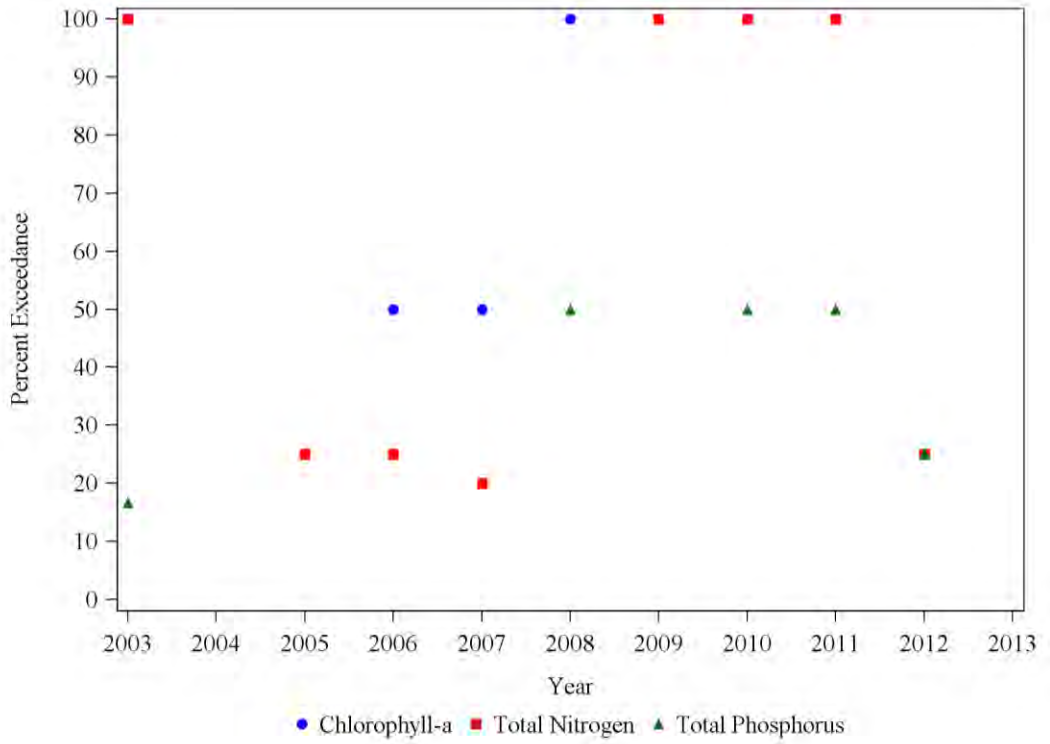
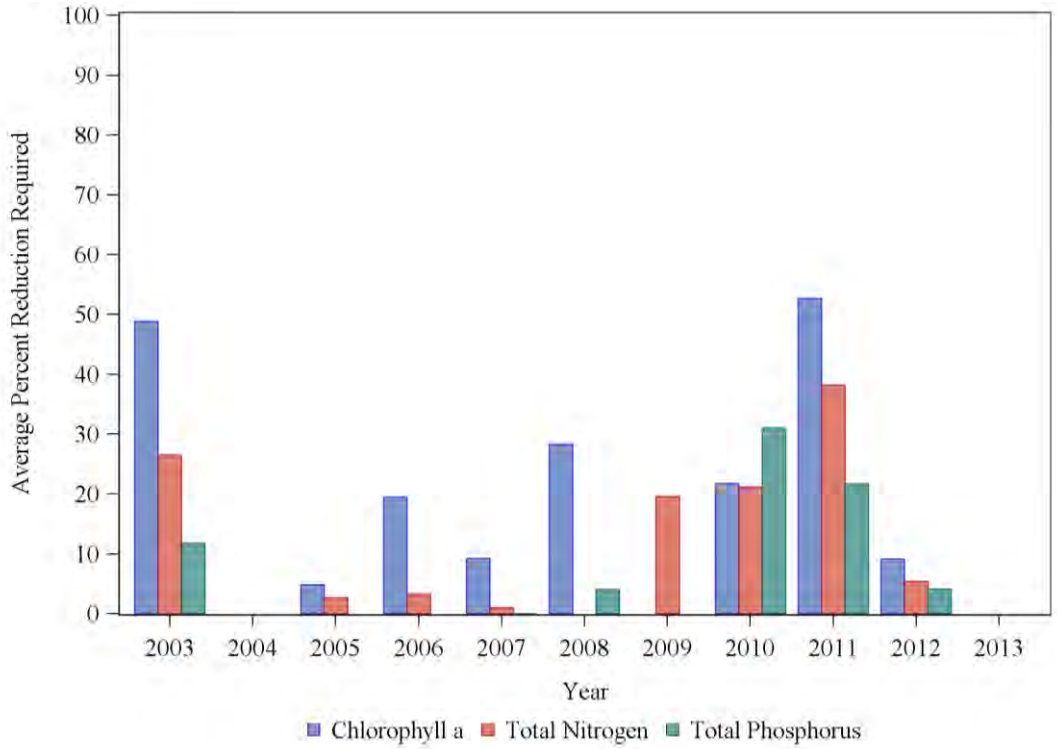


Figure 22. Lake Juliana average percent reduction required to meet the NNC from 2003-2013.



4.7. Lake Smart (WBID 1488A)

Lake Smart (**Figure 23**) was declared impaired for nutrients due to elevated TSI during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Lake Smart. The impairment status of Lake Smart was evaluated using NNC over the verified period used for the initial impairment. Lake Smart is considered a clear, alkaline lake based on a long-term geometric mean color of 27 PCU and alkalinity of 67 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Smart was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period (**Table 15**).

In addition, Lake Smart water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Smart remained classified as a clear, alkaline lake (color=27 PCU, alkalinity=67 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Smart continues to be impaired but only for TN (**Table 16**). There were insufficient chlorophyll-a or TP data to determine impairment status over the period of 2003-2013. The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 24**). The percent exceedance was variable for all parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 25**). The calculated required TN concentration reductions ranged from 8 to 57 percent to obtain compliance with NNC.

Figure 23. Location of water quality sampling sites in Lake Smart (WBID 1488A).

Table 15. Results of NNC evaluation for Lake Smart (WBID 1488A) over verified period for TSI impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488A	LAKE SMART	1997	-	**1.237**	**0.080**
1488A	LAKE SMART	1998	-	**1.595**	**0.088**
1488A	LAKE SMART	1999	**26.8**	**1.295**	**0.039**
1488A	LAKE SMART	2000	**23.0**	**1.470**	**0.036**
1488A	LAKE SMART	2001	-	-	-
1488A	LAKE SMART	2002	-	-	-
1488A	LAKE SMART	2003	-	**1.624**	-
1488A	LAKE SMART	2004	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 16. Results of NNC evaluation for Lake Smart (WBID 1488A) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488A	LAKE SMART	2003	-	**1.624**	-
1488A	LAKE SMART	2004	-	**1.434**	-
1488A	LAKE SMART	2005	**22.4**	**1.229**	**0.063**
1488A	LAKE SMART	2006	-	-	-
1488A	LAKE SMART	2007	-	-	-
1488A	LAKE SMART	2008	-	-	-
1488A	LAKE SMART	2009	-	-	-
1488A	LAKE SMART	2010	-	-	-
1488A	LAKE SMART	2011	**51.5**	**2.473**	**0.043**
1488A	LAKE SMART	2012	-	-	-
1488A	LAKE SMART	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 24. Percent of Lake Smart Samples which Exceed Criteria from 2003-2013.

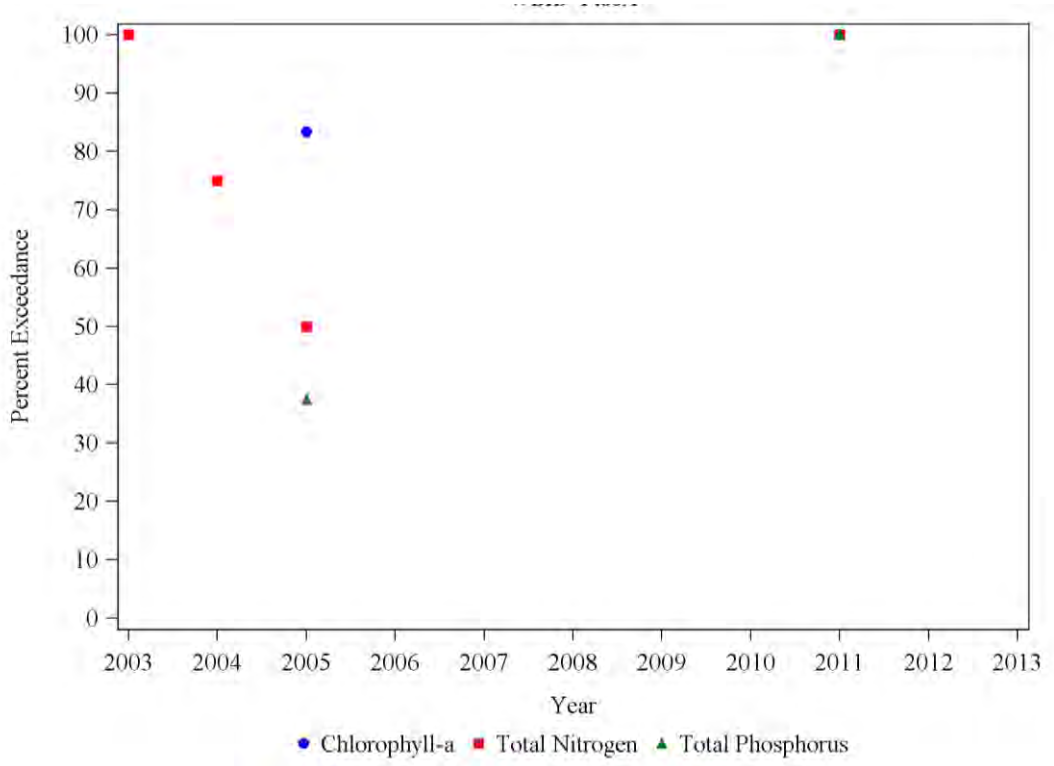
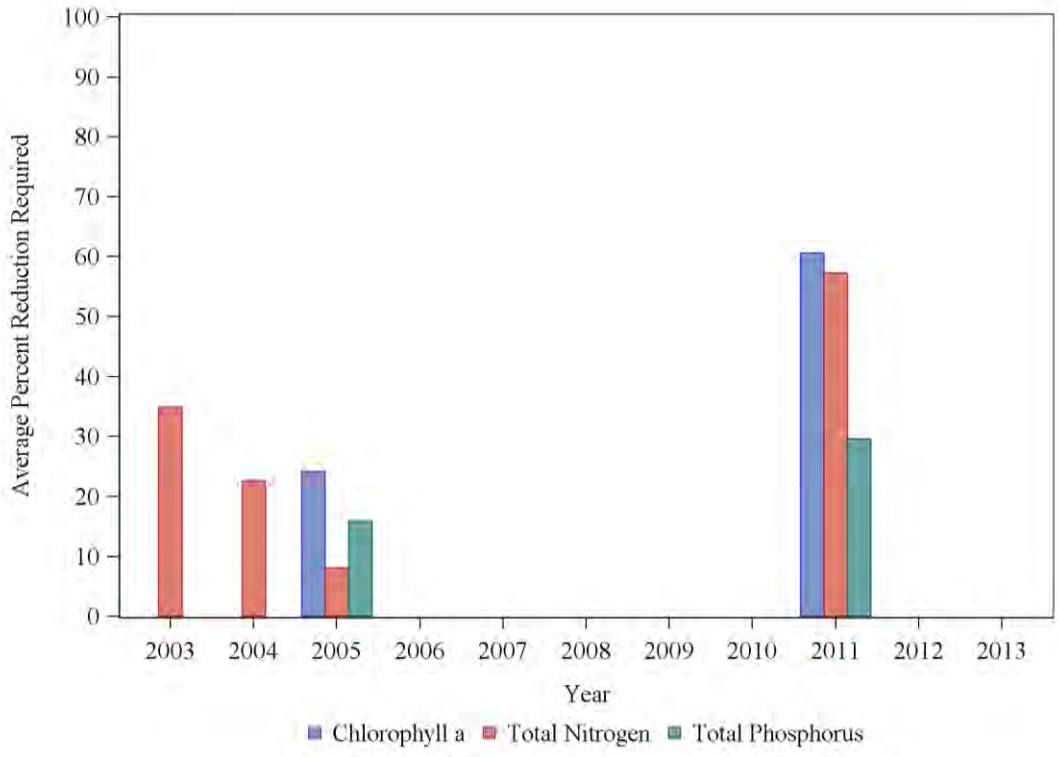


Figure 25. Lake Smart average percent reduction required to meet the NNC from 2003-2013.



4.8. Lake Rochelle (WBID 1488B)

Lake Rochelle (**Figure 26**) was declared impaired for nutrients due to elevated TSI during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. The impairment status of Lake Rochelle was evaluated using NNC over the verified period used for the initial impairment. Lake Rochelle is considered a clear, alkaline lake based on a long-term geometric mean color of 40 PCU and alkalinity of 62 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Rochelle was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period (**Table 17**).

In addition, Lake Rochelle water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Rochelle remained classified as a clear, alkaline lake (color=31 PCU, alkalinity=70 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Rochelle continues to be impaired chlorophyll-a, TN and TP (**Table 18**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 27**). The percent exceedance was frequently greater than 70 percent for TN and TP. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 28**). The calculated required chlorophyll-a percent concentration reductions ranged from 13 to 33 percent, TN concentration reductions ranged from 4 to 31 percent and TP concentration reductions from 9 to 38 percent to obtain compliance with NNC.

Figure 26. Location of water quality sampling sites in Lake Rochelle (WBID 1488B).

Table 17. Results of NNC evaluation for Lake Rochelle (WBID 1488B) over verified period for TSI impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488B	LAKE ROCHELLE	1997	-	0.827	**0.051**
1488B	LAKE ROCHELLE	1998	-	**1.262**	**0.059**
1488B	LAKE ROCHELLE	1999	**21.4**	**1.067**	**0.056**
1488B	LAKE ROCHELLE	2000	**24.2**	1.047	**0.041**
1488B	LAKE ROCHELLE	2001	-	-	-
1488B	LAKE ROCHELLE	2002	**29.5**	**1.413**	**0.051**
1488B	LAKE ROCHELLE	2003	-	**1.373**	-
1488B	LAKE ROCHELLE	2004	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 18. Results of NNC evaluation for Lake Rochelle (WBID 1488B) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488B	LAKE ROCHELLE	2003	-	**1.373**	-
1488B	LAKE ROCHELLE	2004	-	-	-
1488B	LAKE ROCHELLE	2005	**30.2**	**1.323**	-
1488B	LAKE ROCHELLE	2006	**20.9**	**1.085**	-
1488B	LAKE ROCHELLE	2007	**27.0**	**1.195**	**0.043**
1488B	LAKE ROCHELLE	2008	-	**1.250**	**0.043**
1488B	LAKE ROCHELLE	2009	-	**1.536**	**0.033**
1488B	LAKE ROCHELLE	2010	**29.1**	**1.367**	-
1488B	LAKE ROCHELLE	2011	19.7	1.209	0.034
1488B	LAKE ROCHELLE	2012	**29.6**	**1.391**	**0.033**
1488B	LAKE ROCHELLE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 27. Percent of Lake Rochelle Samples which Exceed Criteria from 2003-2013.

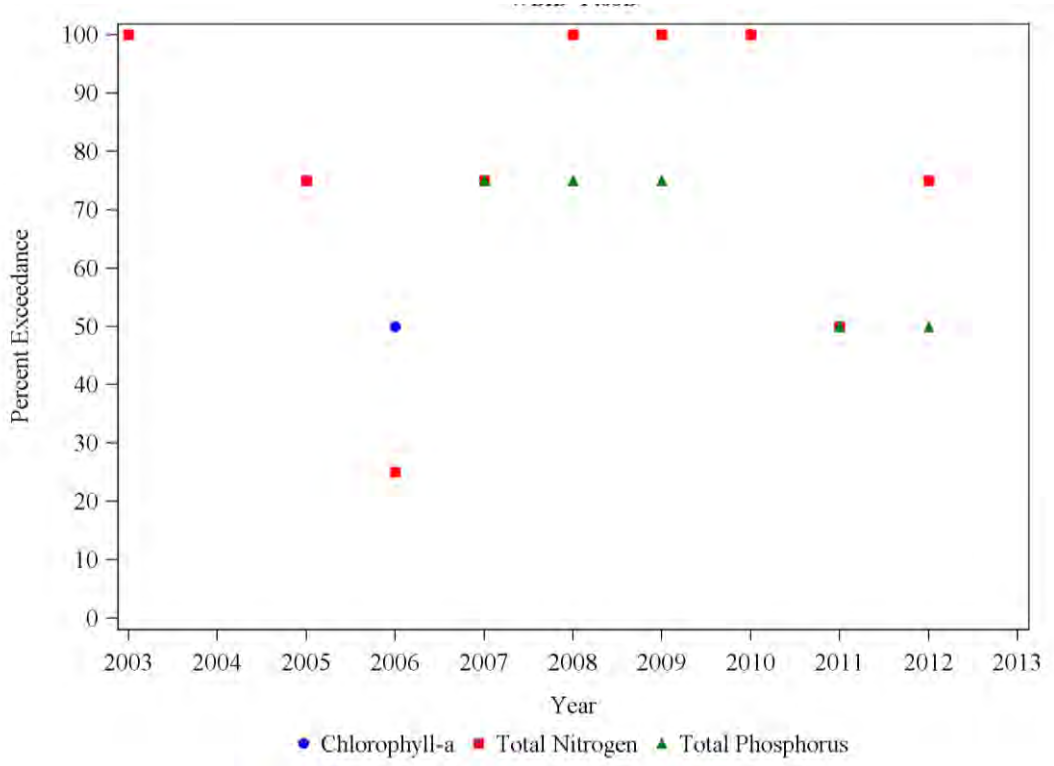
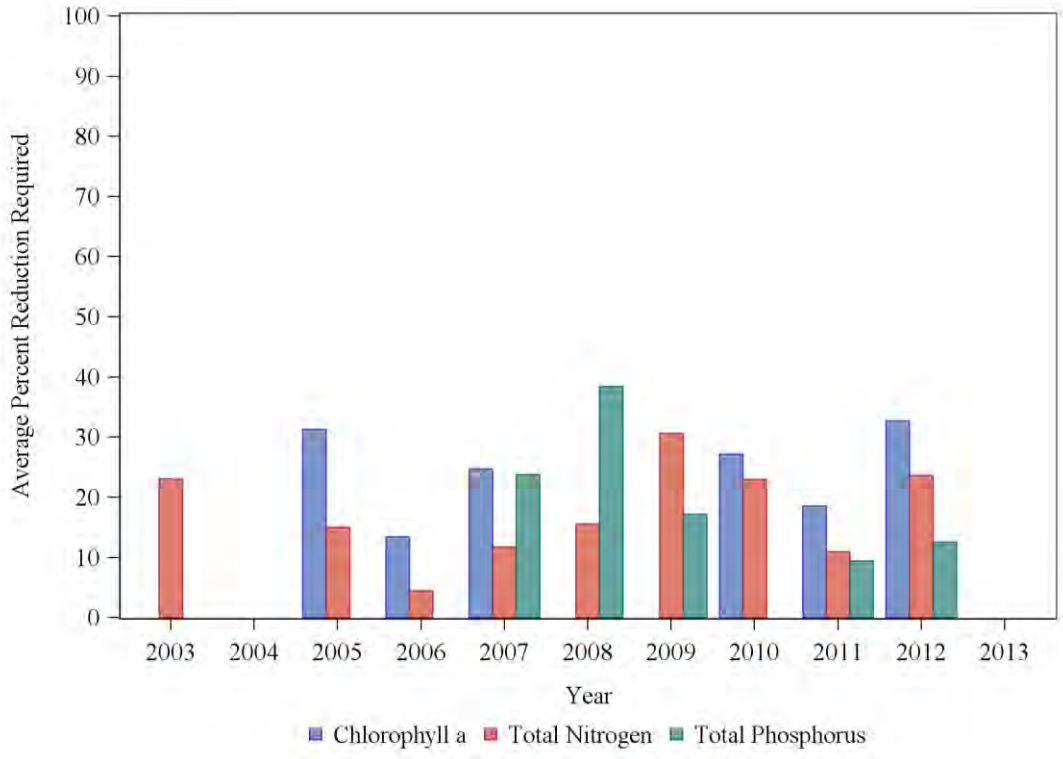


Figure 28. Lake Rochelle average percent reduction required to meet the NNC from 2003-2013.



4.9. Lake Haines (WBID 1488C)

Lake Haines (**Figure 29**) was declared impaired for nutrients due to elevated TSI during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Lake Haines. In Lake Haines, sampling station 21FLPOLKLOWERY/HAINES2 was removed from the analysis due to the location of the sampling station which was located at in a culvert under a roadway.

The impairment status of Lake Haines was evaluated using NNC over the verified period used for the initial impairment. Lake Haines is considered a colored lake based on a long-term geometric mean color of 52 PCU. Based on the colored characterization, nutrient criteria were determined based on chlorophyll-a concentration of 20.0 µg/L. Additionally, Lake Haines is located in the West Central nutrient threshold region. Therefore, if chlorophyll-concentrations remain below 20.0 µg/L, the TP concentration criteria default to 0.49 mg/L. The results of the analysis support the initial impairment determination and indicate that Lake Haines was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period (**Table 19**).

In addition, Lake Haines water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Haines remained classified as a colored lake (color=50 PCU). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Haines continues to be impaired chlorophyll-a and TN but not TP (**Table 20**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 30**). The percent exceedance was frequently greater than 70 percent for chlorophyll-a and TN. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 31**). The calculated required chlorophyll-a percent concentration reductions ranged from 22 to 47 percent and TN concentration reductions ranged from 2 to 18 percent.

Figure 29. Location of water quality sampling sites in Lake Haines (WBID 1488C).

Table 19. Results of NNC evaluation for Lake Haines (WBID 1488C) over verified period for TSI impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488C	LAKE HAINES	1997	-	**1.346**	**0.084**
1488C	LAKE HAINES	1998	-	**1.328**	**0.086**
1488C	LAKE HAINES	1999	**41.4**	**1.393**	**0.070**
1488C	LAKE HAINES	2000	**30.6**	1.252	0.050
1488C	LAKE HAINES	2001	**21.5**	**1.366**	0.041
1488C	LAKE HAINES	2002	**36.3**	**1.561**	**0.053**
1488C	LAKE HAINES	2003	**40.3**	**1.562**	**0.066**
1488C	LAKE HAINES	2004	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 20. Results of NNC evaluation for Lake Haines (WBID 1488C) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488C	LAKE HAINES	2003	**40.3**	**1.562**	**0.066**
1488C	LAKE HAINES	2004	-	-	-
1488C	LAKE HAINES	2005	**34.9**	**1.464**	-
1488C	LAKE HAINES	2006	-	**1.458**	-
1488C	LAKE HAINES	2007	**28.3**	**1.290**	-
1488C	LAKE HAINES	2008	-	**1.364**	0.038
1488C	LAKE HAINES	2009	-	**1.399**	0.038
1488C	LAKE HAINES	2010	**22.6**	**1.355**	0.038
1488C	LAKE HAINES	2011	**20.0**	**1.290**	0.035
1488C	LAKE HAINES	2012	**35.2**	**1.509**	0.039
1488C	LAKE HAINES	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 30. Percent of Lake Haines Samples which Exceed Criteria from 2003-2013.

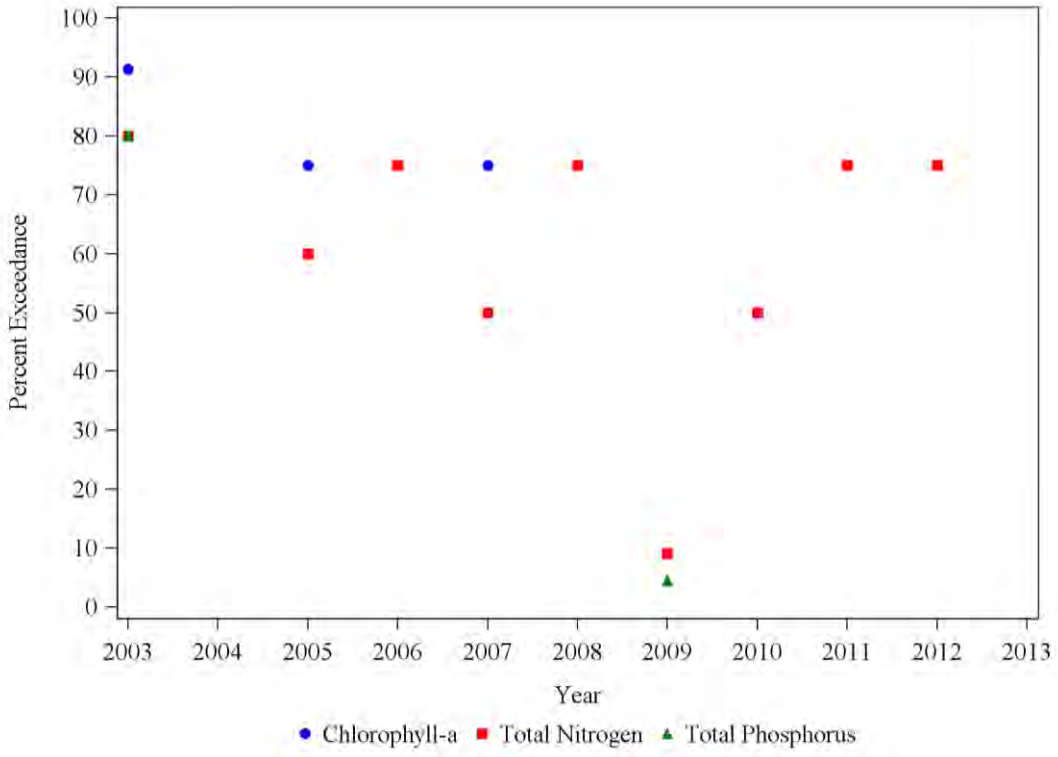
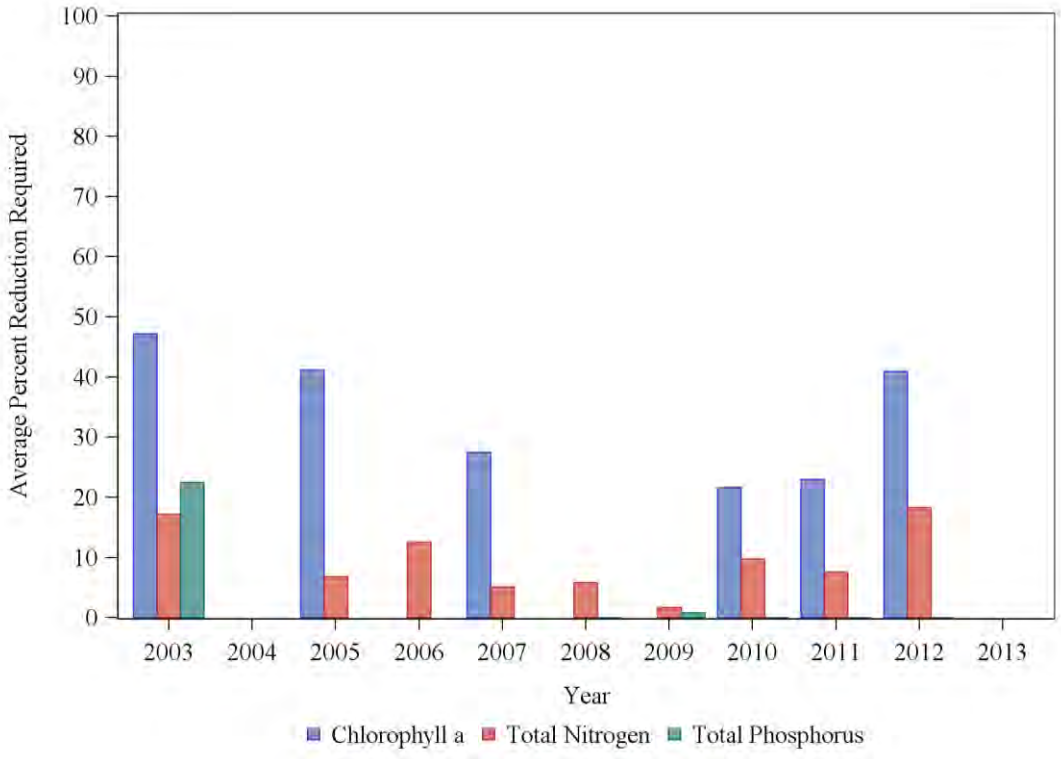


Figure 31. Lake Haines average percent reduction required to meet the NNC from 2003-2013.



4.10. Lake Alfred (WBID 1488D)

Lake Alfred (**Figure 32**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Alfred was evaluated using NNC over the verified period used for the initial impairment. Lake Alfred is considered a clear, alkaline lake based on a long-term geometric mean color of 23 PCU and alkalinity of 49 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Alfred was impaired for elevated TN and TP concentrations during the verified period (**Table 21**). There were insufficient chlorophyll-a data to determine impairment status over the initial verified period.

In addition, Lake Alfred water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Alfred remained classified as a clear, alkaline lake (color=23 PCU, alkalinity=53 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Alfred continues to be impaired TN and TP (**Table 22**). There were insufficient chlorophyll-a data to determine impairment status over the 2003 to 2013 period. The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 33**). The percent exceedance was frequently greater than 70 for TN. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 34**). The calculated required TN concentration reductions ranged from 8 to 47 percent and TP concentration reductions ranged from 5 to 14 percent to obtain compliance with NNC.

Figure 32. Location of water quality sampling sites in Lake Alfred (WBID 1488D).

Table 21. Results of NNC evaluation for Lake Alfred (WBID 1488D) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488D	LAKE ALFRED	2002	-	-	-
1488D	LAKE ALFRED	2003	-	-	-
1488D	LAKE ALFRED	2004	-	-	-
1488D	LAKE ALFRED	2005	-	**1.339**	-
1488D	LAKE ALFRED	2006	10.2	1.363	-
1488D	LAKE ALFRED	2007	-	**1.875**	**0.031**
1488D	LAKE ALFRED	2008	-	**1.565**	**0.033**
1488D	LAKE ALFRED	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 22. Results of NNC evaluation for Lake Alfred (WBID 1488D) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488D	LAKE ALFRED	2003	-	-	-
1488D	LAKE ALFRED	2004	-	-	-
1488D	LAKE ALFRED	2005	-	**1.339**	-
1488D	LAKE ALFRED	2006	10.2	1.363	-
1488D	LAKE ALFRED	2007	-	**1.875**	**0.031**
1488D	LAKE ALFRED	2008	-	**1.565**	**0.033**
1488D	LAKE ALFRED	2009	-	-	-
1488D	LAKE ALFRED	2010	13.0	1.818	0.032
1488D	LAKE ALFRED	2011	-	-	-
1488D	LAKE ALFRED	2012	-	**1.977**	0.028
1488D	LAKE ALFRED	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 33. Percent of Lake Alfred Samples which Exceed Criteria from 2003-2013.

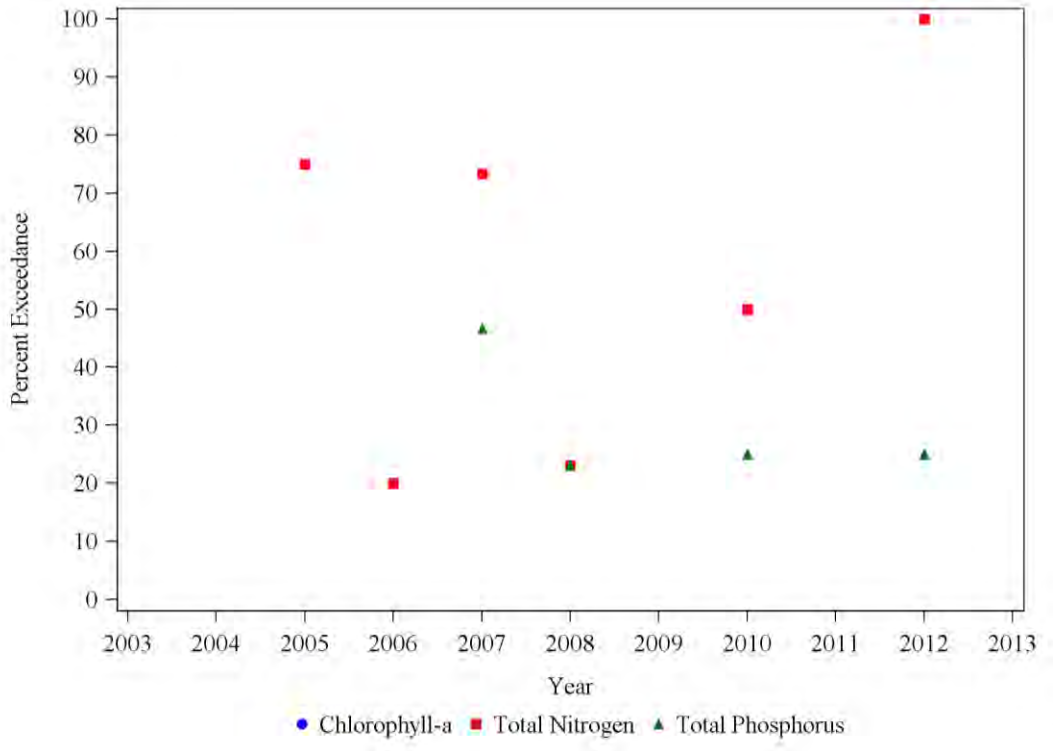
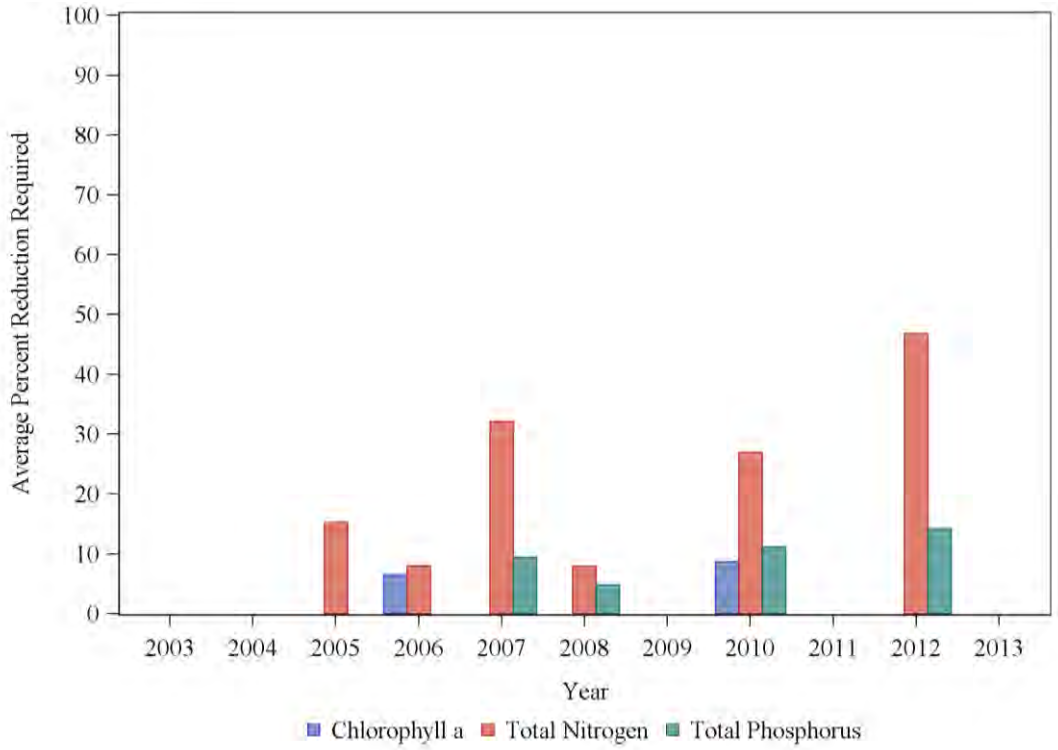


Figure 34. Lake Alfred average percent reduction required to meet the NNC from 2003-2013.



4.11. Lake Silver (WBID 1488G)

Lake Silver (**Figure 35**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Silver was evaluated using NNC over the verified period used for the initial impairment. Lake Silver is considered a clear, alkaline lake based on a long-term geometric mean color of 7 PCU and alkalinity of 83 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis were not consistent with the initial impairment determination and indicate that Lake Silver was not found to be impaired for TN and TP during the verified period using the NNC (**Table 23**). There were insufficient chlorophyll-a data to determine impairment status over the initial verified period.

In addition, Lake Silver water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Silver remained classified as a clear, alkaline lake (color=7 PCU, alkalinity=78 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Silver is unimpaired for all three parameters (**Table 24**).

Figure 35. Location of water quality sampling sites in Lake Silver (WBID 1488G).

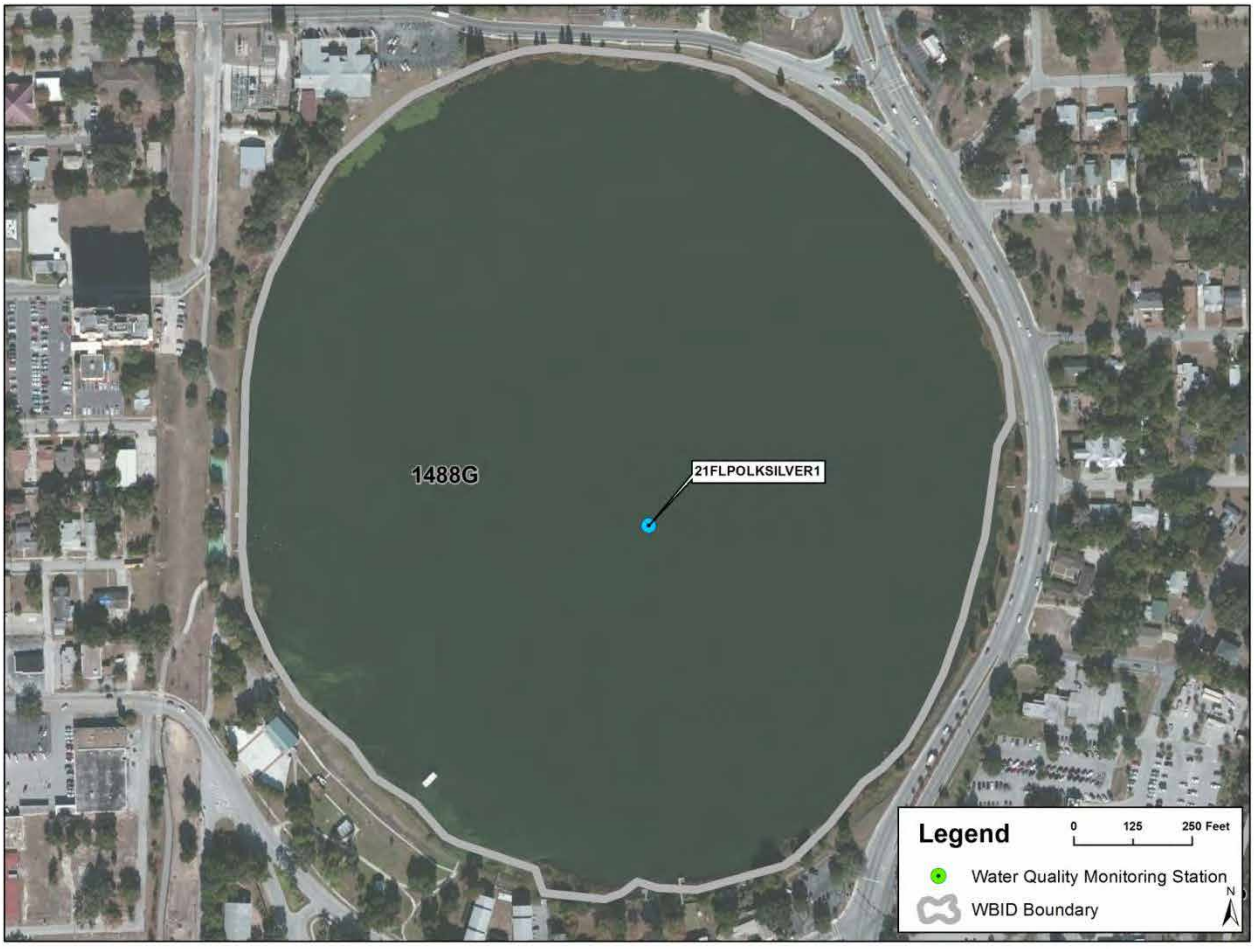


Table 23. Results of NNC evaluation for Lake Silver (WBID 1488G) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488G	LAKE SILVER	2002		-	-
1488G	LAKE SILVER	2003	-	-	-
1488G	LAKE SILVER	2004	-	-	-
1488G	LAKE SILVER	2005	-	-	-
1488G	LAKE SILVER	2006	-	0.718	-
1488G	LAKE SILVER	2007	7.1	0.713	0.021
1488G	LAKE SILVER	2008	-	0.604	0.019
1488G	LAKE SILVER	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 24. Results of NNC evaluation for Lake Silver (WBID 1488G) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488G	LAKE SILVER	2003	-	-	-
1488G	LAKE SILVER	2004	-	-	-
1488G	LAKE SILVER	2005	-	-	-
1488G	LAKE SILVER	2006	-	0.718	-
1488G	LAKE SILVER	2007	7.1	0.713	0.021
1488G	LAKE SILVER	2008	-	0.604	0.019
1488G	LAKE SILVER	2009	-	0.763	0.020
1488G	LAKE SILVER	2010	12.1	0.898	0.022
1488G	LAKE SILVER	2011	8.8	0.733	0.022
1488G	LAKE SILVER	2012	-	0.690	0.020
1488G	LAKE SILVER	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

4.12. Lake Martha (WBID 1488P)

Lake Martha (**Figure 36**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Martha was evaluated using NNC over the verified period used for the initial impairment. Lake Martha is considered a clear, alkaline lake based on a long-term geometric mean color of 9 PCU and alkalinity of 63 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis were not consistent with the initial impairment determination and indicate that Lake Martha was not found to be impaired for chlorophyll-a and total nitrogen during the verified period using the NNC (**Table 25**). There were insufficient TP data to determine impairment status over the initial verified period.

In addition, Lake Martha water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Martha remained classified as a clear, alkaline lake (color=9 PCU, alkalinity=71 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Martha was unimpaired (**Table 26**).

Figure 36. Location of water quality sampling sites in Lake Martha (WBID 1488P).

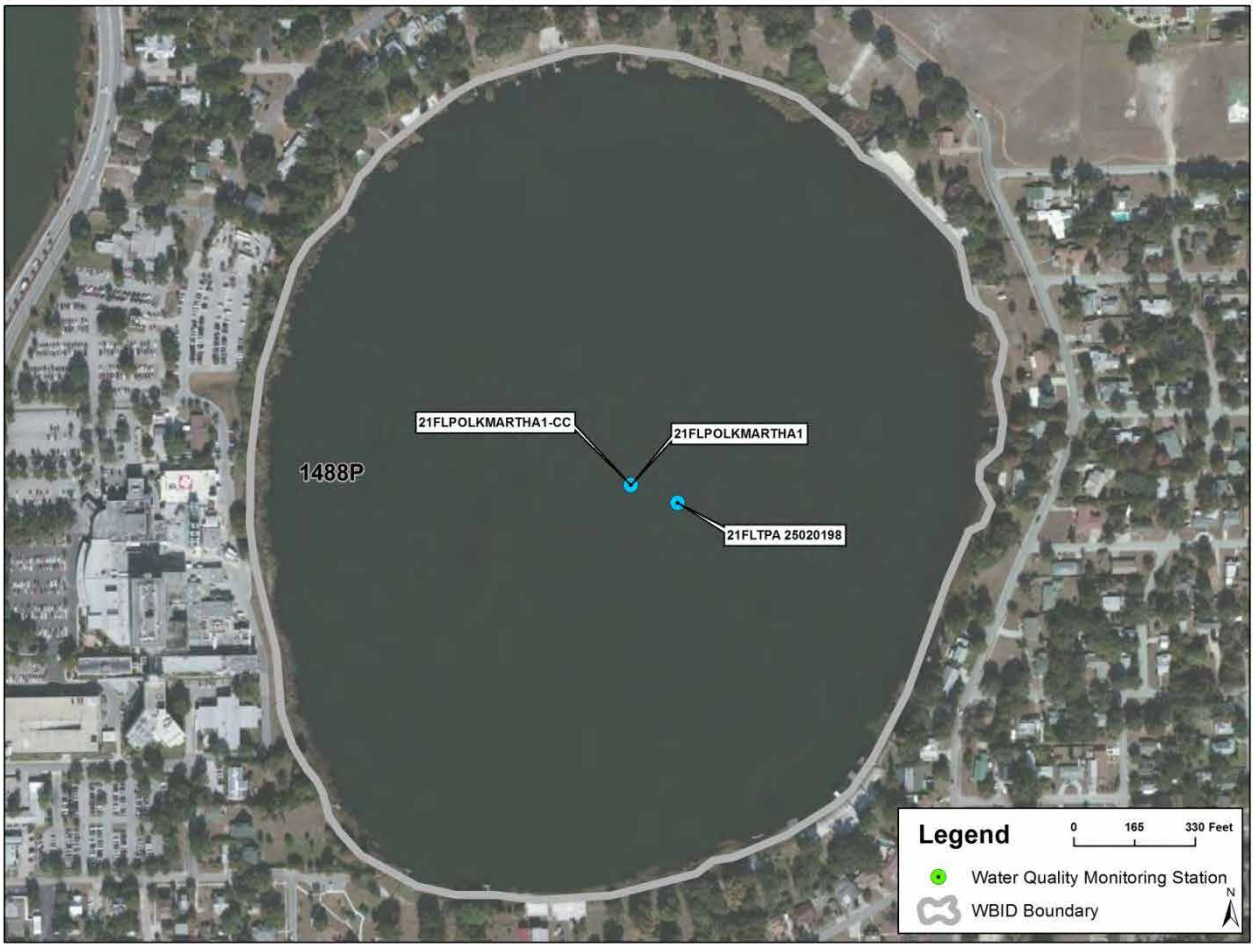


Table 25. Results of NNC evaluation for Lake Martha (WBID 1488P) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488P	LAKE MARTHA	2002	-	-	-
1488P	LAKE MARTHA	2003	5.8	0.667	-
1488P	LAKE MARTHA	2004	-	-	-
1488P	LAKE MARTHA	2005	-	0.500	-
1488P	LAKE MARTHA	2006	3.0	0.428	-
1488P	LAKE MARTHA	2007	3.4	0.479	-
1488P	LAKE MARTHA	2008	-	0.601	-
1488P	LAKE MARTHA	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 26. Results of NNC evaluation for Lake Martha (WBID 1488P) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488P	LAKE MARTHA	2003	5.8	0.667	-
1488P	LAKE MARTHA	2004	-	-	-
1488P	LAKE MARTHA	2005	-	0.500	-
1488P	LAKE MARTHA	2006	3.0	0.428	-
1488P	LAKE MARTHA	2007	3.4	0.479	-
1488P	LAKE MARTHA	2008	-	0.601	-
1488P	LAKE MARTHA	2009	5.7	0.621	0.018
1488P	LAKE MARTHA	2010	6.7	0.639	0.022
1488P	LAKE MARTHA	2011	-	-	-
1488P	LAKE MARTHA	2012	6.3	0.598	0.023
1488P	LAKE MARTHA	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

4.13. Lake Maude (WBID 1488Q)

Lake Maude (**Figure 37**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Maude was evaluated using NNC over the verified period used for the initial impairment. Lake Maude is considered a clear, alkaline lake based on a long-term geometric mean color of 14 PCU and alkalinity of 102 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on chlorophyll-a concentration of 20.0 µg/L. The results of the analysis are contradictory to the initial impairment determination and indicate that Lake Maude was not impaired for chlorophyll-a and TN during the verified period using NNC (**Table 27**). There were insufficient TP data to determine impairment status over the initial verified period.

In addition, Lake Maude water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Maude remained classified as a clear, alkaline lake (color=15 PCU, alkalinity=99 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Maude was impaired for elevated TP concentrations (**Table 28**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 38**). The percent exceedance for TP was greater than 50 percent. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 39**). The calculated required TP concentration reductions ranged from 0 to 41 percent to obtain compliance with NNC.

Figure 37. Location of water quality sampling sites in Lake Maude (WBID 1488Q).

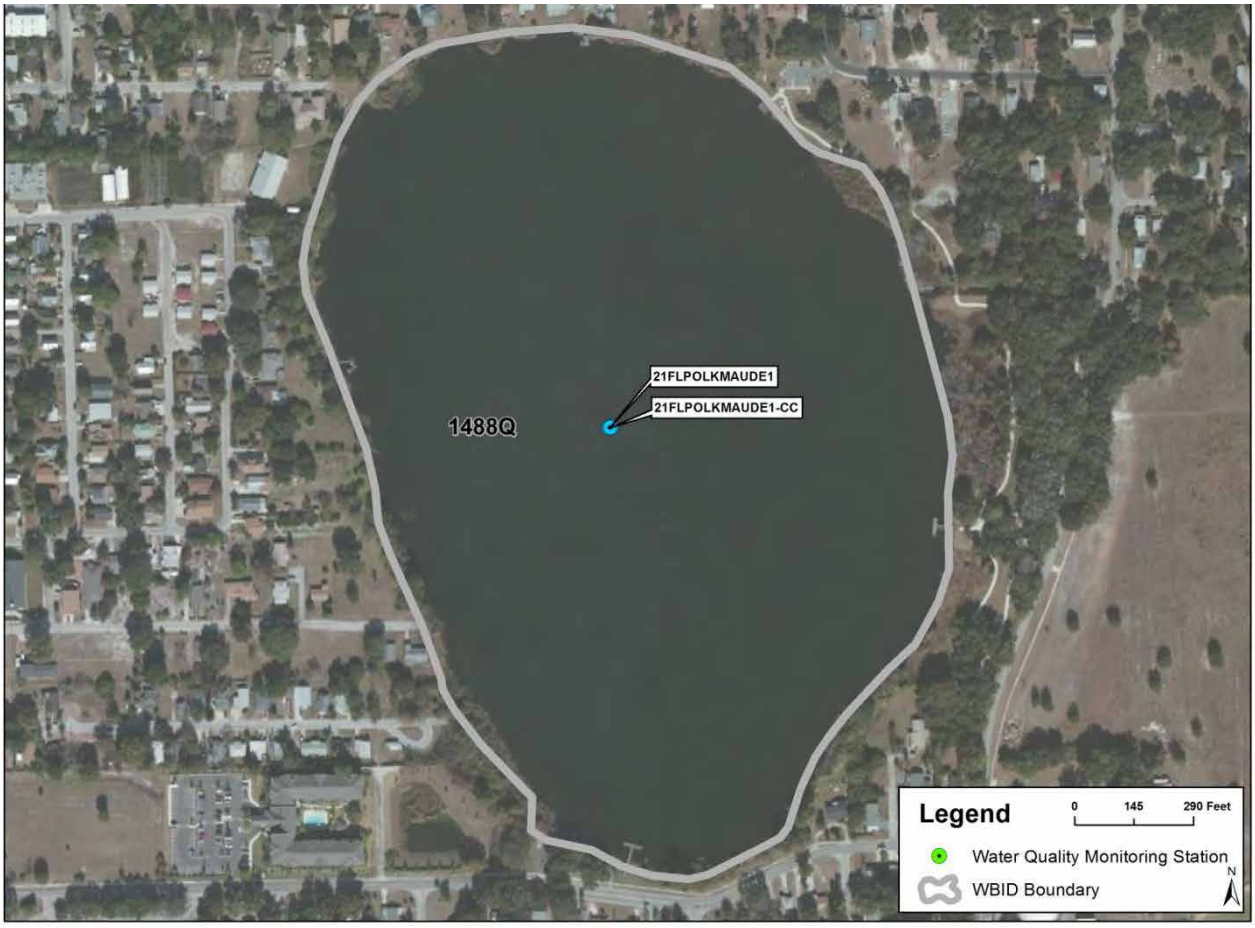


Table 27. Results of NNC evaluation for Lake Maude (WBID 1488Q) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488Q	LAKE MAUDE	2002	-	-	-
1488Q	LAKE MAUDE	2003	-	-	-
1488Q	LAKE MAUDE	2004	-	-	-
1488Q	LAKE MAUDE	2005	-	0.838	-
1488Q	LAKE MAUDE	2006	4.7	0.559	-
1488Q	LAKE MAUDE	2007	4.8	0.665	0.022
1488Q	LAKE MAUDE	2008	-	-	**0.038**
1488Q	LAKE MAUDE	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 28. Results of NNC evaluation for Lake Maude (WBID 1488Q) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488Q	LAKE MAUDE	2003	-	-	-
1488Q	LAKE MAUDE	2004	-	-	-
1488Q	LAKE MAUDE	2005	-	0.838	-
1488Q	LAKE MAUDE	2006	4.7	0.559	-
1488Q	LAKE MAUDE	2007	4.8	0.665	0.022
1488Q	LAKE MAUDE	2008	-	-	**0.038**
1488Q	LAKE MAUDE	2009	-	1.024	**0.039**
1488Q	LAKE MAUDE	2010	10.9	0.831	0.037
1488Q	LAKE MAUDE	2011	8.5	0.864	0.032
1488Q	LAKE MAUDE	2012	12.6	0.841	0.030
1488Q	LAKE MAUDE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 38. Percent of Lake Maude Samples which Exceed Criteria from 2003-2013.

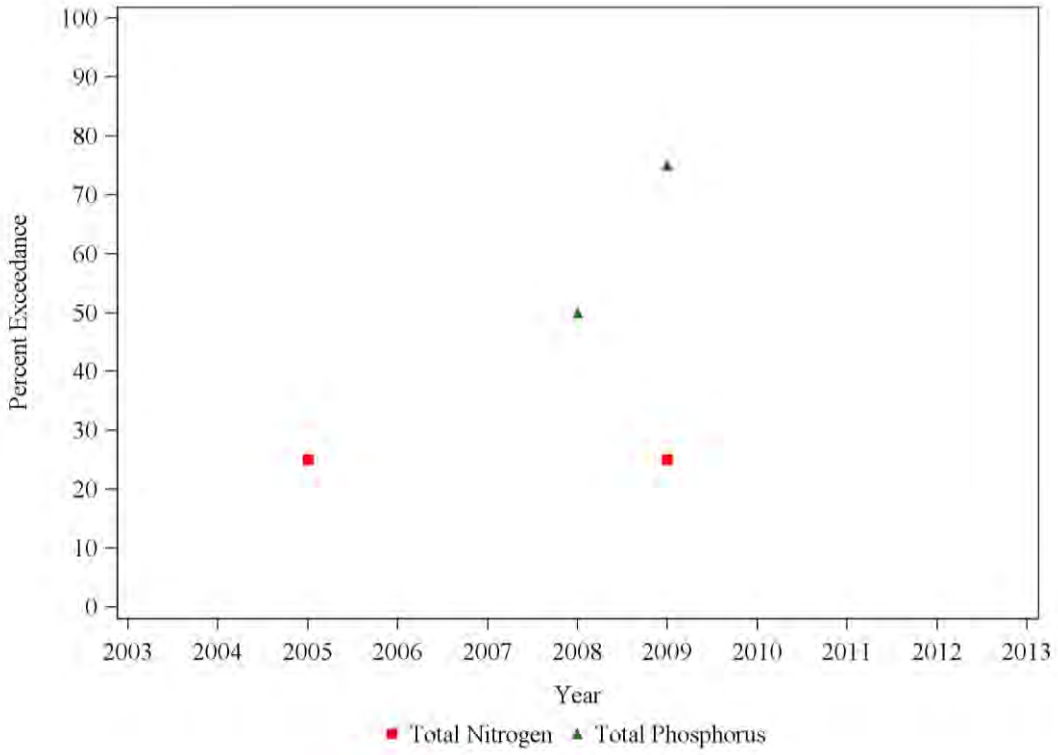
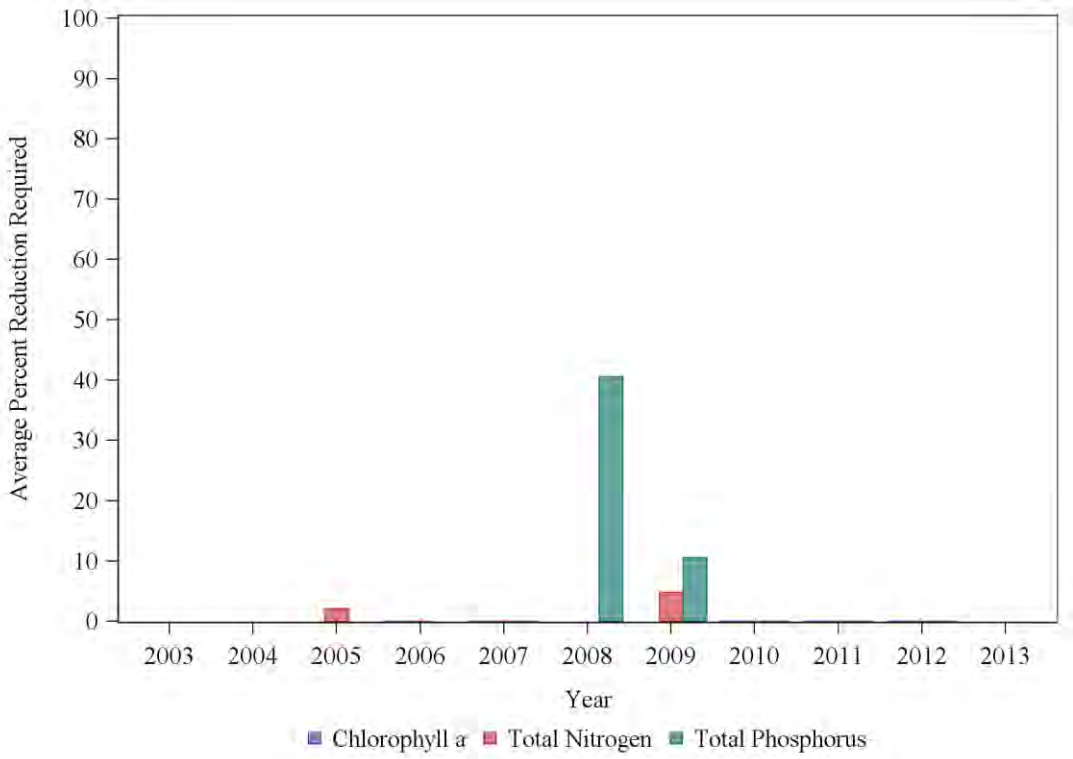


Figure 39. Lake Maude average percent reduction required to meet the NNC from 2003-2013.



4.14. Lake Buckeye (WBID 1488S)

Lake Buckeye (**Figure 40**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Buckeye was evaluated using NNC over the verified period used for the initial impairment. Lake Buckeye is considered a clear, alkaline lake based on a long-term geometric mean color of 16 PCU and alkalinity of 50 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis were not consistent with the initial impairment determination and indicate that Lake Buckeye was not found to be impaired for TN and TP during the verified period using the NNC (**Table 29**). There were insufficient chlorophyll-a data to determine impairment status over the initial verified period.

In addition, Lake Buckeye water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Buckeye remained classified as a clear, alkaline lake (color=17 PCU, alkalinity=63 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Buckeye was unimpaired for all three parameters using the NNC (**Table 30**).

Figure 40. Location of water quality sampling sites in Lake Buckeye (WBID 1488S).

Table 29. Results of NNC evaluation for Lake Buckeye (WBID 1488S) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488S	LAKE BUCKEYE	2002	19.6	-	-
1488S	LAKE BUCKEYE	2003	-	1.033	-
1488S	LAKE BUCKEYE	2004	-	-	-
1488S	LAKE BUCKEYE	2005	**24.2**	0.951	-
1488S	LAKE BUCKEYE	2006	-	0.818	-
1488S	LAKE BUCKEYE	2007	13.6	0.835	0.027
1488S	LAKE BUCKEYE	2008	-	0.855	0.023
1488S	LAKE BUCKEYE	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 30. Results of NNC evaluation for Lake Buckeye (WBID 1488S) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488S	LAKE BUCKEYE	2003	-	1.033	-
1488S	LAKE BUCKEYE	2004	-	-	-
1488S	LAKE BUCKEYE	2005	**24.2**	0.951	-
1488S	LAKE BUCKEYE	2006	-	0.818	-
1488S	LAKE BUCKEYE	2007	13.6	0.835	0.027
1488S	LAKE BUCKEYE	2008	-	0.855	0.023
1488S	LAKE BUCKEYE	2009	-	0.855	0.022
1488S	LAKE BUCKEYE	2010	7.6	0.903	0.025
1488S	LAKE BUCKEYE	2011	6.0	0.778	0.021
1488S	LAKE BUCKEYE	2012	6.6	0.683	0.021
1488S	LAKE BUCKEYE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

4.15. Lake Conine (WBID 1488U)

Lake Conine (**Figure 41**) was declared impaired for nutrients due to elevated TSI during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. The impairment status of Lake Conine was evaluated using NNC over the verified period used for the initial impairment. Lake Conine is considered a clear, alkaline lake based on a long-term geometric mean color of 30 PCU and alkalinity of 57 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Conine was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period (**Table 31**).

In addition, Lake Conine water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Conine remained classified as a clear, alkaline lake (color=30 PCU, alkalinity=57 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Conine continues to be impaired for all three parameters (**Table 32**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 42**). The percent exceedance was frequently 100 percent for all parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 43**). The calculated required chlorophyll-a percent concentration reductions ranged from 42 to 53 percent, TN concentration reductions ranged from 16 to 35 percent and TP concentration reductions from 35 to 55 percent to obtain compliance with NNC.

Figure 41. Location of water quality sampling sites in Lake Conine (WBID 1488U).

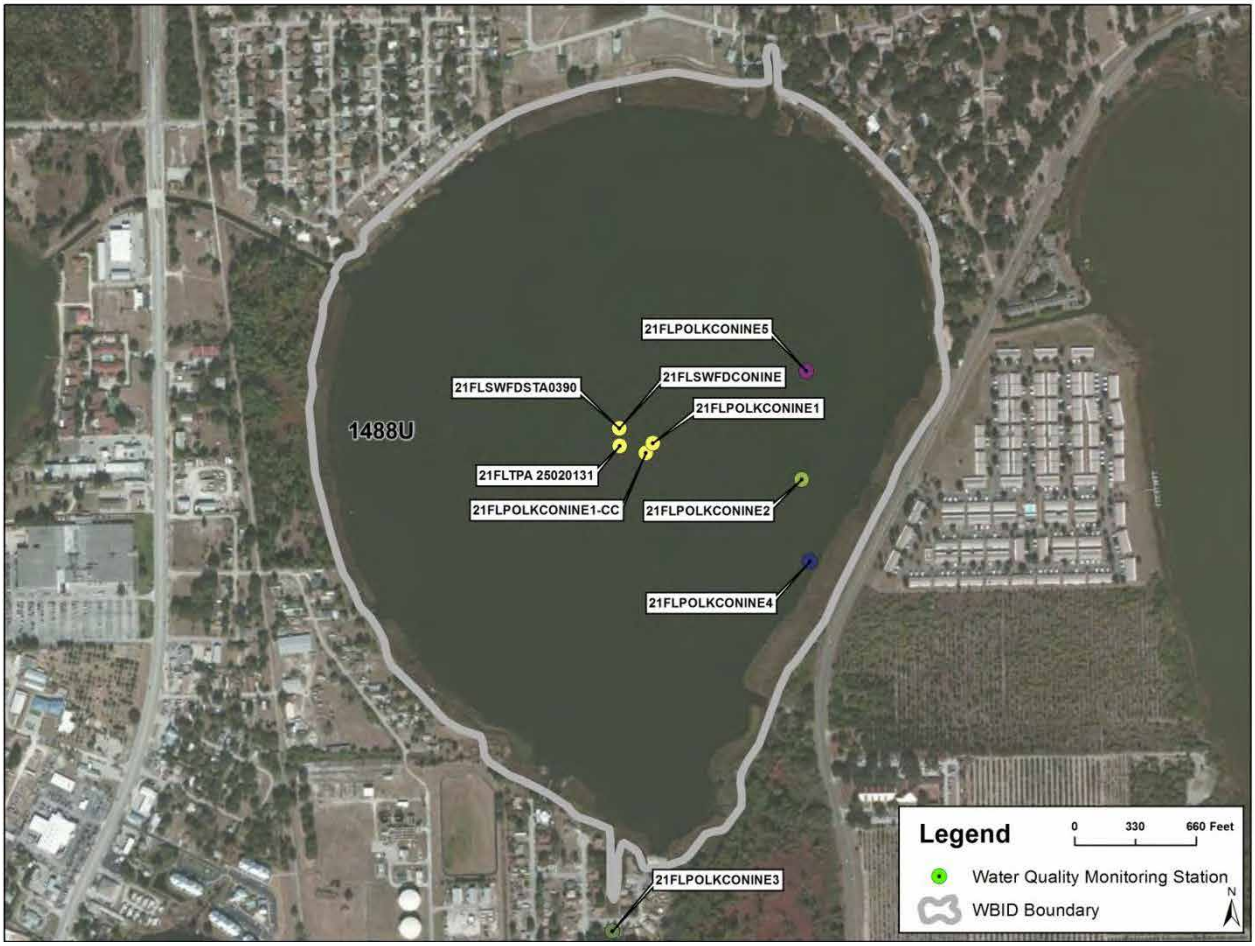


Table 31. Results of NNC evaluation for Lake Conine (WBID 1488U) over verified period for TSI impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488U	LAKE CONINE	1997	-	**1.374**	**0.099**
1488U	LAKE CONINE	1998	-	**1.379**	**0.068**
1488U	LAKE CONINE	1999	**25.7**	**1.107**	**0.043**
1488U	LAKE CONINE	2000	**28.2**	**1.058**	**0.040**
1488U	LAKE CONINE	2001	**30.9**	**1.432**	**0.055**
1488U	LAKE CONINE	2002	**34.7**	-	-
1488U	LAKE CONINE	2003	-	**1.253**	**0.058**
1488U	LAKE CONINE	2004	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 32. Results of NNC evaluation for Lake Conine (WBID 1488U) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488U	LAKE CONINE	2003	-	**1.253**	**0.058**
1488U	LAKE CONINE	2004	-	-	-
1488U	LAKE CONINE	2005	**39.6**	**1.461**	-
1488U	LAKE CONINE	2006	-	-	-
1488U	LAKE CONINE	2007	-	**1.464**	**0.066**
1488U	LAKE CONINE	2008	**35.8**	**1.358**	**0.050**
1488U	LAKE CONINE	2009	**36.1**	**1.476**	**0.048**
1488U	LAKE CONINE	2010	**37.6**	**1.427**	-
1488U	LAKE CONINE	2011	**44.1**	**1.648**	**0.061**
1488U	LAKE CONINE	2012	**34.5**	**1.362**	**0.047**
1488U	LAKE CONINE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 42. Percent of Lake Conine Samples which Exceed Criteria from 2003-2013.

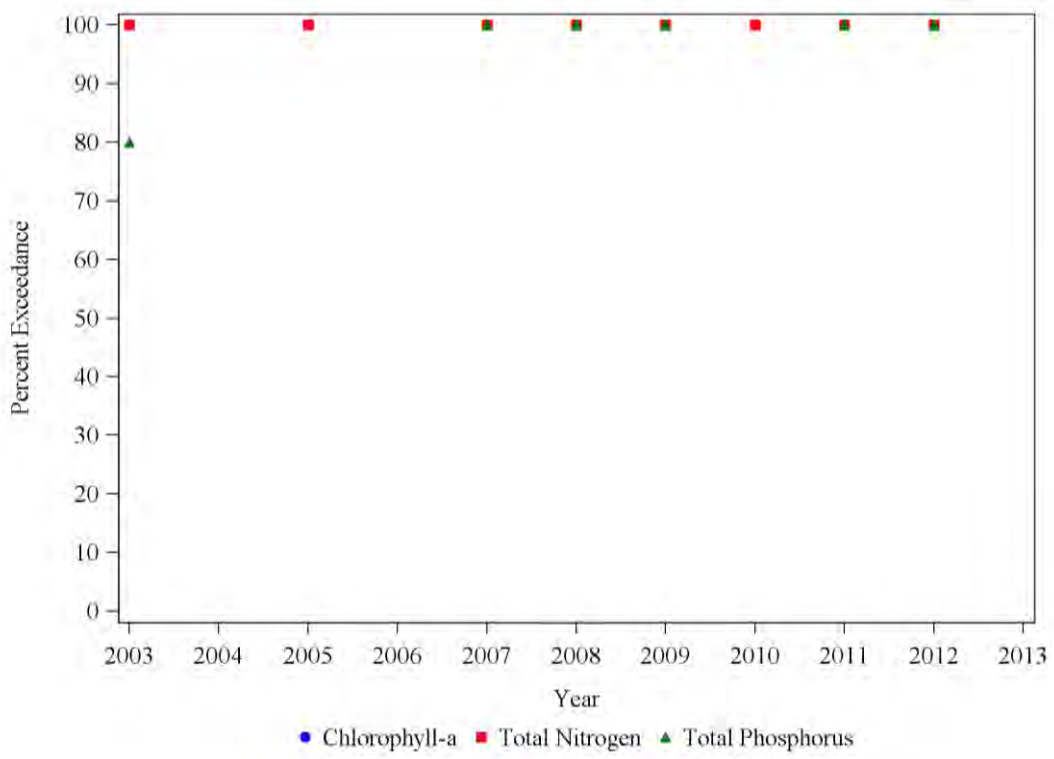
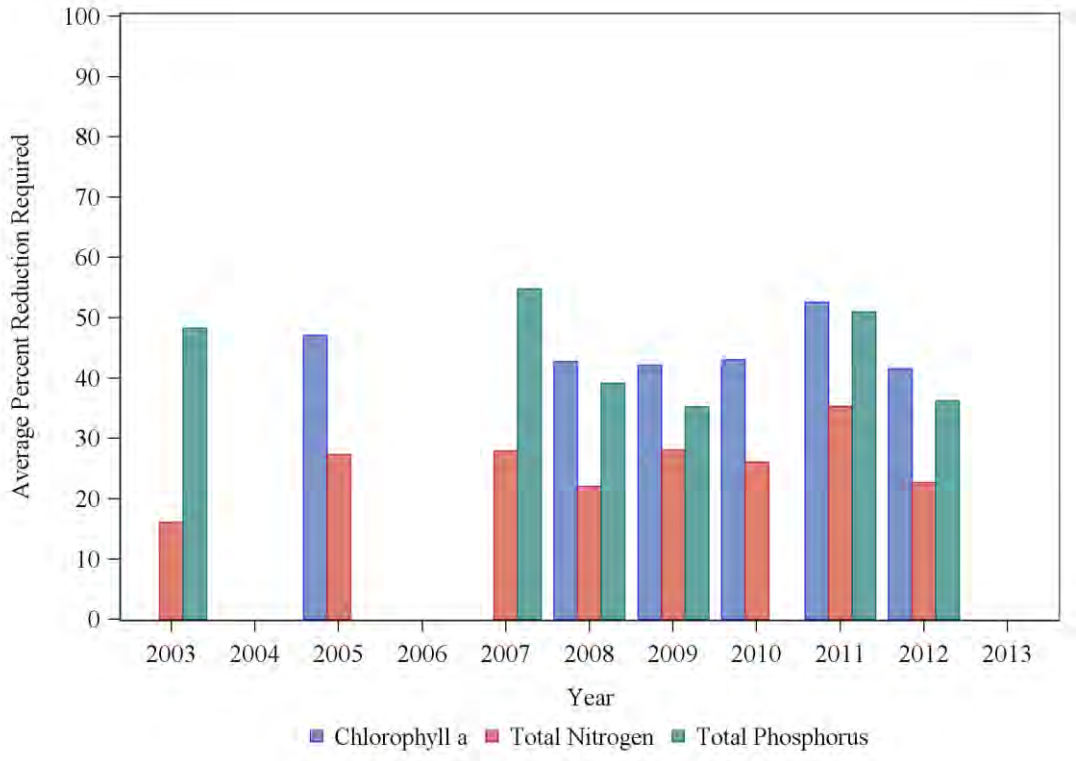


Figure 43. Lake Conine average percent reduction required to meet the NNC from 2003-2013.



4.16. Lake Swoope (WBID 1488V)

Lake Swoope (**Figure 44**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Swoope was evaluated using NNC over the verified period used for the initial impairment. Lake Swoope is considered a clear, alkaline lake based on a long-term geometric mean color of 30 PCU and alkalinity of 103 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis were not consistent with the initial impairment determination and indicate that Lake Swoope was not found to be impaired for chlorophyll-a, TN and TP during the verified period using the NNC (**Table 33**).

In addition, Lake Swoope water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Swoope remained classified as a clear, alkaline lake (color=31 PCU, alkalinity=98 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Swoope was unimpaired for all three parameters using the NNC (**Table 34**).

Figure 44. Location of water quality sampling sites in Lake Swoope (WBID 1488V).

Table 33. Results of NNC evaluation for Lake Swoope (WBID 1488V) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488V	LAKE SWOOPE	2002	7.5	1.050	0.020
1488V	LAKE SWOOPE	2003	-	-	-
1488V	LAKE SWOOPE	2004	-	**1.212**	0.026
1488V	LAKE SWOOPE	2005	10.0	0.963	0.032
1488V	LAKE SWOOPE	2006	11.4	1.087	0.033
1488V	LAKE SWOOPE	2007	17.3	1.348	0.030
1488V	LAKE SWOOPE	2008	-	**1.415**	0.029
1488V	LAKE SWOOPE	2009	7.5	1.144	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 34. Results of NNC evaluation for Lake Swoope (WBID 1488V) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488V	LAKE SWOOPE	2003	-	-	-
1488V	LAKE SWOOPE	2004	-	**1.212**	0.026
1488V	LAKE SWOOPE	2005	10.0	0.963	0.032
1488V	LAKE SWOOPE	2006	11.4	1.087	0.033
1488V	LAKE SWOOPE	2007	17.3	1.348	0.030
1488V	LAKE SWOOPE	2008	-	**1.415**	0.029
1488V	LAKE SWOOPE	2009	7.5	1.384	0.029
1488V	LAKE SWOOPE	2010	11.4	1.392	0.029
1488V	LAKE SWOOPE	2011	8.0	1.184	0.021
1488V	LAKE SWOOPE	2012	5.1	1.189	0.025
1488V	LAKE SWOOPE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

4.17. Lake Pansy (WBID 1488Y)

Lake Pansy (**Figure 45**) was declared impaired for nutrients due to elevated TSI during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. The impairment status of Lake Pansy was evaluated using NNC over the verified period used for the initial impairment. Lake Pansy is considered a colored lake based on a long-term geometric mean color of 50 PCU. Based on the colored characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Additionally, Lake Pansy is located in the West Central nutrient threshold region. Therefore, if chlorophyll-concentrations remain below 20.0 µg/L, the TP concentration criteria default to 0.49 mg/L. The results of the analysis were not consistent with the initial impairment determination and indicate that Lake Pansy was not found to be impaired for chlorophyll-a, TN and TP during the verified period using the NNC (**Table 35**).

In addition, Lake Pansy water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Pansy remained classified as a colored lake (color=46 PCU). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Pansy was unimpaired for all three parameters using the NNC (**Table 36**).

Figure 45. Location of water quality sampling sites in Lake Pansy (WBID 1488Y).

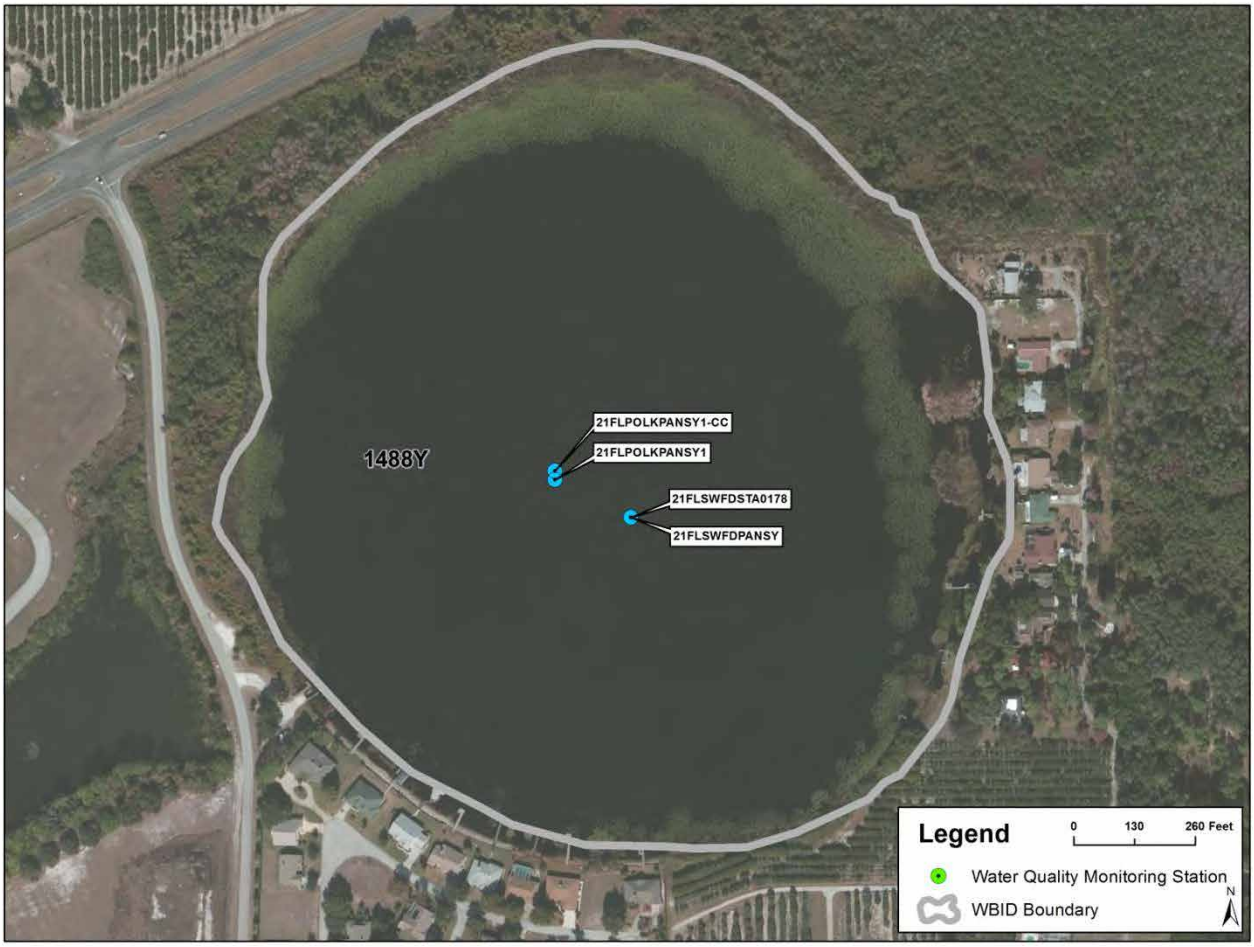


Table 35. Results of NNC evaluation for Lake Pansy (WBID 1488Y) over verified period for TSI impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488Y	LAKE PANSY	1997	-	0.547	0.033
1488Y	LAKE PANSY	1998		-	-
1488Y	LAKE PANSY	1999	8.8	-	0.018
1488Y	LAKE PANSY	2000	4.7	0.605	0.019
1488Y	LAKE PANSY	2001	10.5	0.865	-
1488Y	LAKE PANSY	2002	-	-	-
1488Y	LAKE PANSY	2003	-	-	-
1488Y	LAKE PANSY	2004	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 36. Results of NNC evaluation for Lake Pansy (WBID 1488Y) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488Y	LAKE PANSY	2003	-	-	-
1488Y	LAKE PANSY	2004	-	-	-
1488Y	LAKE PANSY	2005	10.9	0.720	-
1488Y	LAKE PANSY	2006	11.7	0.811	-
1488Y	LAKE PANSY	2007	-	1.025	0.030
1488Y	LAKE PANSY	2008	-	0.921	0.024
1488Y	LAKE PANSY	2009	-	0.873	0.024
1488Y	LAKE PANSY	2010	11.8	0.832	0.025
1488Y	LAKE PANSY	2011	9.9	0.840	0.022
1488Y	LAKE PANSY	2012	-	1.015	0.027
1488Y	LAKE PANSY	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

4.18. Lake Echo (WBID 1488Z)

Lake Echo (**Figure 46**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Echo was evaluated using NNC over the verified period used for the initial impairment. Lake Echo is considered a clear, alkaline lake based on a long-term geometric mean color of 14 PCU and alkalinity of 25 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis were not consistent with the initial impairment determination and indicate that Lake Echo was not found to be impaired for chlorophyll-a, TN and TP during the verified period using the NNC (**Table 37**).

In addition, Lake Echo water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Echo remained classified as a clear, alkaline lake (color=14 PCU, alkalinity=37 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Echo was unimpaired for all three parameters using the NNC (**Table 38**).

Figure 46. Location of water quality sampling sites in Lake Echo (WBID 1488Z).

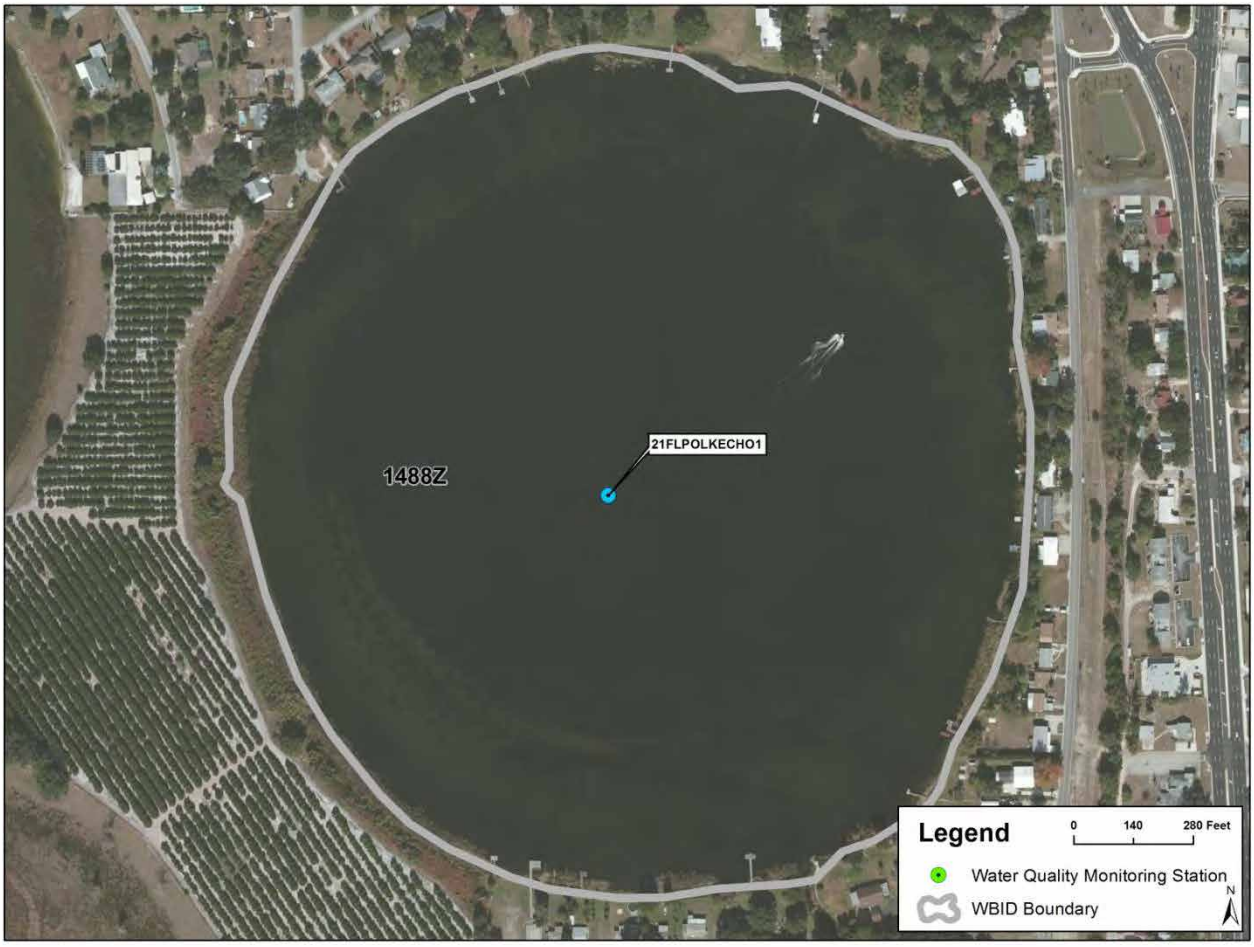


Table 37. Results of NNC evaluation for Lake Echo (WBID 1488Z) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488Z	LAKE ECHO	2002	-	-	-
1488Z	LAKE ECHO	2003	-	-	-
1488Z	LAKE ECHO	2004	-	-	-
1488Z	LAKE ECHO	2005	15.9	0.741	-
1488Z	LAKE ECHO	2006	-	0.663	-
1488Z	LAKE ECHO	2007	8.8	0.793	0.026
1488Z	LAKE ECHO	2008	-	-	0.024
1488Z	LAKE ECHO	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 38. Results of NNC evaluation for Lake Echo (WBID 1488Z) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488Z	LAKE ECHO	2003	-	-	-
1488Z	LAKE ECHO	2004	-	-	-
1488Z	LAKE ECHO	2005	15.9	0.741	-
1488Z	LAKE ECHO	2006	-	0.663	-
1488Z	LAKE ECHO	2007	8.8	0.793	0.026
1488Z	LAKE ECHO	2008	-	-	0.024
1488Z	LAKE ECHO	2009	-	0.948	-
1488Z	LAKE ECHO	2010	-	0.737	0.024
1488Z	LAKE ECHO	2011	9.2	0.848	0.026
1488Z	LAKE ECHO	2012	-	0.602	0.025
1488Z	LAKE ECHO	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

4.19. Lake Tracy (WBID 14921)

Lake Tracy (**Figure 47**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Tracy was evaluated using NNC over the verified period used for the initial impairment. Lake Tracy is considered a clear, alkaline lake based on a long-term geometric mean color of 23 PCU and alkalinity of 74 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis were not consistent with the initial impairment determination and indicate that Lake Tracy was not found to be impaired for chlorophyll-a, TN and TP during the verified period using the NNC (**Table 39**).

In addition, Lake Tracy water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Tracy remained classified as a clear, alkaline lake (color=23 PCU, alkalinity=59 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Tracy was unimpaired for all three parameters using the NNC (**Table 40**).

Figure 47. Location of water quality sampling sites in Lake Tracy (WBID 14921).

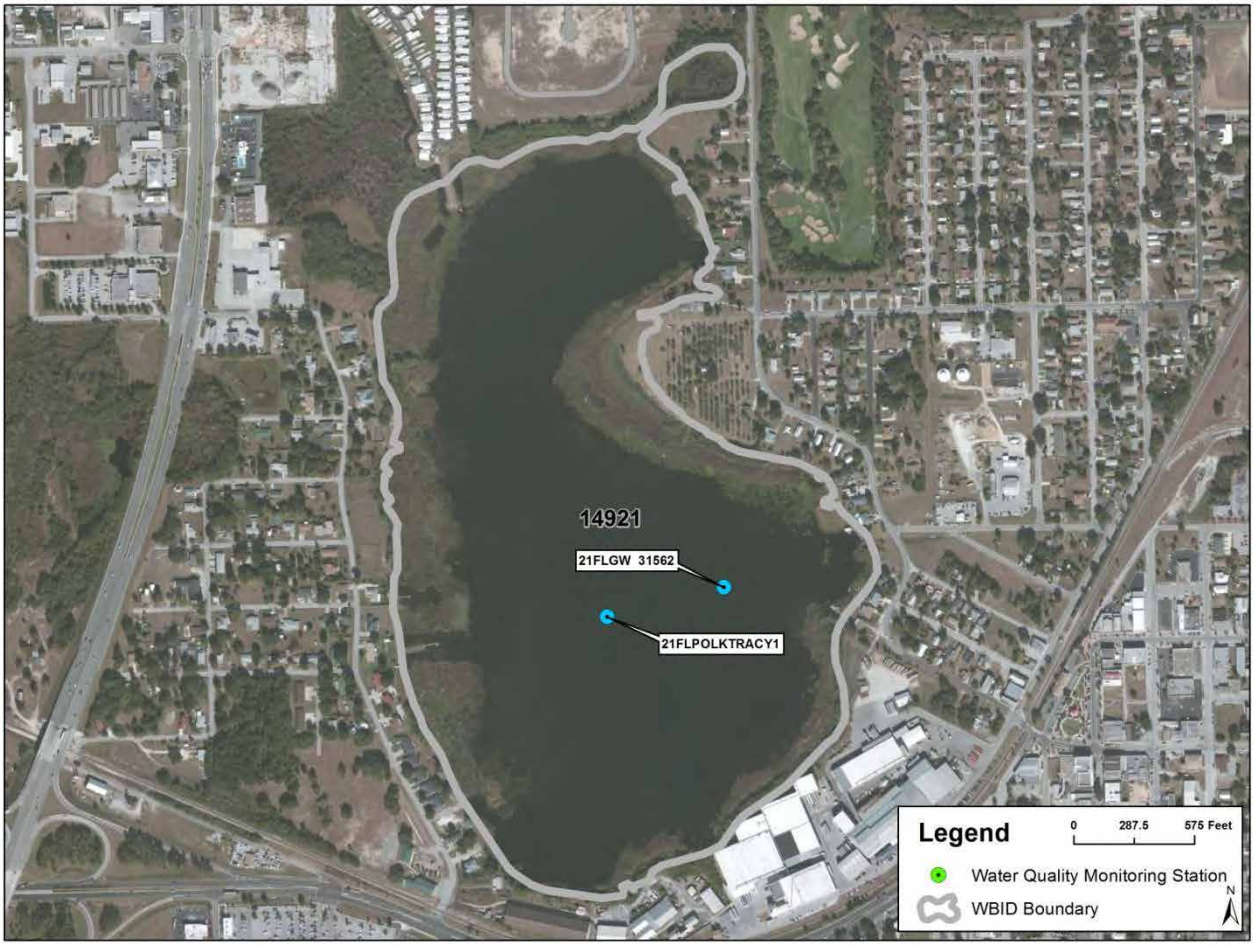


Table 39. Results of NNC evaluation for Lake Tracy (WBID 14921) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
14921	LAKE TRACY	2002	-	-	-
14921	LAKE TRACY	2003		-	-
14921	LAKE TRACY	2004	-	-	-
14921	LAKE TRACY	2005	-	0.839	-
14921	LAKE TRACY	2006	4.6	0.751	-
14921	LAKE TRACY	2007	3.2	0.750	0.021
14921	LAKE TRACY	2008	7.6	0.911	0.028
14921	LAKE TRACY	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 40. Results of NNC evaluation for Lake Tracy (WBID 14921) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
14921	LAKE TRACY	2003		-	-
14921	LAKE TRACY	2004	-	-	-
14921	LAKE TRACY	2005	-	0.839	-
14921	LAKE TRACY	2006	4.6	0.751	-
14921	LAKE TRACY	2007	3.2	0.750	0.021
14921	LAKE TRACY	2008	7.6	0.911	0.028
14921	LAKE TRACY	2009	-	0.975	0.025
14921	LAKE TRACY	2010	3.0	0.705	0.017
14921	LAKE TRACY	2011	3.3	0.789	0.018
14921	LAKE TRACY	2012	3.3	0.670	0.021
14921	LAKE TRACY	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

4.20. Crystal Lake (WBID 1497A)

Crystal Lake (**Figure 48**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Crystal Lake was evaluated using NNC over the verified period used for the initial impairment. Crystal Lake is considered a clear, alkaline lake based on a long-term geometric mean color of 26 PCU and alkalinity of 60 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Crystal Lake was impaired for elevated chlorophyll-a and TN concentrations during the verified period (**Table 41**). There were insufficient TP data to determine impairment status over the initial verified period.

In addition, Crystal Lake water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Crystal Lake remained classified as a clear, alkaline lake (color=26 PCU, alkalinity=58 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Crystal Lake continues to be impaired for chlorophyll-a and TN with the addition of TP (**Table 42**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 49**). Percent exceedance was frequently 100 percent for all parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 50**). The calculated required chlorophyll-a percent concentration reductions ranged from 53 to 71 percent, TN concentration reductions ranged from 20 to 47 percent and TP concentration reductions from 47 to 82 percent to obtain compliance with NNC.

Figure 48. Location of water quality sampling sites in Crystal Lake (WBID 1497A).

Table 41. Results of NNC evaluation for Crystal Lake (WBID 1497A) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1497A	CRYSTAL LAKE	2002	-	-	-
1497A	CRYSTAL LAKE	2003	-	**1.310**	**0.063**
1497A	CRYSTAL LAKE	2004	**43.0**	**1.348**	-
1497A	CRYSTAL LAKE	2005	**58.2**	**1.597**	-
1497A	CRYSTAL LAKE	2006	**49.1**	**1.501**	-
1497A	CRYSTAL LAKE	2007	-	**1.520**	**0.092**
1497A	CRYSTAL LAKE	2008	-	-	-
1497A	CRYSTAL LAKE	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 42. Results of NNC evaluation for Crystal Lake (WBID 1497A) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1497A	CRYSTAL LAKE	2003	-	**1.310**	**0.063**
1497A	CRYSTAL LAKE	2004	**43.0**	**1.348**	-
1497A	CRYSTAL LAKE	2005	**58.2**	**1.597**	-
1497A	CRYSTAL LAKE	2006	**49.1**	**1.501**	-
1497A	CRYSTAL LAKE	2007	-	**1.520**	**0.092**
1497A	CRYSTAL LAKE	2008	-	-	-
1497A	CRYSTAL LAKE	2009	-	-	-
1497A	CRYSTAL LAKE	2010	-	-	-
1497A	CRYSTAL LAKE	2011	**70.2**	**1.957**	**0.091**
1497A	CRYSTAL LAKE	2012	**70.9**	**1.994**	**0.189**
1497A	CRYSTAL LAKE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 49. Percent of Crystal Lake Samples which Exceed Criteria from 2003-2013.

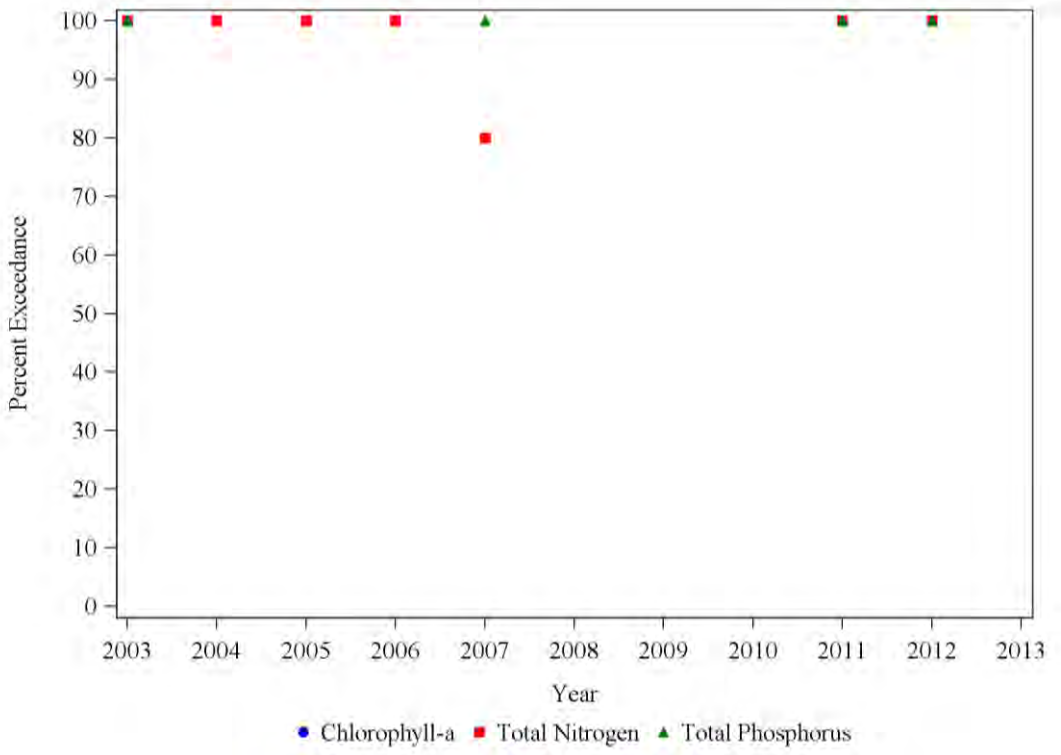
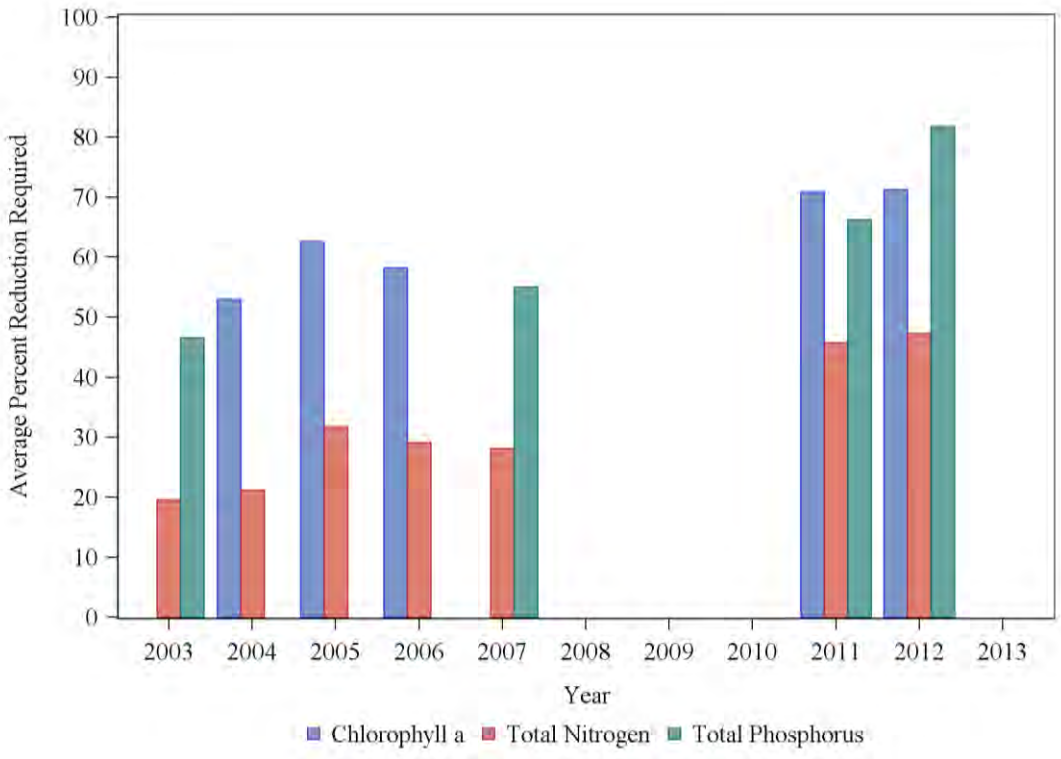


Figure 50. Crystal Lake average percent reduction required to meet the NNC from 2003-2013.



4.21. Lake Parker (WBID 1497B)

Lake Parker (**Figure 51**) was declared impaired for nutrients due to elevated TSI during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. The impairment status of Lake Parker was evaluated using NNC over the verified period used for the initial impairment. Lake Parker is considered a clear, alkaline lake based on a long-term geometric mean color of 27 PCU and alkalinity of 46 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Parker was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period (**Table 43**).

In addition, Lake Parker water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Parker remained classified as a clear, alkaline lake (color=26 PCU, alkalinity=61 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Parker continues to be impaired for chlorophyll-a, TN and TP (**Table 44**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 52**). Percent exceedance was frequently 100 percent for all parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 53**). The calculated required chlorophyll-a percent concentration reductions ranged from 42 to 80 percent, TN concentration reductions ranged from 45 to 68 percent and TP concentration reductions from 25 to 79 percent to obtain compliance with NNC.

Figure 51. Location of water quality sampling sites in Lake Parker (WBID 1497B).

Table 43. Results of NNC evaluation for Lake Parker (WBID 1497B) over verified period for TSI impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1497B	LAKE PARKER	1997		-	-
1497B	LAKE PARKER	1998		-	-
1497B	LAKE PARKER	1999	-	-	-
1497B	LAKE PARKER	2000	-	-	-
1497B	LAKE PARKER	2001	-	-	-
1497B	LAKE PARKER	2002	**130.5**	**3.579**	**0.075**
1497B	LAKE PARKER	2003	**89.5**	**2.579**	**0.084**
1497B	LAKE PARKER	2004	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 44. Results of NNC evaluation for Lake Parker (WBID 1497B) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1497B	LAKE PARKER	2003	**89.5**	**2.579**	**0.084**
1497B	LAKE PARKER	2004	-	-	-
1497B	LAKE PARKER	2005	**55.7**	**1.933**	-
1497B	LAKE PARKER	2006	**88.3**	**2.839**	-
1497B	LAKE PARKER	2007	**108.1**	**3.386**	**0.152**
1497B	LAKE PARKER	2008	-	-	**0.134**
1497B	LAKE PARKER	2009	-	**2.907**	**0.058**
1497B	LAKE PARKER	2010	**38.4**	**2.753**	**0.058**
1497B	LAKE PARKER	2011	**78.5**	**2.991**	**0.056**
1497B	LAKE PARKER	2012	**76.3**	**2.710**	**0.055**
1497B	LAKE PARKER	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 52. Percent of Lake Parker Samples which Exceed Criteria from 2003-2013.

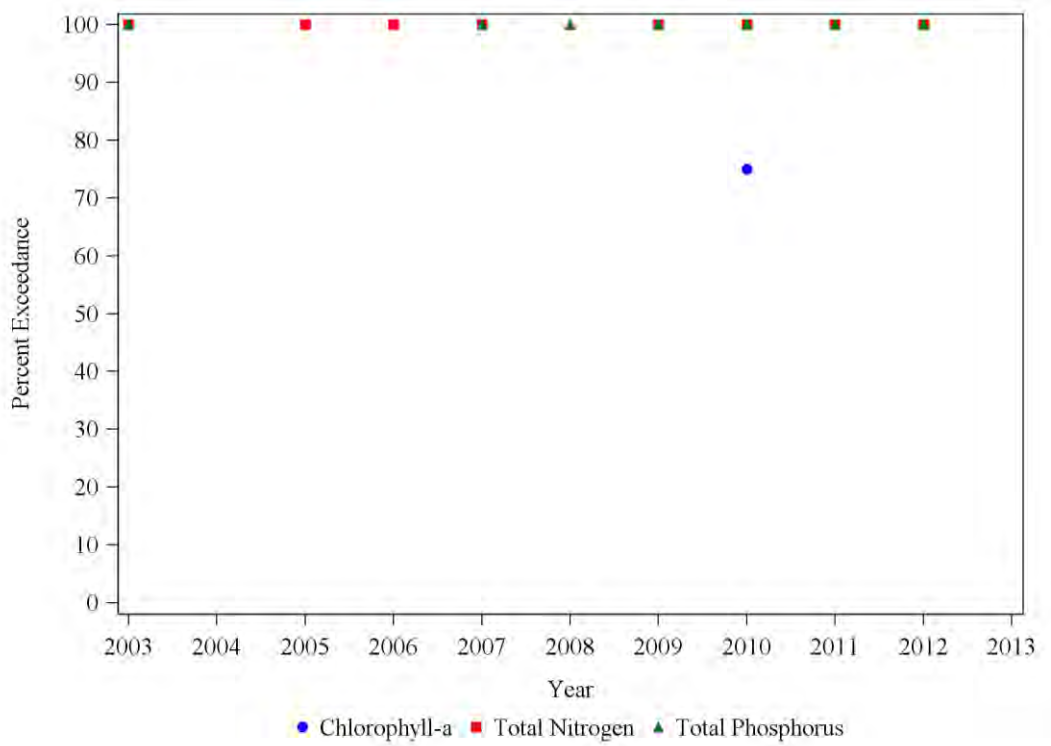
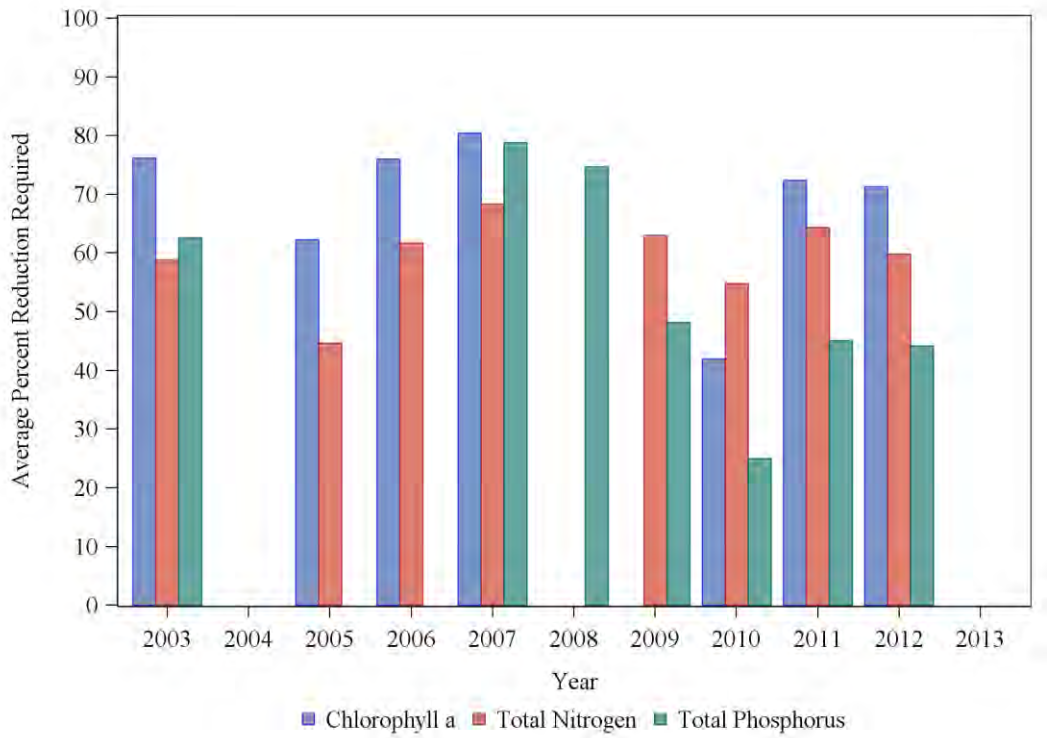


Figure 53. Lake Parker average percent reduction required to meet the NNC from 2003-2013.



4.22. Lake Tenoroc (WBID 1497C)

Lake Tenoroc (**Figure 54**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The only water quality sampling site in Lake Tenoroc is located adjacent to a boat ramp. It is unlikely that this sampling location is providing water quality data representative of the ambient water quality conditions.

The impairment status of Lake Tenoroc was evaluated using NNC over the verified period used for the initial impairment. Lake Tenoroc was assumed to be a clear, acidic lake based on a long-term geometric mean color of alkalinity of 12 mg/L. Color and conductivity data were unavailable to assist in the determination the characterization. Based on the clear, acidic characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 6.0 µg/L. The results of the analysis indicate there were insufficient data for chlorophyll-a, TN and TP to determine the impairment status for Lake Tenoroc using the NNC (**Table 45**).

In addition, Lake Tenoroc water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Tenoroc remained classified as a clear, acidic lake (alkalinity=12 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 6.0 µg/L. Results of the water quality comparison using current data again indicate that here were insufficient data for chlorophyll-a, TN and TP to determine the impairment status for Lake Tenoroc using the NNC over the 2003-2013 time period (**Table 46**).

Figure 54. Location of water quality sampling sites in Lake Tenoroc (WBID 1497C).

Table 45. Results of NNC evaluation for Lake Tenoroc (WBID 1497C) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1497C	LAKE TENOROC	2002	-	-	-
1497C	LAKE TENOROC	2003	-	-	-
1497C	LAKE TENOROC	2004	-	-	-
1497C	LAKE TENOROC	2005	-	-	-
1497C	LAKE TENOROC	2006	-	-	-
1497C	LAKE TENOROC	2007	-	-	-
1497C	LAKE TENOROC	2008	**116.2**	**2.595**	**0.317**
1497C	LAKE TENOROC	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 46. Results of NNC evaluation for Lake Tenoroc (WBID 1497C) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1488G	LAKE SILVER	2003	-	-	-
1488G	LAKE SILVER	2004	-	-	-
1488G	LAKE SILVER	2005	-	-	-
1488G	LAKE SILVER	2006	-	-	-
1488G	LAKE SILVER	2007	-	-	-
1488G	LAKE SILVER	2008	**116.2**	**2.595**	**0.317**
1488G	LAKE SILVER	2009	-	-	-
1488G	LAKE SILVER	2010	-	-	-
1488G	LAKE SILVER	2011	-	-	-
1488G	LAKE SILVER	2012	-	-	-
1488G	LAKE SILVER	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

4.23. Lake Gibson (WBID 1497D)

Lake Gibson (**Figure 55**) was declared impaired for nutrients due to elevated TSI during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. The impairment status of Lake Gibson was evaluated using NNC over the verified period used for the initial impairment. Lake Gibson is considered a colored lake based on a long-term geometric mean color of 46 PCU. Based on the colored characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis indicate that there were insufficient data for chlorophyll-a, TN and TP to determine the impairment status for Lake Gibson using the NNC over the verified period (**Table 47**).

In addition, Lake Gibson water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Gibson was reclassified as a clear, alkaline lake (color=35 PCU, alkalinity=22 mg/L). Although a change in characterization occurred, the nutrient criteria continued to be determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Gibson was impaired for TP (**Table 48**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 56**). The percent exceedance was frequently 100 percent for TP. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 57**). The calculated required TP percent concentration reductions ranged from 0 to 31 percent to obtain compliance with NNC.

Figure 55. Location of water quality sampling sites in Lake Gibson (WBID 1497D).

Table 47. Results of NNC evaluation for Lake Gibson (WBID 1497D) over verified period for TSI impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1497D	LAKE GIBSON	1997	-	-	-
1497D	LAKE GIBSON	1998	-	-	-
1497D	LAKE GIBSON	1999	-	-	-
1497D	LAKE GIBSON	2000	-	-	-
1497D	LAKE GIBSON	2001	-	-	-
1497D	LAKE GIBSON	2002	-	-	-
1497D	LAKE GIBSON	2003	-	-	-
1497D	LAKE GIBSON	2004	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 48. Results of NNC evaluation for Lake Gibson (WBID 1497D) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1497D	LAKE GIBSON	2003	-	-	-
1497D	LAKE GIBSON	2004	-	-	-
1497D	LAKE GIBSON	2005	12.9	0.805	-
1497D	LAKE GIBSON	2006	-	0.643	-
1497D	LAKE GIBSON	2007	11.6	0.842	**0.135**
1497D	LAKE GIBSON	2008	-	-	**0.112**
1497D	LAKE GIBSON	2009	-	0.756	**0.086**
1497D	LAKE GIBSON	2010	17.4	1.001	0.072
1497D	LAKE GIBSON	2011	**27.6**	1.004	**0.072**
1497D	LAKE GIBSON	2012	-	0.781	**0.080**
1497D	LAKE GIBSON	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 56. Percent of Lake Gibson Samples which Exceed Criteria from 2003-2013.

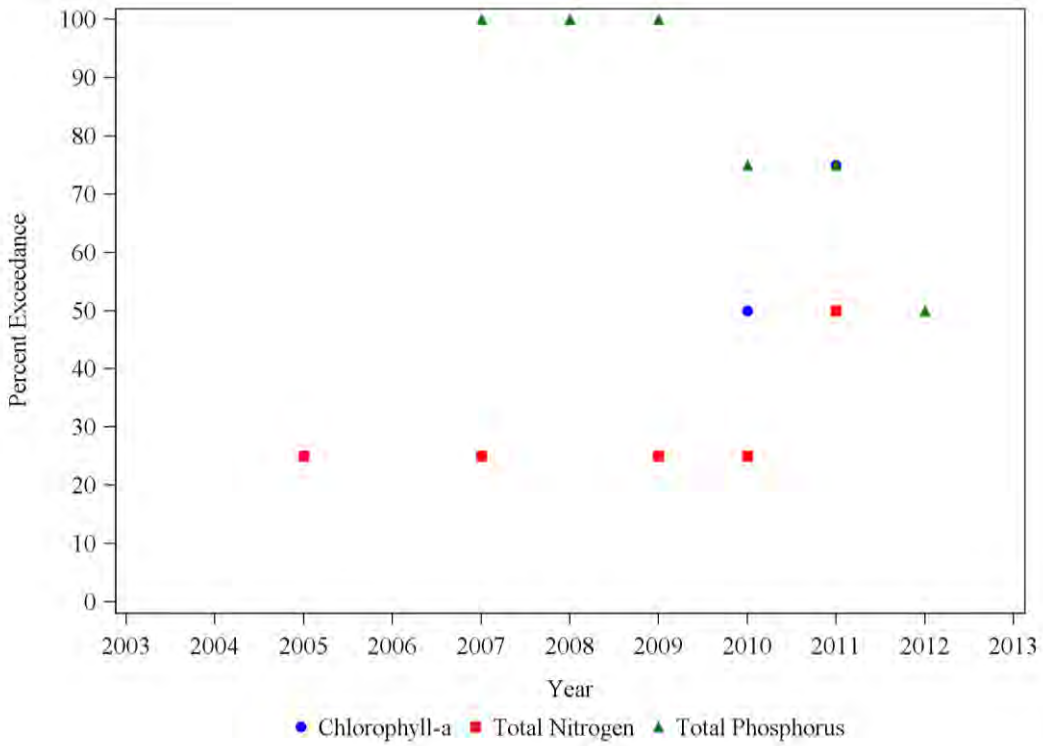
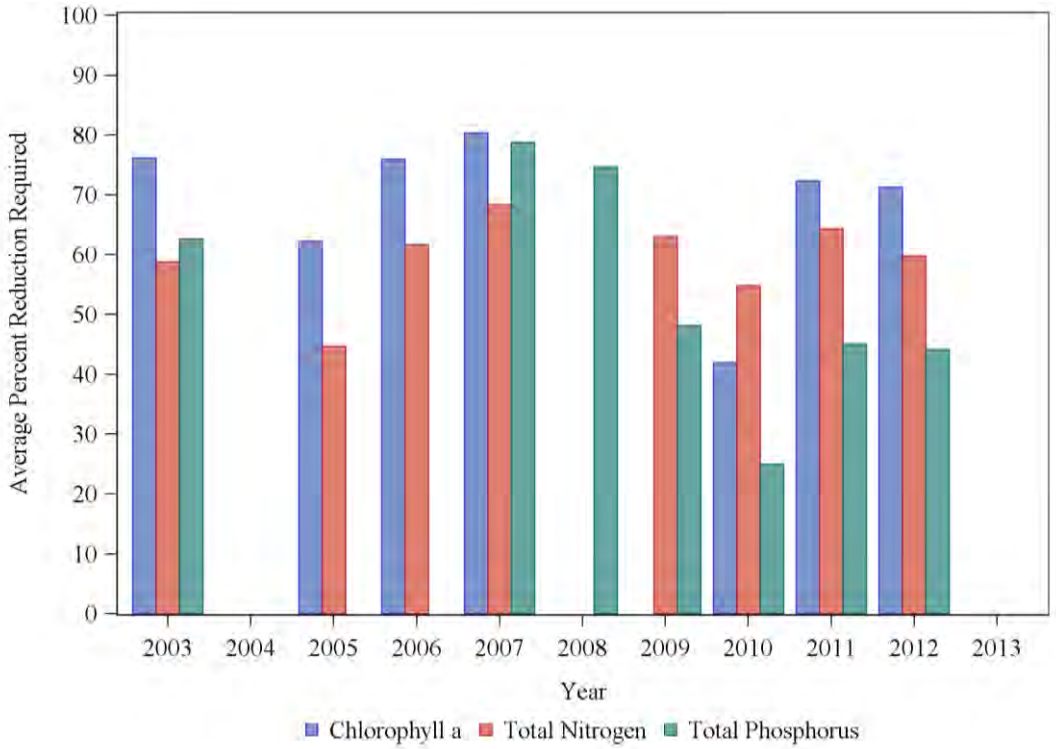


Figure 57. Lake Gibson average percent reduction required to meet the NNC from 2003-2013.



4.24. Lake Bonny (WBID 1497E)

Lake Bonny (**Figure 58**) was declared impaired for nutrients due to elevated TSI during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. The impairment status of Lake Bonny was evaluated using NNC over the verified period used for the initial impairment. Lake Bonny is considered a clear, alkaline lake based on a long-term geometric mean color of 28 PCU and alkalinity of 51 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on chlorophyll-a concentration of 20.0 µg/L. The results of the analysis indicate that there were insufficient data for chlorophyll-a, TN and TP to determine the impairment status for Lake Bonny using the NNC over the verified period (**Table 49**).

In addition, Lake Bonny water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Bonny remained classified as a clear, alkaline lake (color=30 PCU, alkalinity=48 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Bonny was impaired for elevated chlorophyll-a, TN and TP concentrations (**Table 50**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 59**). The percent exceedance was frequently 100 percent for all parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 60**). The calculated required chlorophyll-a percent concentration reductions ranged from 47 to 70 percent, TN concentration reductions ranged from 17 to 77 percent and TP concentration reductions from 38 to 91 percent to obtain compliance with NNC.

Figure 58. Location of water quality sampling sites in Lake Bonny (WBID 1497E).

Table 49. Results of NNC evaluation for Lake Bonny (WBID 1497E) over verified period for TSI impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1497E	LAKE BONNY	1997	-	-	-
1497E	LAKE BONNY	1998		-	-
1497E	LAKE BONNY	1999	-	-	-
1497E	LAKE BONNY	2000	-	-	-
1497E	LAKE BONNY	2001	-	-	-
1497E	LAKE BONNY	2002	-	-	-
1497E	LAKE BONNY	2003	-	**1.433**	**0.050**
1497E	LAKE BONNY	2004	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 50. Results of NNC evaluation for Lake Bonny (WBID 1497E) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1497E	LAKE BONNY	2003	-	**1.433**	**0.050**
1497E	LAKE BONNY	2004	-	-	-
1497E	LAKE BONNY	2005	**39.1**	**1.499**	-
1497E	LAKE BONNY	2006	**60.7**	**2.153**	-
1497E	LAKE BONNY	2007	-	**4.666**	**0.223**
1497E	LAKE BONNY	2008	-	-	**0.335**
1497E	LAKE BONNY	2009	-	-	-
1497E	LAKE BONNY	2010	-	-	-
1497E	LAKE BONNY	2011	**66.7**	**2.648**	**0.087**
1497E	LAKE BONNY	2012	**46.7**	**2.002**	**0.082**
1497E	LAKE BONNY	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 59. Percent of Lake Bonny Samples which Exceed Criteria from 2003-2013.

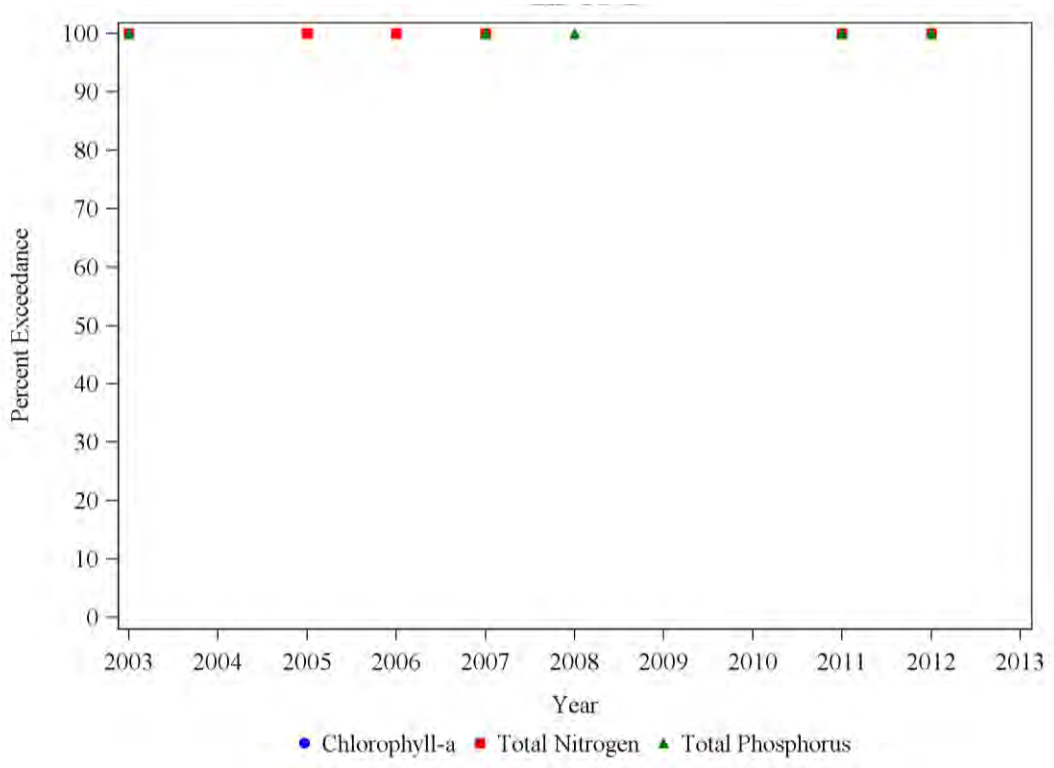
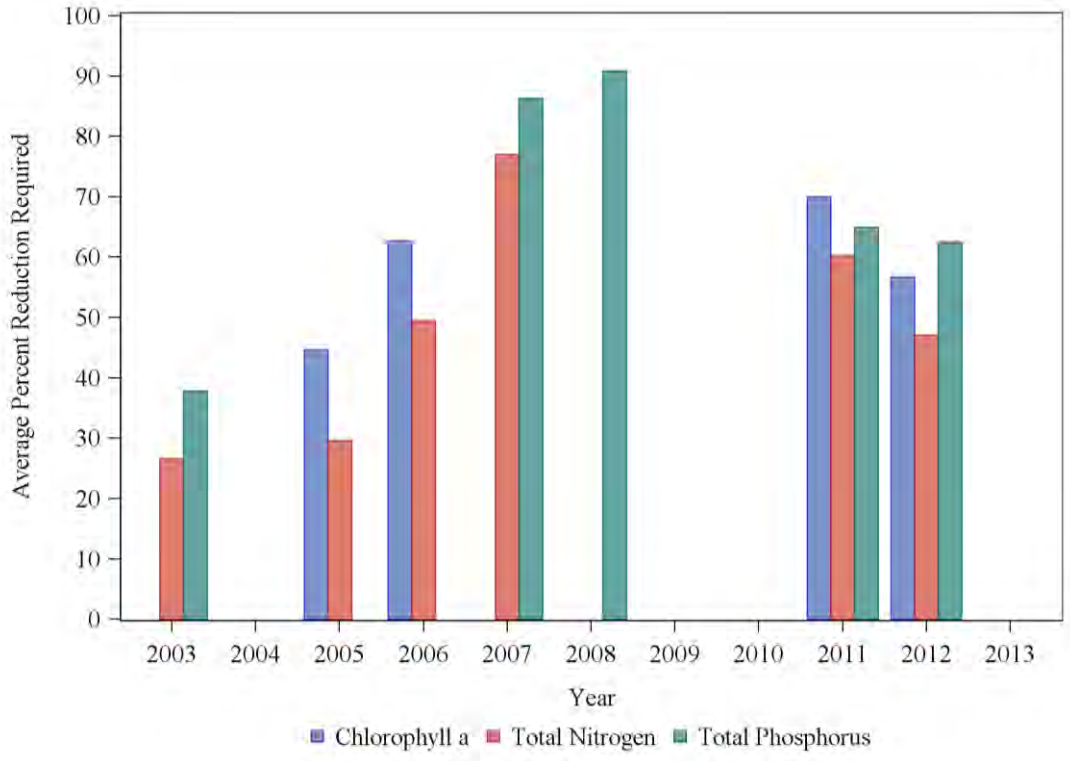


Figure 60. Lake Bonny average percent reduction required to meet the NNC from 2003-2013.



4.25. Little Lake Hamilton (WBID 15001)

Little Lake Hamilton (**Figure 61**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Little Lake Hamilton was evaluated using NNC over the verified period used for the initial impairment. Little Lake Hamilton is considered a clear, alkaline lake based on a long-term geometric mean color of 31 PCU and alkalinity of 77 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Little Lake Hamilton was impaired for elevated TN and TP using the NNC over the verified period (**Table 51**).

In addition, Little Lake Hamilton water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Little Lake Hamilton remained classified as a clear, alkaline lake (color=30 PCU, alkalinity=83 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Little Lake Hamilton was impaired for elevated TN and TP concentrations (**Table 52**). The annual percent exceedance was calculated for chlorophyll-a, TN and total phosphorus (**Figure 62**). The percent exceedance was variable for each parameter. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 53**). The calculated required TN percent concentration reductions ranged from 0 to 40 percent and TP concentration reductions from 10 to 38 percent to obtain compliance with NNC.

Figure 61. Location of water quality sampling sites in Little Lake Hamilton (WBID 15001).

Table 51. Results of NNC evaluation for Little Lake Hamilton (WBID 15001) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
15001	LITTLE LAKE HAMILTON	2002	-	-	-
15001	LITTLE LAKE HAMILTON	2003	-	-	-
15001	LITTLE LAKE HAMILTON	2004	-	-	-
15001	LITTLE LAKE HAMILTON	2005	19.4	1.108	-
15001	LITTLE LAKE HAMILTON	2006	13.6	0.987	-
15001	LITTLE LAKE HAMILTON	2007	-	**1.366**	**0.035**
15001	LITTLE LAKE HAMILTON	2008	**33.6**	**1.757**	**0.049**
15001	LITTLE LAKE HAMILTON	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 52. Results of NNC evaluation for Little Lake Hamilton (WBID 15001) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
15001	LITTLE LAKE HAMILTON	2003	-	-	-
15001	LITTLE LAKE HAMILTON	2004	-	-	-
15001	LITTLE LAKE HAMILTON	2005	19.4	1.108	-
15001	LITTLE LAKE HAMILTON	2006	13.6	0.987	-
15001	LITTLE LAKE HAMILTON	2007	-	**1.366**	**0.035**
15001	LITTLE LAKE HAMILTON	2008	**33.6**	**1.757**	**0.049**
15001	LITTLE LAKE HAMILTON	2009	-	-	-
15001	LITTLE LAKE HAMILTON	2010	-	-	-
15001	LITTLE LAKE HAMILTON	2011	-	-	-
15001	LITTLE LAKE HAMILTON	2003	-	-	-
15001	LITTLE LAKE HAMILTON	2004	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 62. Percent of Little Lake Hamilton Samples which Exceed Criteria from 2003-2013.

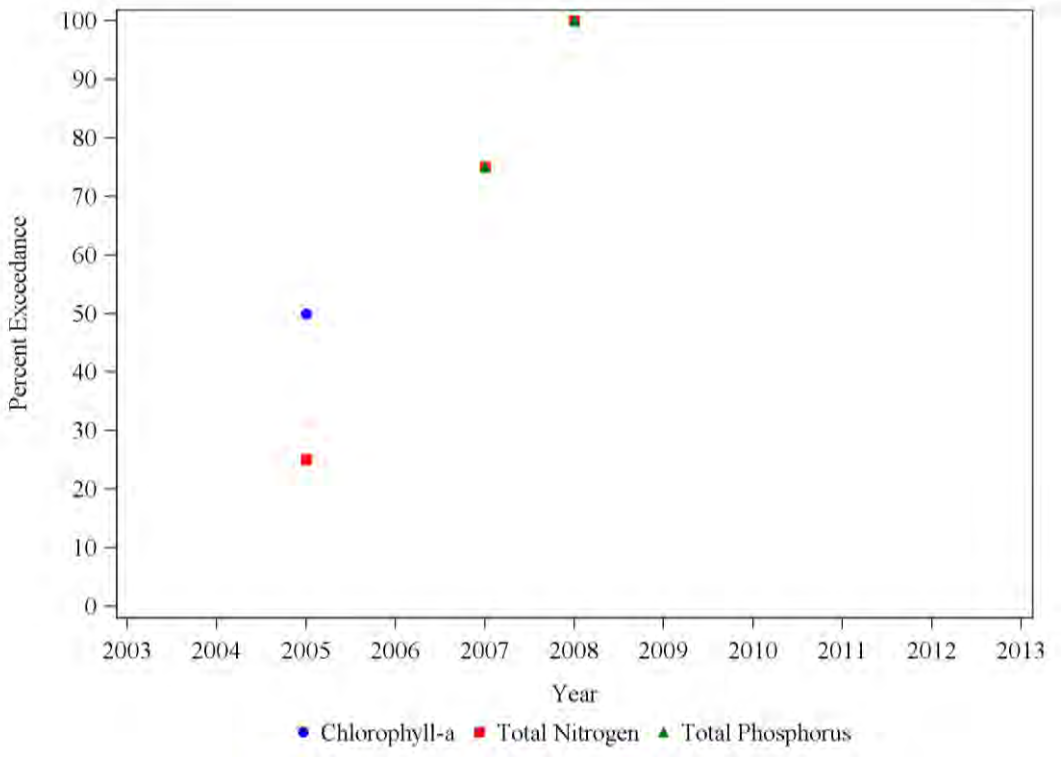
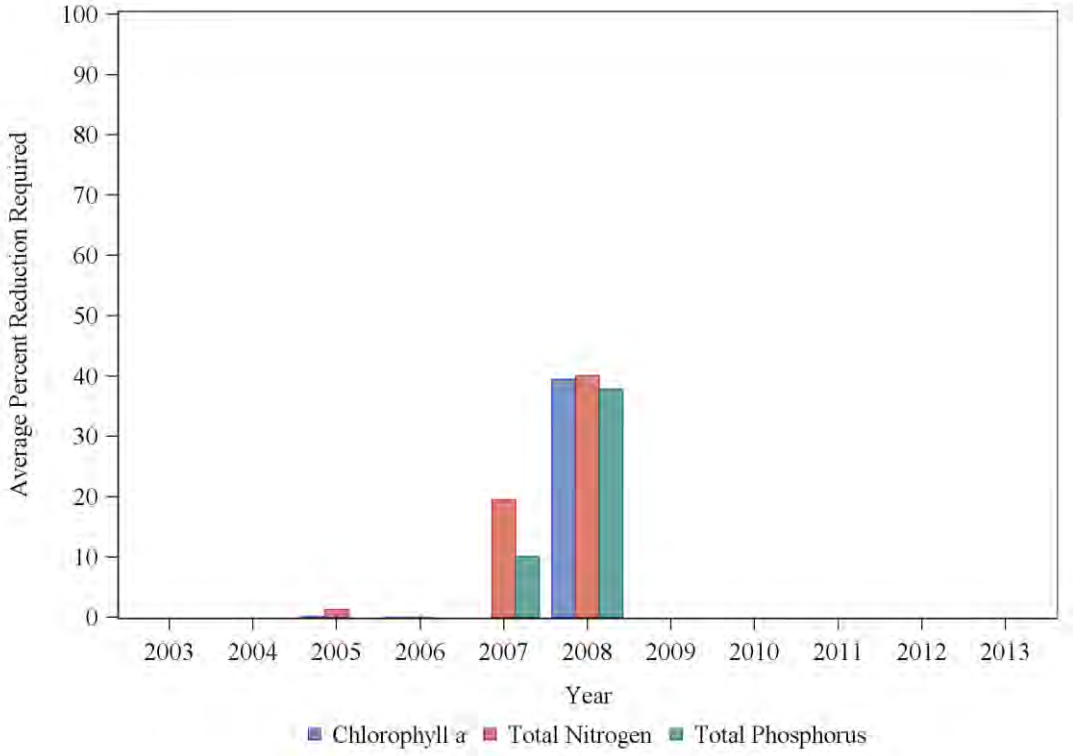


Figure 63. Little Lake Hamilton average percent reduction required to meet the NNC from 2003-2013.



4.26. Lake Confusion (WBID 15003)

Lake Confusion (**Figure 64**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Confusion was evaluated using NNC over the verified period used for the initial impairment. Lake Confusion is considered a clear, alkaline lake based on a long-term geometric mean color of 18 PCU and alkalinity of 42 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis were not consistent with the initial impairment determination and indicate that Lake Confusion was not found to be impaired for TN and TP during the verified period using the NNC (**Table 53**). There were insufficient chlorophyll-a data to determine impairment status over the initial verified period.

In addition, Lake Confusion water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Confusion remained classified as a clear, alkaline lake (color=19 PCU, alkalinity=24 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Confusion was unimpaired for TN and TP (**Table 54**). There were insufficient chlorophyll-a data to determine impairment status over the 2003 to 2013 time period.

Figure 64. Location of water quality sampling sites in Lake Confusion (WBID 15003).

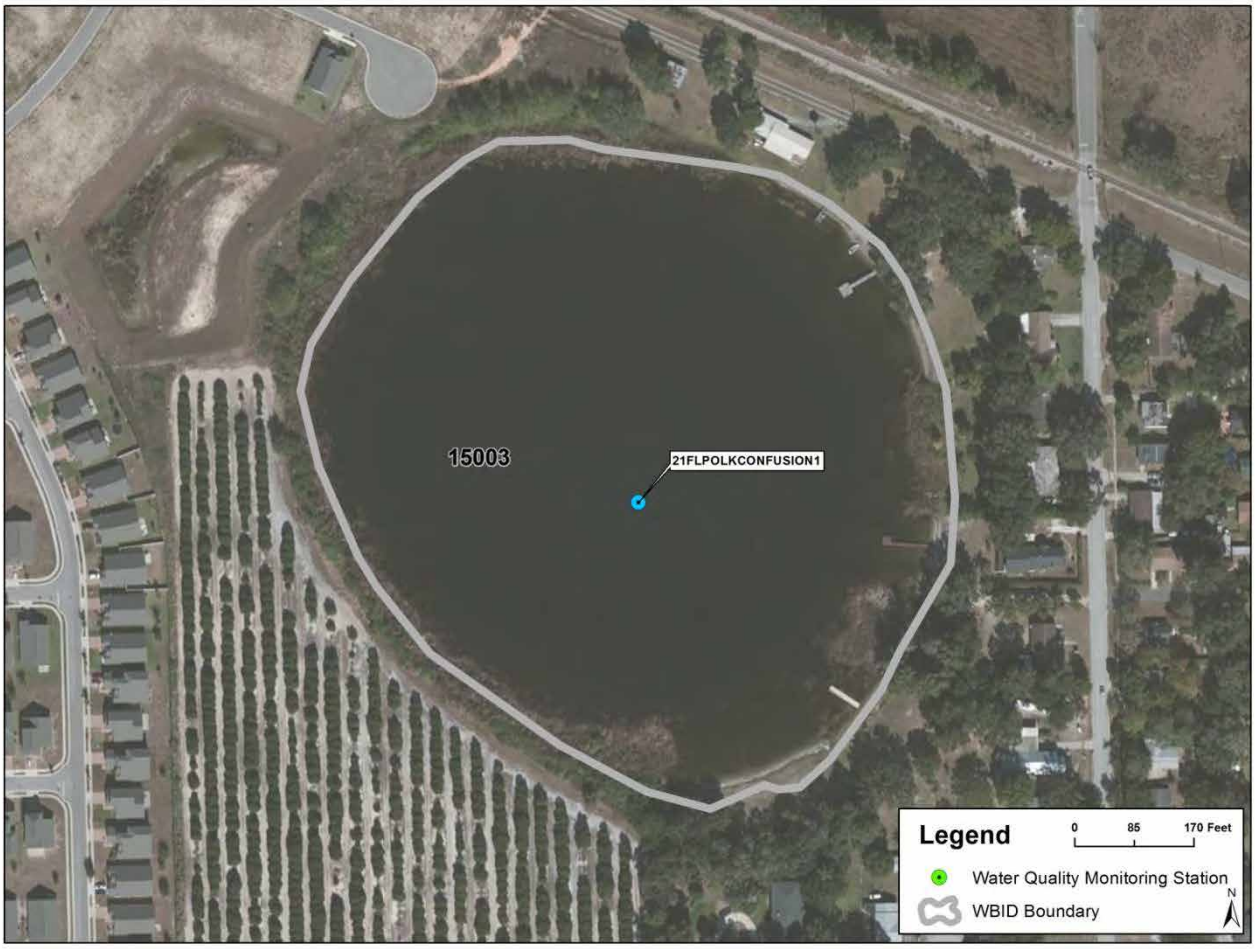


Table 53. Results of NNC evaluation for Lake Confusion (WBID 15003) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
15003	LAKE CONFUSION	2002	-	-	-
15003	LAKE CONFUSION	2003		-	-
15003	LAKE CONFUSION	2004	-	-	-
15003	LAKE CONFUSION	2005	7.1	0.894	-
15003	LAKE CONFUSION	2006	-	0.827	-
15003	LAKE CONFUSION	2007	-	0.836	0.025
15003	LAKE CONFUSION	2008	-	0.853	0.028
15003	LAKE CONFUSION	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 54. Results of NNC evaluation for Lake Confusion (WBID 15003) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
15003	LAKE CONFUSION	2003		-	-
15003	LAKE CONFUSION	2004	-	-	-
15003	LAKE CONFUSION	2005	7.1	0.894	-
15003	LAKE CONFUSION	2006	-	0.827	-
15003	LAKE CONFUSION	2007	-	0.836	0.025
15003	LAKE CONFUSION	2008	-	0.853	0.028
15003	LAKE CONFUSION	2009	-	0.789	0.018
15003	LAKE CONFUSION	2010	-	-	-
15003	LAKE CONFUSION	2011	4.4	0.871	0.018
15003	LAKE CONFUSION	2012	-	-	-
15003	LAKE CONFUSION	2003		-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

4.27. Lake Lena (WBID 1501)

Lake Lena (**Figure 65**) was declared impaired for nutrients due to elevated TSI during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. The impairment status of Lake Lena was evaluated using NNC over the verified period used for the initial impairment. Lake Lena is considered a clear, alkaline lake based on a long-term geometric mean color of 11 PCU and alkalinity of 28 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on chlorophyll-a concentration of 20.0 µg/L. The results of the analysis are contradictory to the initial impairment determination and indicate that there were insufficient data to determine impairment status over the initial verified period using the NNC (**Table 55**).

In addition, Lake Lena water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Lena remained classified as a clear, alkaline lake (color=12 PCU, alkalinity=38 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Lena was impaired for elevated chlorophyll-a, TN and TP concentrations (**Table 56**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 66**). The percent exceedance was variable for each parameter. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 67**). The calculated required chlorophyll-a percent concentration reductions ranged from 10 to 57 percent, TN concentration reductions ranged from 5 to 43 percent and TP concentration reductions from 8 to 38 percent to obtain compliance with NNC.

Figure 65. Location of water quality sampling sites in Lake Lena (WBID 1501).

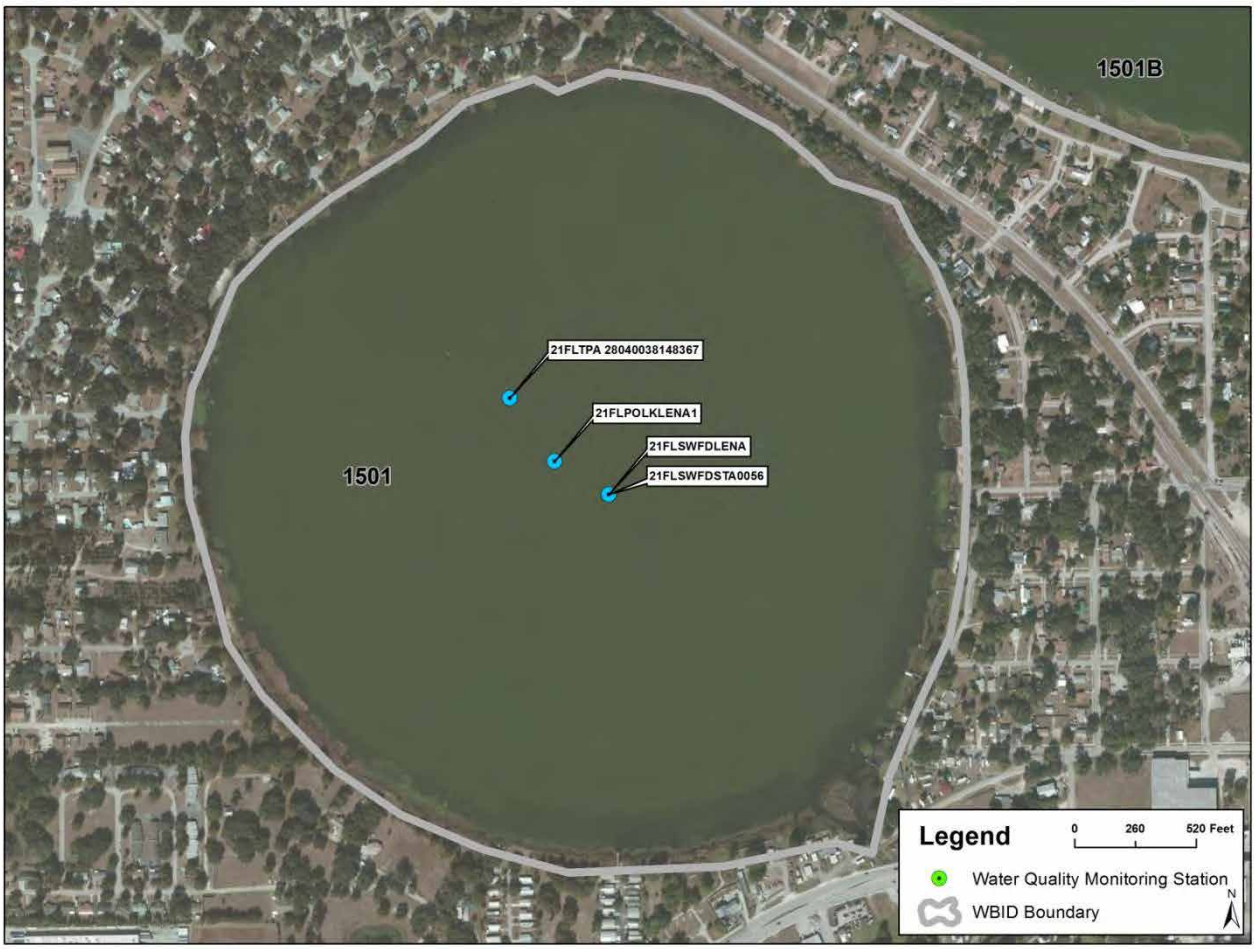


Table 55. Results of NNC evaluation for Lake Lena (WBID 1501) over verified period for TSI impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1501	LAKE LENA	1997	-	-	-
1501	LAKE LENA	1998		-	-
1501	LAKE LENA	1999	-	-	-
1501	LAKE LENA	2000	-	-	-
1501	LAKE LENA	2001	-	-	-
1501	LAKE LENA	2002	-	-	-
1501	LAKE LENA	2003	**42.6**	**1.864**	**0.048**
1501	LAKE LENA	2004	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 56. Results of NNC evaluation for Lake Lena (WBID 1501) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1501	LAKE LENA	2003	**42.6**	**1.864**	**0.048**
1501	LAKE LENA	2004	-	-	-
1501	LAKE LENA	2005	19.1	1.033	-
1501	LAKE LENA	2006	**62.4**	**1.952**	-
1501	LAKE LENA	2007	**39.3**	**1.687**	**0.034**
1501	LAKE LENA	2008	**38.6**	-	**0.035**
1501	LAKE LENA	2009	-	**1.976**	**0.036**
1501	LAKE LENA	2010	**21.2**	**1.442**	0.030
1501	LAKE LENA	2011	**32.3**	**1.902**	**0.037**
1501	LAKE LENA	2012	**28.0**	**1.559**	**0.033**
1501	LAKE LENA	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 66. Percent of Lake Lena Samples which Exceed Criteria from 2003-2013.

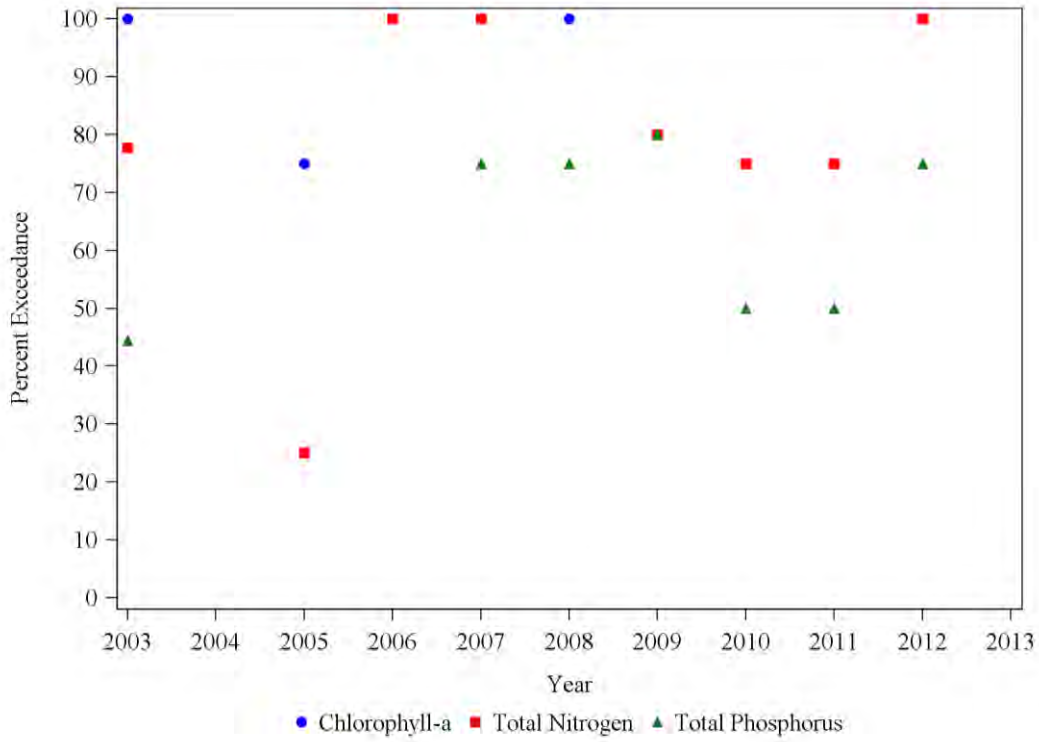
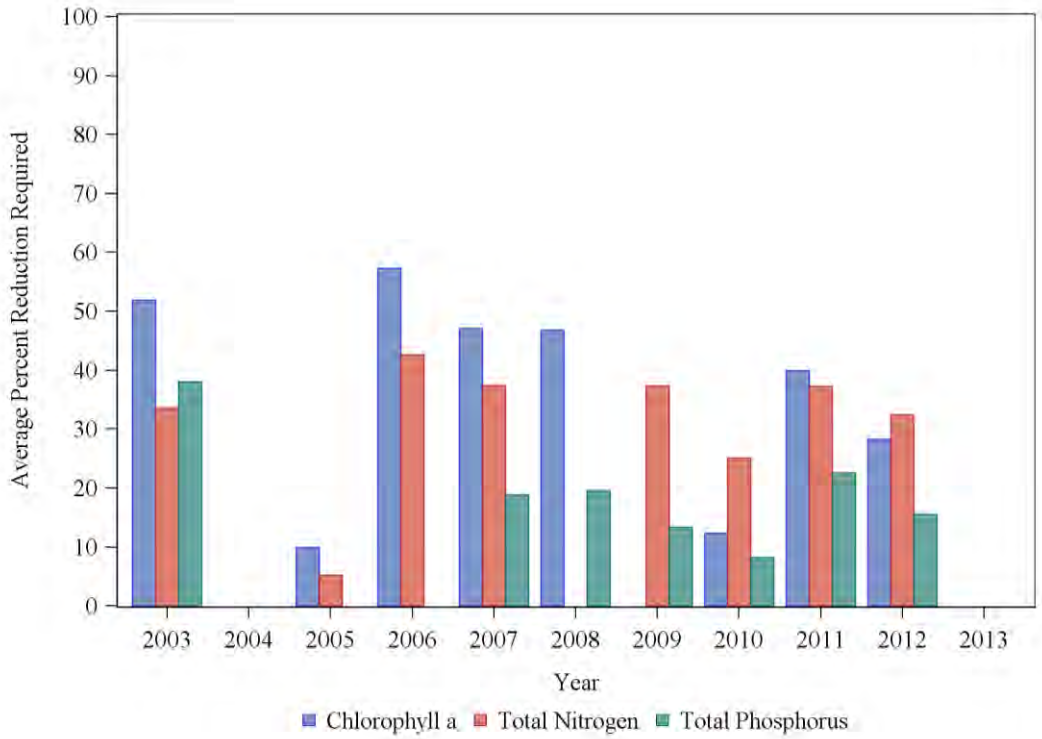


Figure 67. Lake Lena average percent reduction required to meet the NNC from 2003-2013.



4.28. Lake Ariana (WBID 1501B)

Lake Ariana (**Figure 68**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Ariana was evaluated using NNC over the verified period used for the initial impairment. Lake Ariana is considered a clear, alkaline lake based on a long-term geometric mean color of 9 PCU and alkalinity of 29 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Ariana was impaired for elevated chlorophyll-a concentrations during the verified period (**Table 57**).

In addition, Lake Ariana water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Ariana remained classified as a clear, alkaline lake (color=9 PCU, alkalinity=32 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Ariana continues to be impaired chlorophyll-a with the addition of TN (**Table 58**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 69**). The percent exceedance was frequently greater than 70 for chlorophyll-a and TN. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 70**). The calculated required chlorophyll-a concentration reductions ranged from 0 to 47 percent and TN concentration reductions ranged from 0 to 34 percent to obtain compliance with NNC.

Figure 68. Location of water quality sampling sites in Lake Ariana (WBID 1501B).

Table 57. Results of NNC evaluation for Lake Ariana (WBID 1501B) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1501B	LAKE ARIANA	2002	-	-	-
1501B	LAKE ARIANA	2003	-	**1.443**	0.026
1501B	LAKE ARIANA	2004	-	-	-
1501B	LAKE ARIANA	2005	13.8	0.784	-
1501B	LAKE ARIANA	2006	**25.0**	0.959	-
1501B	LAKE ARIANA	2007	19.4	0.802	0.022
1501B	LAKE ARIANA	2008	**22.7**	0.979	0.025
1501B	LAKE ARIANA	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 58. Results of NNC evaluation for Lake Ariana (WBID 1501B) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1501B	LAKE ARIANA	2003	-	**1.443**	0.026
1501B	LAKE ARIANA	2004	-	-	-
1501B	LAKE ARIANA	2005	13.8	0.784	-
1501B	LAKE ARIANA	2006	**25.0**	0.959	-
1501B	LAKE ARIANA	2007	19.4	0.802	0.022
1501B	LAKE ARIANA	2008	**22.7**	0.979	0.025
1501B	LAKE ARIANA	2009	-	**1.102**	0.023
1501B	LAKE ARIANA	2010	**28.6**	**1.315**	0.026
1501B	LAKE ARIANA	2011	**39.3**	**1.597**	0.029
1501B	LAKE ARIANA	2012	**25.0**	**1.170**	0.023
1501B	LAKE ARIANA	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 69. Percent of Lake Ariana Samples which Exceed Criteria from 2003-2013.

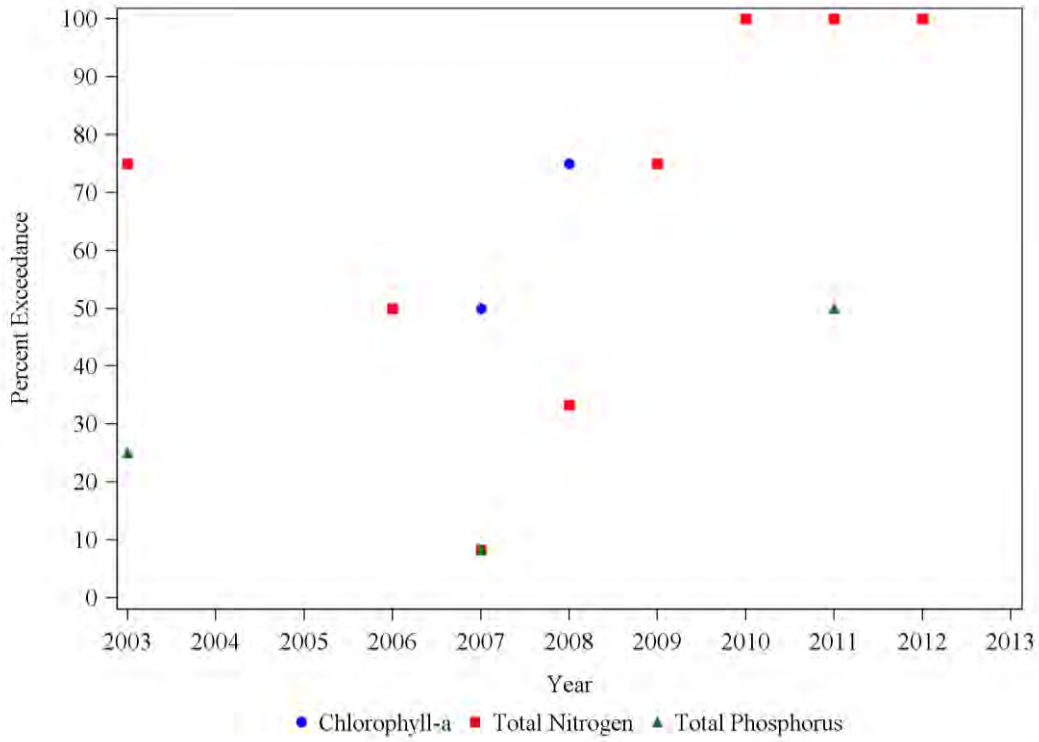
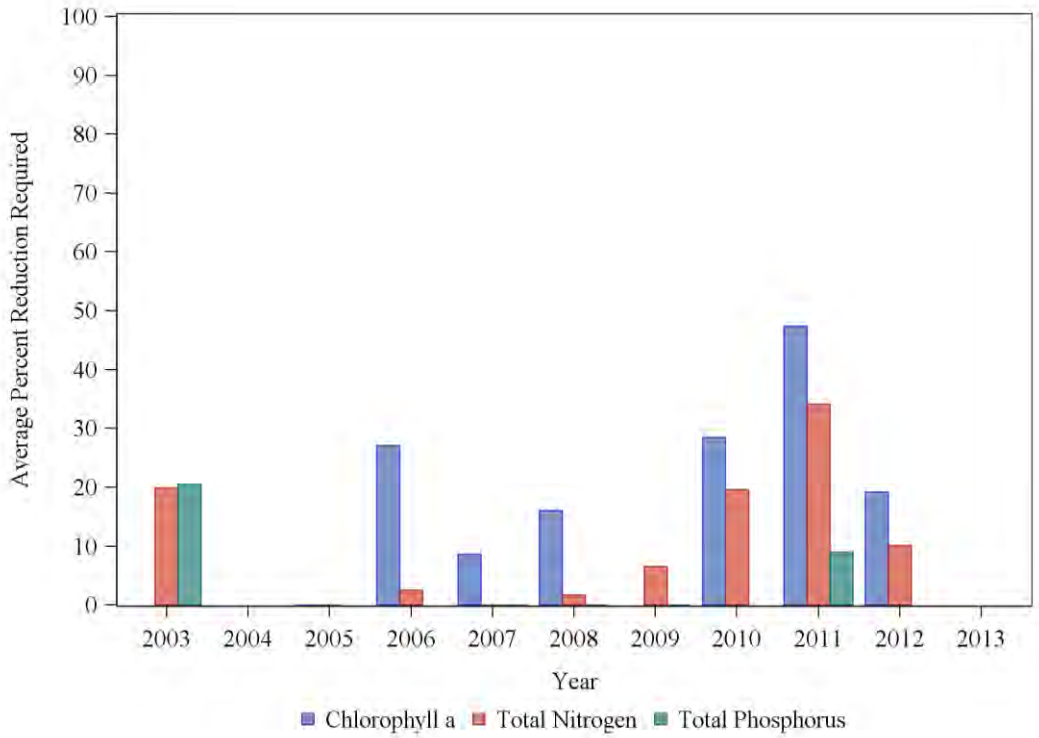


Figure 70. Lake Ariana average percent reduction required to meet the NNC from 2003-2013.



4.29. Sears Lake (WBID 1501W)

Sears Lake (**Figure 71**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Sears Lake was evaluated using NNC over the verified period used for the initial impairment. Sears Lake is considered a clear, alkaline lake based on a long-term geometric mean color of 20 PCU and conductivity of 184 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L The results of the analysis were not consistent with the initial impairment determination and indicate that Sears Lake was not found to be impaired for chlorophyll-a, TN and TP during the verified period using the NNC (**Table 59**).

In addition, Sears Lake water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Sears Lake was reclassified as a clear, acidic lake (color=17 PCU, alkalinity=3 mg/L). Due to the change in characterization, the nutrient criteria were determined based on a chlorophyll-a concentration of 6.0 µg/L. Results of the water quality comparison using current data indicate that Sears Lake was impaired for chlorophyll-a, TN and TP (**Table 60**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 72**). When sufficient data were available for analysis, the percent exceedance was variable for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 73**). The calculated required chlorophyll-a percent concentration reductions ranged from 0 to 52 percent, TN concentration reductions ranged from 0 to 31 percent and TP concentration reductions from 0 to 55 percent to obtain compliance with NNC.

Figure 71. Location of water quality sampling sites in Sears Lake (WBID 1501W).

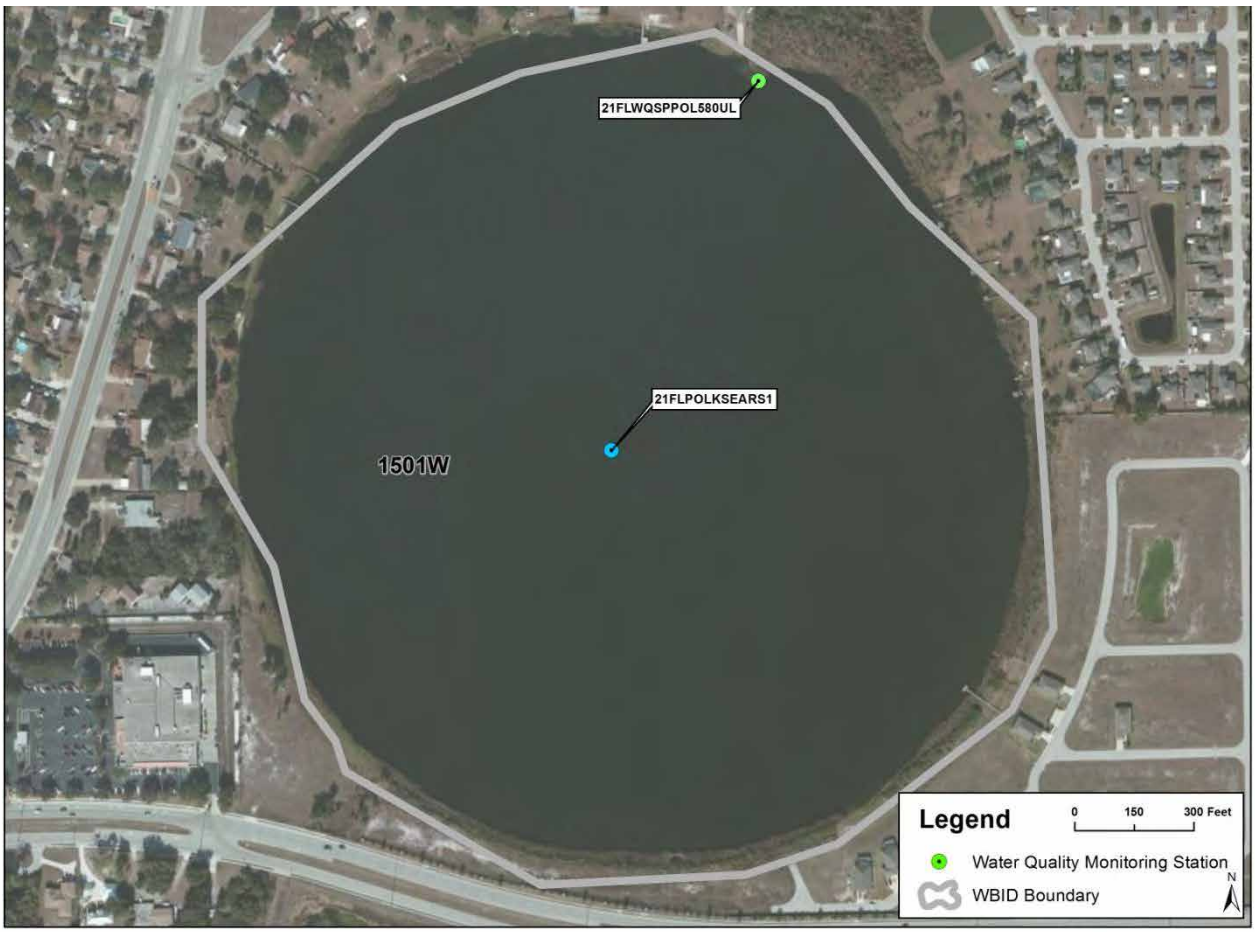


Table 59. Results of NNC evaluation for Sears Lake (WBID 1501W) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1501W	SEARS LAKE	2002	-	-	-
1501W	SEARS LAKE	2003	-	-	-
1501W	SEARS LAKE	2004	-	-	-
1501W	SEARS LAKE	2005	9.8	0.797	0.030
1501W	SEARS LAKE	2006	-	0.741	-
1501W	SEARS LAKE	2007	13.4	0.724	0.023
1501W	SEARS LAKE	2009	-	-	-
1501W	SEARS LAKE	2002	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 60. Results of NNC evaluation for Sears Lake (WBID 1501W) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1501W	SEARS LAKE	2003	-	-	-
1501W	SEARS LAKE	2004	-	-	-
1501W	SEARS LAKE	2005	**9.8**	**0.797**	**0.030**
1501W	SEARS LAKE	2006	-	**0.741**	-
1501W	SEARS LAKE	2007	**13.4**	**0.724**	**0.023**
1501W	SEARS LAKE	2008	-	-	-
1501W	SEARS LAKE	2009	-	-	-
1501W	SEARS LAKE	2010	-	-	-
1501W	SEARS LAKE	2011	-	**0.664**	**0.025**
1501W	SEARS LAKE	2012	4.4	0.527	0.022
1501W	SEARS LAKE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 72. Percent of Sears Lake Samples which Exceed Criteria from 2003-2013.

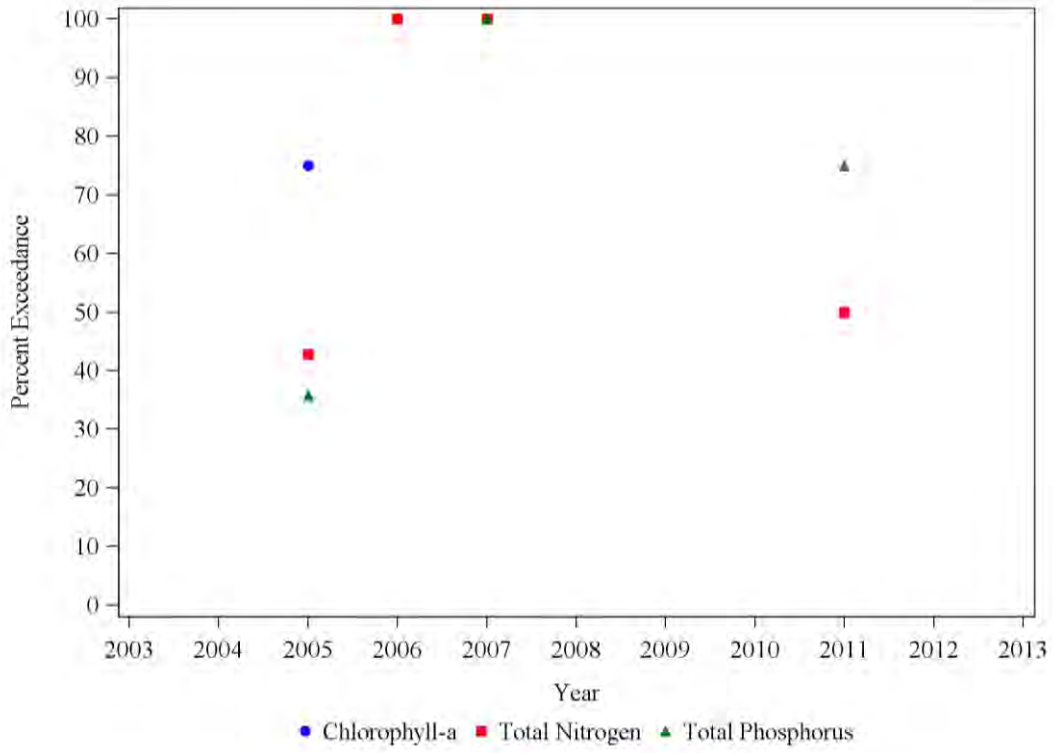
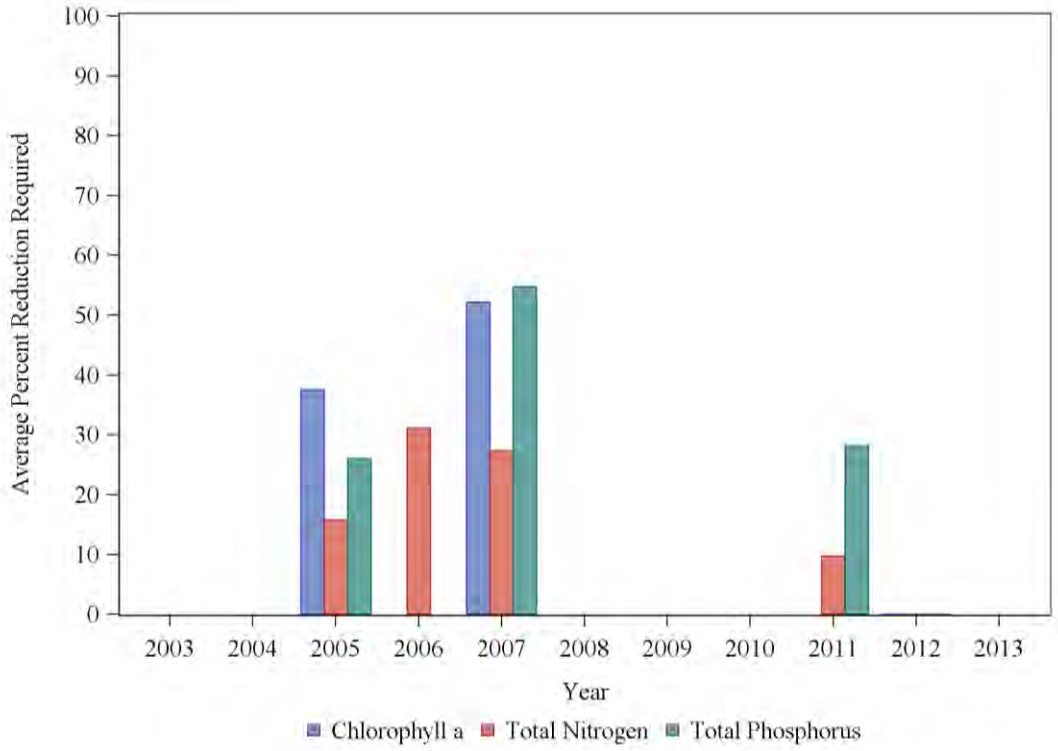


Figure 73. Sears Lake average percent reduction required to meet the NNC from 2003-2013.



4.30. Lake Eva (WBID 15101)

Lake Eva (**Figure 74**) was declared impaired for nutrients due to TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Eva was evaluated using NNC over the verified period used for the initial impairment. Lake Eva is considered a clear, alkaline lake based on a long-term geometric mean color of 14 PCU and alkalinity of 60 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Eva was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period (**Table 61**).

In addition, Lake Eva water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Eva remained characterized as a clear, alkaline lake (color=14 PCU, alkalinity=65 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Eva continues to be impaired for chlorophyll-a, TN and TP (**Table 62**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 75**). The percent exceedance was frequently greater than 70 percent for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 76**). The calculated required chlorophyll-a percent concentration reductions ranged from 3 to 44 percent, TN concentration reductions ranged from 2 to 47 percent and TP concentration reductions from 14 to 43 percent to obtain compliance with NNC.

Figure 74. Location of water quality sampling sites in Lake Eva (WBID 15101).

Table 61. Results of NNC evaluation for Lake Eva (WBID 15101) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
15101	LAKE EVA	2002	**26.3**	**1.408**	**0.046**
15101	LAKE EVA	2003	-	**1.194**	**0.053**
15101	LAKE EVA	2004	17.4	1.025	0.037
15101	LAKE EVA	2005	**31.4**	**1.387**	-
15101	LAKE EVA	2006	**26.0**	**1.215**	**0.042**
15101	LAKE EVA	2007	**21.9**	**1.260**	**0.040**
15101	LAKE EVA	2008	-	-	-
15101	LAKE EVA	2009	-	**1.929**	**0.050**
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 62. Results of NNC evaluation for Lake Eva (WBID 15101) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
15101	LAKE EVA	2003	-	**1.194**	**0.053**
15101	LAKE EVA	2004	17.4	1.025	0.037
15101	LAKE EVA	2005	**31.4**	**1.387**	-
15101	LAKE EVA	2006	**26.0**	**1.215**	**0.042**
15101	LAKE EVA	2007	**21.9**	**1.260**	**0.040**
15101	LAKE EVA	2008	-	-	-
15101	LAKE EVA	2009	**36.5**	**1.996**	**0.044**
15101	LAKE EVA	2010	**26.9**	**1.829**	**0.042**
15101	LAKE EVA	2011	**30.8**	**1.676**	**0.038**
15101	LAKE EVA	2012	**33.0**	**1.672**	**0.043**
15101	LAKE EVA	2013	-	**1.705**	**0.049**
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 75. Percent of Lake Eva Samples which Exceed Criteria from 2003-2013.

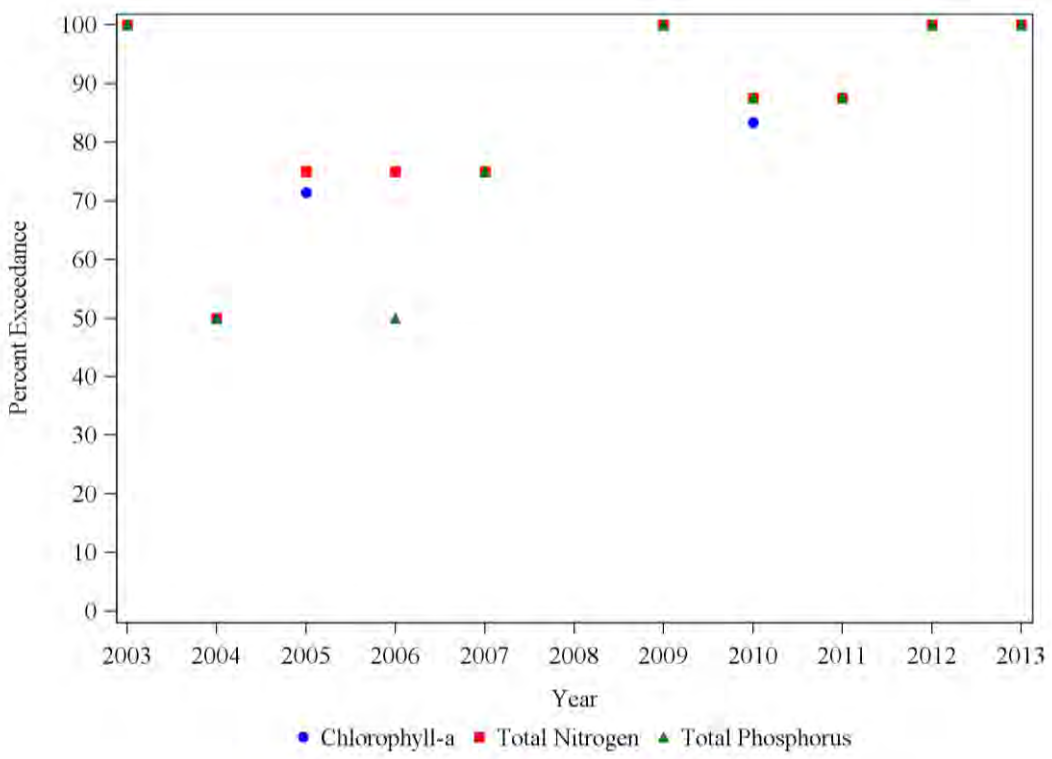
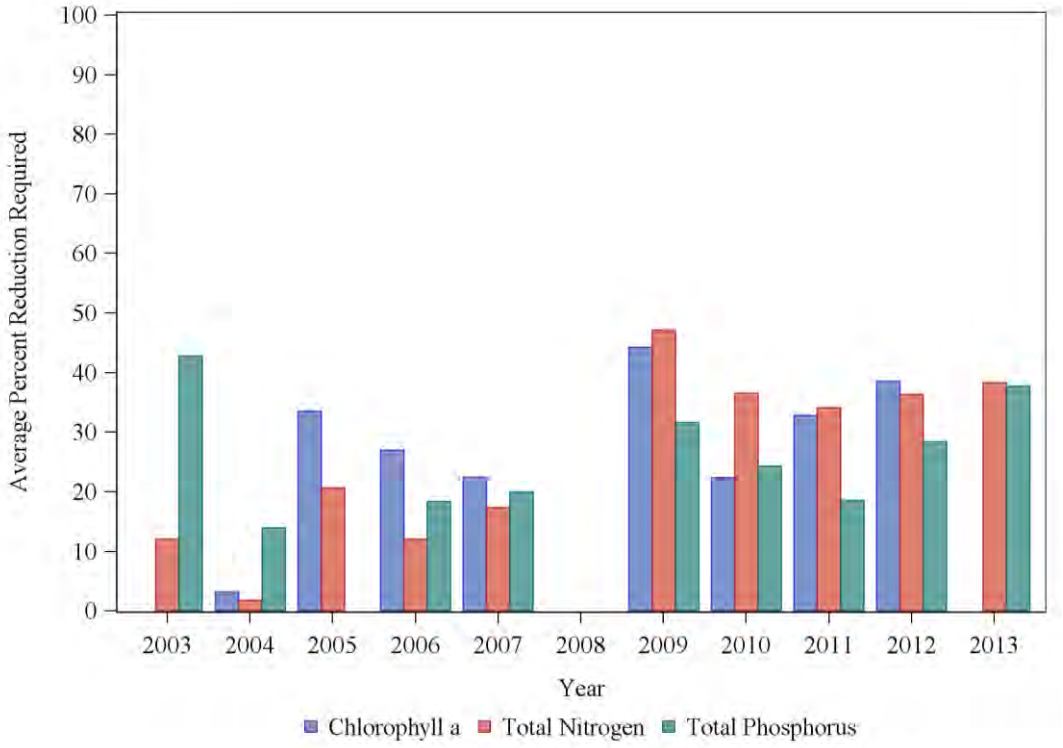


Figure 76. Lake Eva average percent concentration reduction required to meet the NNC from 2003-2013.



4.31. Lake Lulu (WBID 1521)

Lake Lulu (**Figure 77**) was declared impaired for nutrients due to TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Lake Lulu. The impairment status of Lake Lulu was evaluated using NNC over the verified period used for the initial impairment. Lake Lulu is considered a clear, alkaline lake based on a long-term geometric mean color of 20 PCU and alkalinity of 59 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L The results of the analysis support the initial impairment determination and indicate that Lake Lulu was impaired for elevated chlorophyll-a and TN concentrations during the verified period using the NNC (**Table 63**). There were insufficient TP data to determine impairment status over the initial verified period.

In addition, Lake Lulu water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Lulu remained characterized as a clear, alkaline lake (color=19 PCU, alkalinity=60 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Lulu continues to be impaired for chlorophyll-a and TN with the addition of TP (**Table 64**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 78**). The percent exceedance was frequently 100 percent for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 79**). The calculated required chlorophyll-a percent concentration reductions ranged from 10 to 46 percent, TN concentration reductions ranged from 10 to 35 percent and TP concentration reductions from 9 to 39 percent to obtain compliance with NNC.

Figure 77. Location of water quality sampling sites in Lake Lulu (WBID 1521).

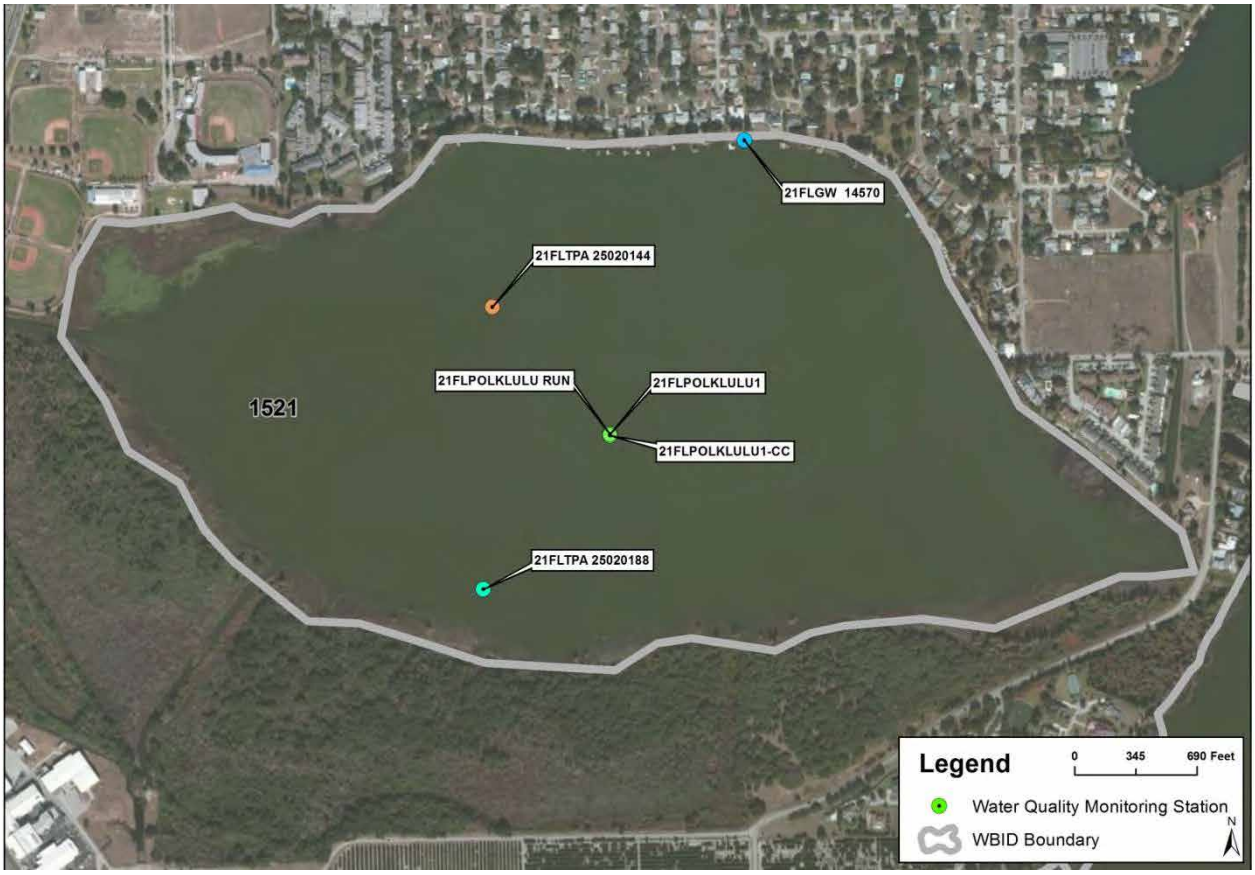


Table 63. Results of NNC evaluation for Lake Lulu (WBID 1521) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521	LAKE LULU	2002	-	**1.490**	**0.041**
1521	LAKE LULU	2003	-	-	-
1521	LAKE LULU	2004	-	-	-
1521	LAKE LULU	2005	-	**1.162**	-
1521	LAKE LULU	2006	**38.6**	**1.374**	-
1521	LAKE LULU	2007	-	**1.588**	-
1521	LAKE LULU	2008	**34.8**	**1.643**	**0.049**
1521	LAKE LULU	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 64. Results of NNC evaluation for Lake Lulu (WBID 1521) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521	LAKE LULU	2003	-	-	-
1521	LAKE LULU	2004	-	-	-
1521	LAKE LULU	2005	-	**1.162**	-
1521	LAKE LULU	2006	**38.6**	**1.374**	-
1521	LAKE LULU	2007	-	**1.588**	-
1521	LAKE LULU	2008	**34.8**	**1.643**	**0.049**
1521	LAKE LULU	2009	**30.9**	**1.455**	**0.044**
1521	LAKE LULU	2010	**29.6**	**1.496**	**0.042**
1521	LAKE LULU	2011	**25.5**	**1.456**	**0.036**
1521	LAKE LULU	2012	**22.3**	**1.330**	**0.034**
1521	LAKE LULU	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 78. Percent of Lake Lulu Samples which Exceed Criteria from 2003-2013.

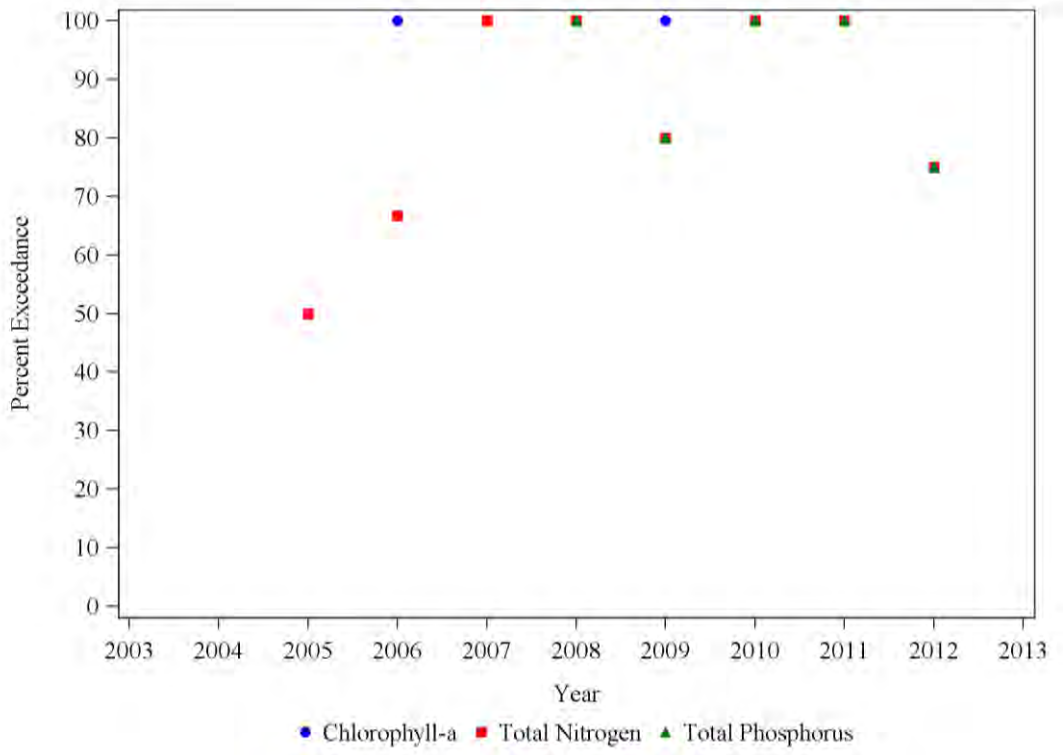
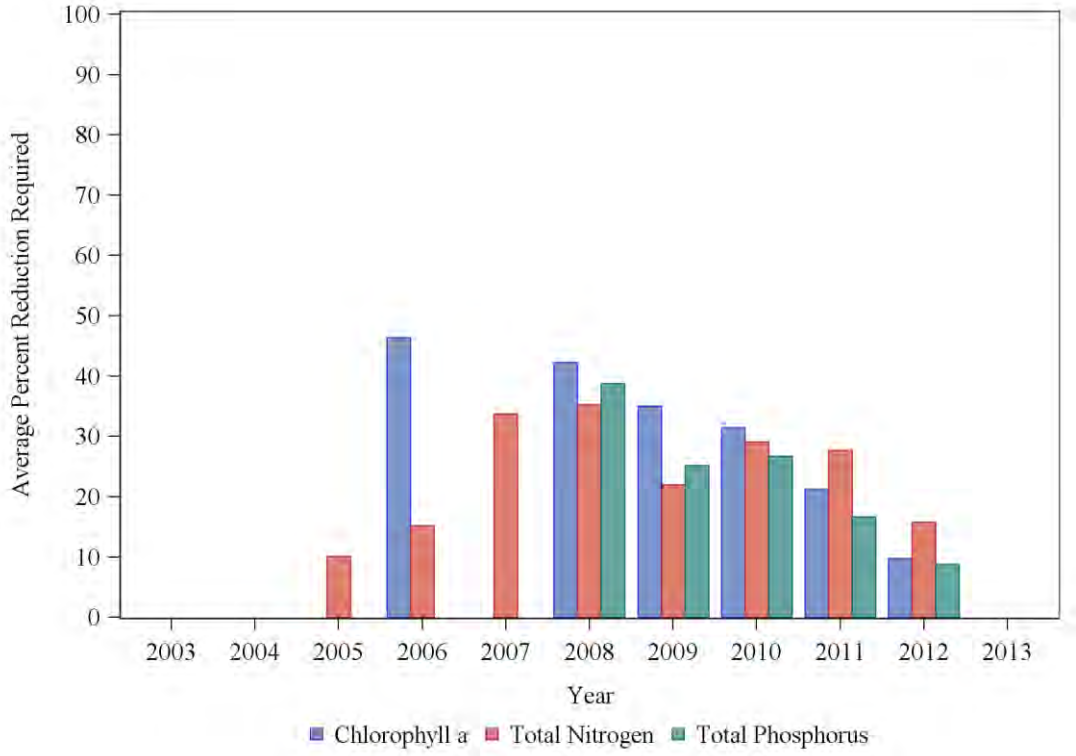


Figure 79. Lake Lulu average percent concentration reduction required to meet the NNC from 2003-2013.



4.32. Lake Eloise (WBID 1521B)

Lake Eloise (**Figure 80**) was declared impaired for nutrients due to TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Eloise was evaluated using NNC over the verified period used for the initial impairment. Lake Eloise is considered a clear, alkaline lake based on a long-term geometric mean color of 13 PCU and alkalinity of 56 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L The results of the analysis support the initial impairment determination and indicate that Lake Eloise was impaired for elevated chlorophyll-a and TN concentrations during the verified period using the NNC (**Table 65**). There were insufficient TP data to determine impairment status over the initial verified period.

In addition, Lake Eloise water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Eloise remained characterized as a clear, alkaline lake (color=13 PCU, alkalinity=59 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Eloise continues to be impaired for chlorophyll-a and TN with the addition of TP (**Table 66**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 81**). The percent exceedance was frequently greater than 70 percent for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 82**). The calculated required chlorophyll-a percent concentration reductions ranged from 10 to 49 percent, TN concentration reductions ranged from 10 to 36 percent and TP concentration reductions from 8 to 19 percent to obtain compliance with NNC.

Figure 80. Location of water quality sampling sites in Lake Eloise (WBID 1521B).

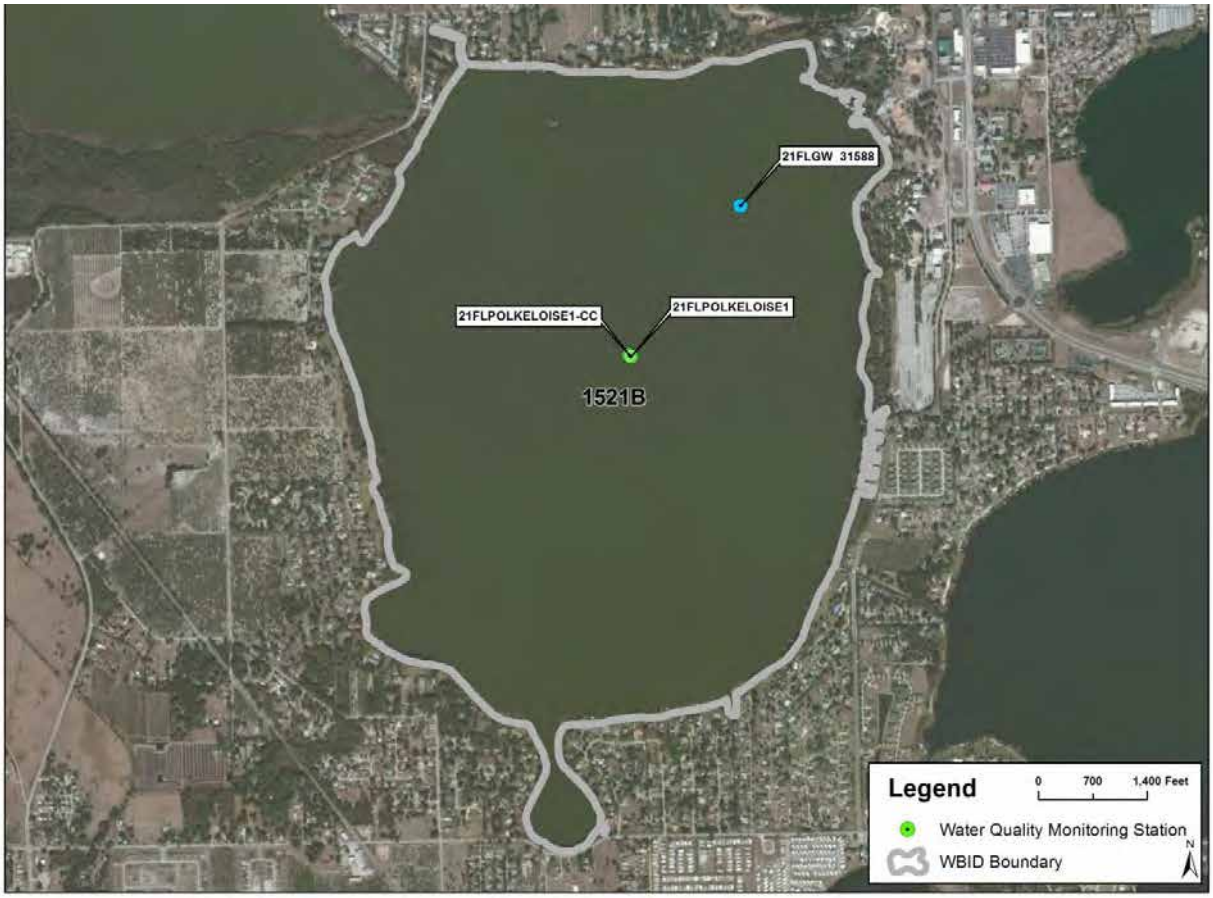


Table 65. Results of NNC evaluation for Lake Eloise (WBID 1521B) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521B	LAKE ELOISE	2002	-	-	-
1521B	LAKE ELOISE	2003	**24.9**	**1.173**	-
1521B	LAKE ELOISE	2004	**22.8**	**1.189**	**0.037**
1521B	LAKE ELOISE	2005	-	**1.480**	-
1521B	LAKE ELOISE	2006	**30.4**	**1.168**	-
1521B	LAKE ELOISE	2007	-	**1.167**	-
1521B	LAKE ELOISE	2008	**30.5**	**1.134**	**0.033**
1521B	LAKE ELOISE	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 66. Results of NNC evaluation for Lake Eloise (WBID 1521B) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521B	LAKE ELOISE	2003	**24.9**	**1.173**	-
1521B	LAKE ELOISE	2004	**22.8**	**1.189**	**0.037**
1521B	LAKE ELOISE	2005	-	**1.480**	-
1521B	LAKE ELOISE	2006	**30.4**	**1.168**	-
1521B	LAKE ELOISE	2007	-	**1.167**	-
1521B	LAKE ELOISE	2008	**30.5**	**1.134**	**0.033**
1521B	LAKE ELOISE	2009	**27.1**	**1.167**	**0.033**
1521B	LAKE ELOISE	2010	**31.0**	**1.345**	**0.031**
1521B	LAKE ELOISE	2011	**39.0**	**1.648**	**0.032**
1521B	LAKE ELOISE	2012	**25.6**	**1.316**	**0.031**
1521B	LAKE ELOISE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 81. Percent of Lake Eloise Samples which Exceed Criteria from 2003-2013.

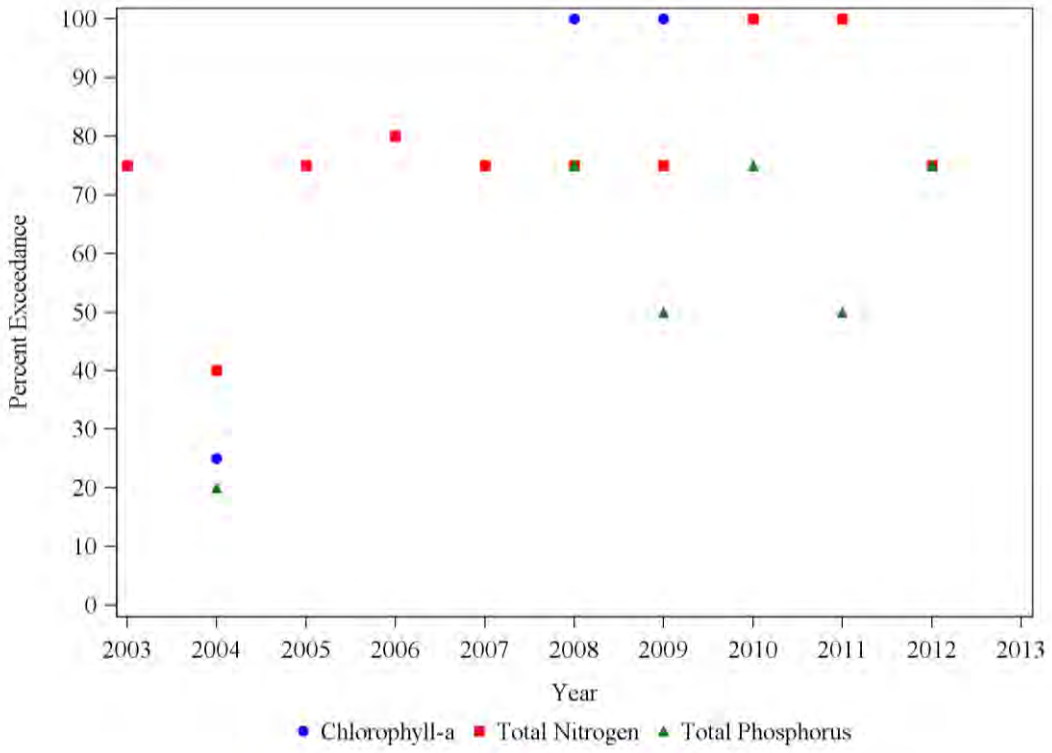
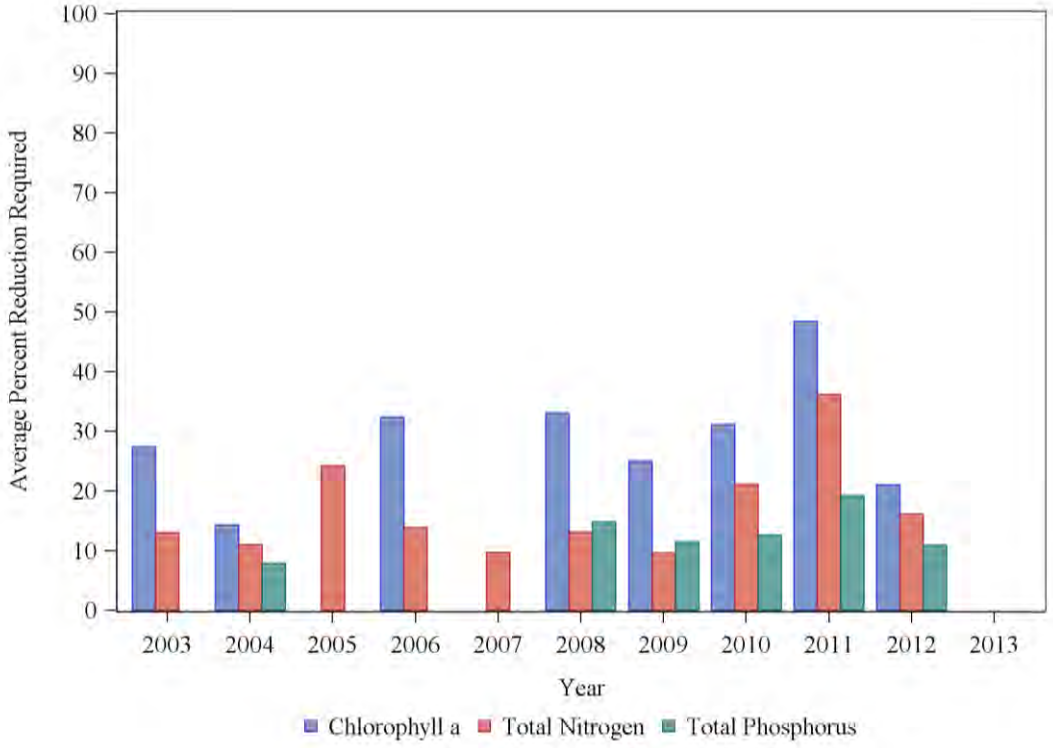


Figure 82. Lake Eloise average percent concentration reduction required to meet the NNC from 2003-2013.



4.33. Lake Shipp (WBID 1521D)

Lake Shipp (**Figure 83**) was declared impaired for nutrients due to TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Lake Shipp. The impairment status of Lake Shipp was evaluated using NNC over the verified period used for the initial impairment. Lake Shipp is considered a clear, alkaline lake based on a long-term geometric mean color of 19 PCU and alkalinity of 59 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Shipp was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period using the NNC (**Table 67**).

In addition, Lake Shipp water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Shipp remained characterized as a clear, alkaline lake (color=18 PCU, alkalinity=60 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Shipp continues to be impaired for chlorophyll-a, TN and TP (**Table 68**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 84**). The percent exceedance was frequently 100 percent for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 85**). The calculated required chlorophyll-a percent concentration reductions ranged from 44 to 73 percent, TN concentration reductions ranged from 26 to 60 percent and TP concentration reductions from 21 to 38 percent to obtain compliance with NNC.

Figure 83. Location of water quality sampling sites in Lake Shipp (WBID 1521D).

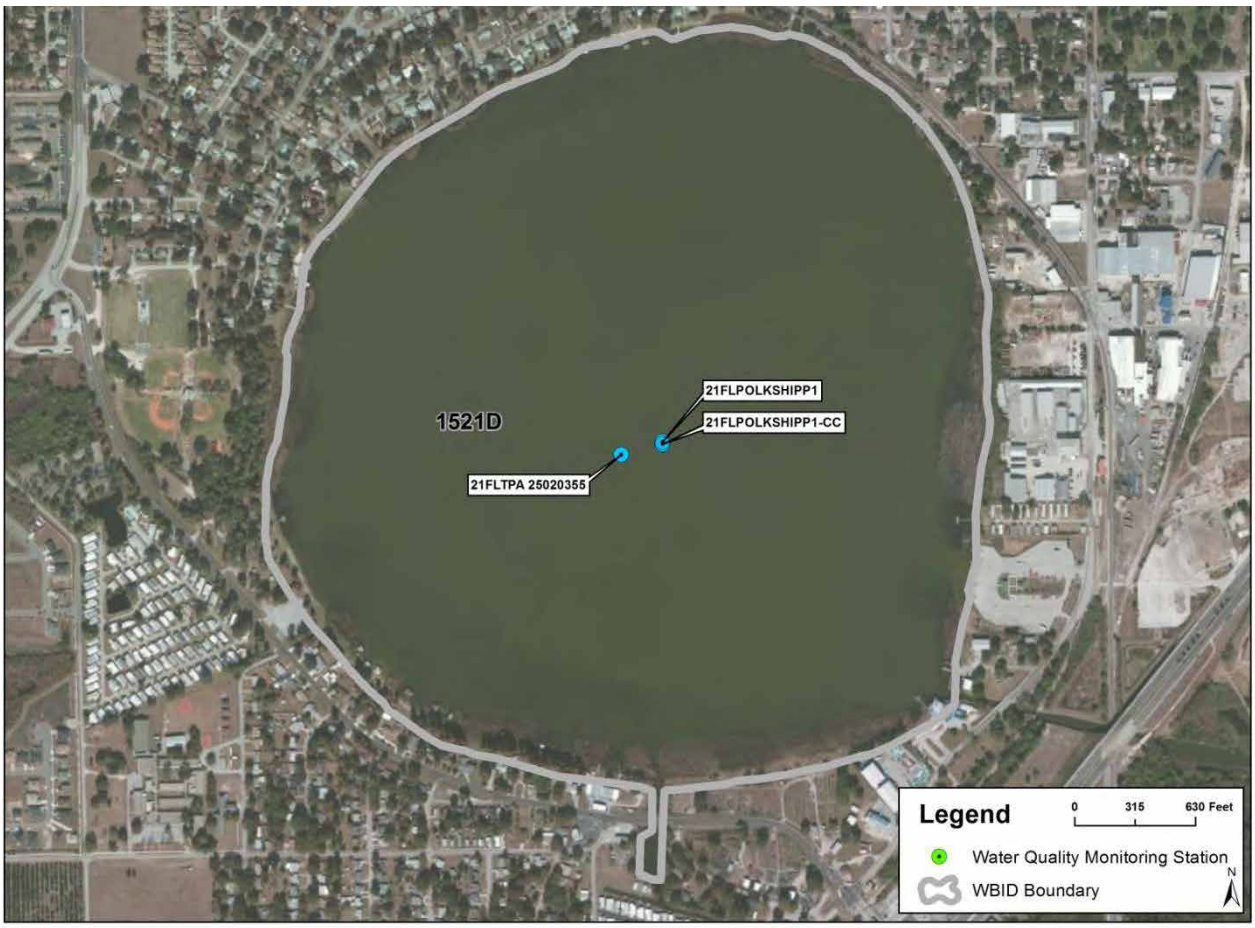


Table 67. Results of NNC evaluation for Lake Shipp (WBID 1521D) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521D	LAKE SHIPP	2002	-	**2.087**	**0.038**
1521D	LAKE SHIPP	2003	**40.0**	**1.677**	**0.041**
1521D	LAKE SHIPP	2004	-	**1.586**	**0.045**
1521D	LAKE SHIPP	2005	-	**1.450**	-
1521D	LAKE SHIPP	2006	**73.9**	**2.227**	-
1521D	LAKE SHIPP	2007	-	**2.648**	-
1521D	LAKE SHIPP	2008	**30.0**	**2.083**	**0.050**
1521D	LAKE SHIPP	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 68. Results of NNC evaluation for Lake Shipp (WBID 1521D) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521D	LAKE SHIPP	2003	**40.0**	**1.677**	**0.041**
1521D	LAKE SHIPP	2004	-	**1.586**	**0.045**
1521D	LAKE SHIPP	2005	-	**1.450**	-
1521D	LAKE SHIPP	2006	**73.9**	**2.227**	-
1521D	LAKE SHIPP	2007	-	**2.648**	-
1521D	LAKE SHIPP	2008	**30.0**	**2.083**	**0.050**
1521D	LAKE SHIPP	2009	**50.5**	**1.948**	**0.048**
1521D	LAKE SHIPP	2010	**38.8**	**1.688**	**0.041**
1521D	LAKE SHIPP	2011	**38.1**	**1.868**	**0.042**
1521D	LAKE SHIPP	2012	**36.2**	**1.725**	**0.038**
1521D	LAKE SHIPP	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 84. Percent of Lake Shipp Samples which Exceed Criteria from 2003-2013.

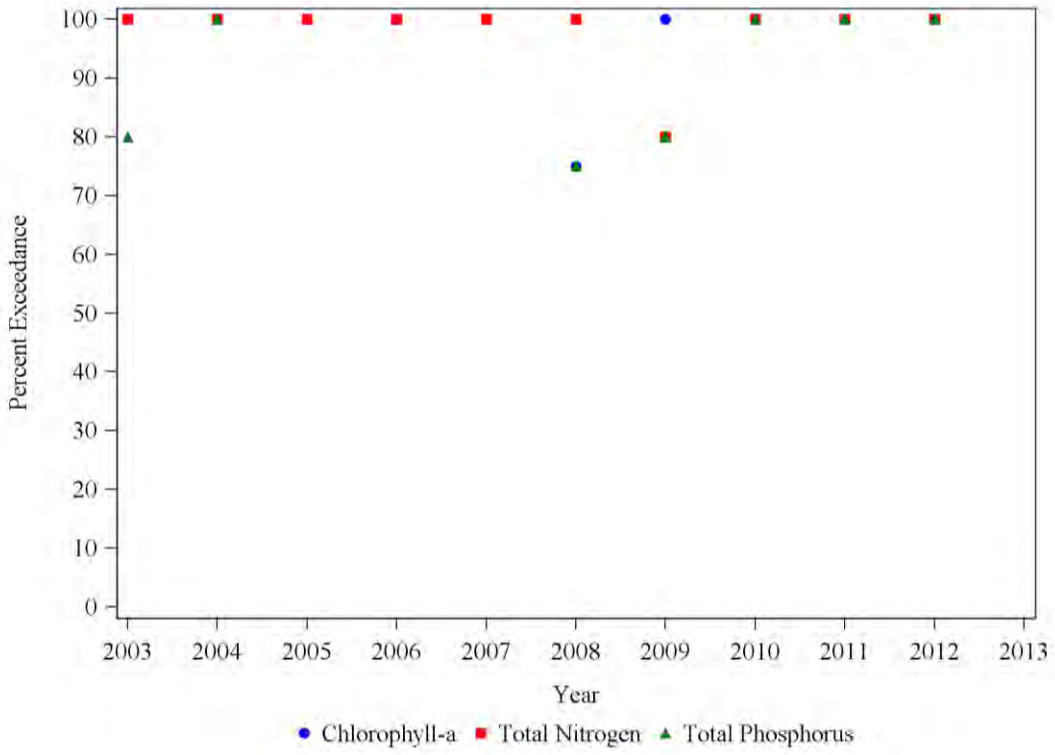
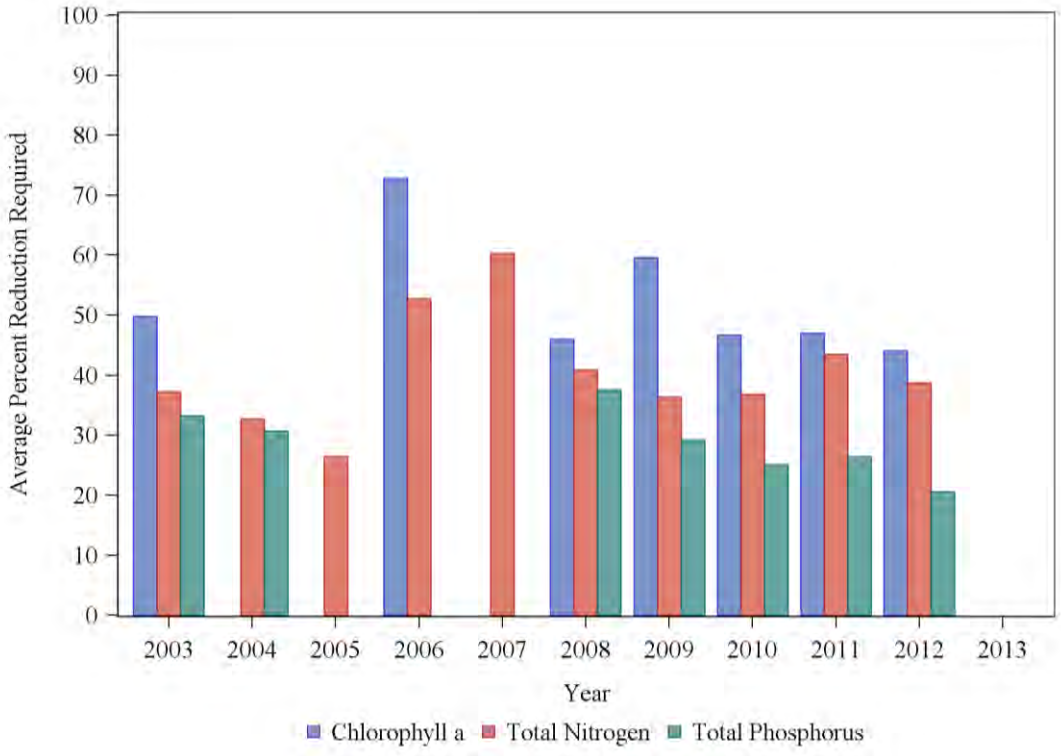


Figure 85. Lake Shipp average percent concentration reduction required to meet the NNC from 2003-2013.



4.34. Lake May (WBID 1521E)

Lake May (**Figure 86**) was declared impaired for nutrients due to TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Lake May. The impairment status of Lake May was evaluated using NNC over the verified period used for the initial impairment. Lake May is considered a clear, alkaline lake based on a long-term geometric mean color of 19 PCU and alkalinity of 58 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L The results of the analysis support the initial impairment determination and indicate that Lake May was impaired for elevated chlorophyll-a and TN concentrations during the verified period using the NNC (**Table 69**). There were insufficient TP data to determine impairment status over the initial verified period.

In addition, Lake May water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake May remained characterized as a clear, alkaline lake (color=19 PCU, alkalinity=60 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake May continues to be impaired for chlorophyll-a and TN with the addition of TP (**Table 70**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 87**). The percent exceedance was 100 percent for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 88**). The calculated required chlorophyll-a percent concentration reductions ranged from 38 to 60 percent, TN concentration reductions ranged from 21 to 54 percent and TP concentration reductions from 47 to 59 percent to obtain compliance with NNC.

Figure 86. Location of water quality sampling sites in Lake May (WBID 1521E).

Table 69. Results of NNC evaluation for Lake May (WBID 1521E) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521E	LAKE MAY	2002	-	-	-
1521E	LAKE MAY	2003	-	-	-
1521E	LAKE MAY	2004	-	-	-
1521E	LAKE MAY	2005	-	**1.326**	-
1521E	LAKE MAY	2006	**47.6**	**1.641**	-
1521E	LAKE MAY	2007	-	**2.298**	-
1521E	LAKE MAY	2008	**51.3**	**1.905**	**0.074**
1521E	LAKE MAY	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 70. Results of NNC evaluation for Lake May (WBID 1521E) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521E	LAKE MAY	2003	-	-	-
1521E	LAKE MAY	2004	-	-	-
1521E	LAKE MAY	2005	-	**1.326**	-
1521E	LAKE MAY	2006	**47.6**	**1.641**	-
1521E	LAKE MAY	2007	-	**2.298**	-
1521E	LAKE MAY	2008	**51.3**	**1.905**	**0.074**
1521E	LAKE MAY	2009	**46.8**	**1.729**	**0.075**
1521E	LAKE MAY	2010	**32.3**	**1.547**	**0.058**
1521E	LAKE MAY	2011	**35.3**	**1.732**	**0.058**
1521E	LAKE MAY	2012	-	-	-
1521E	LAKE MAY	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 87. Percent of Lake May Samples which Exceed Criteria from 2003-2013.

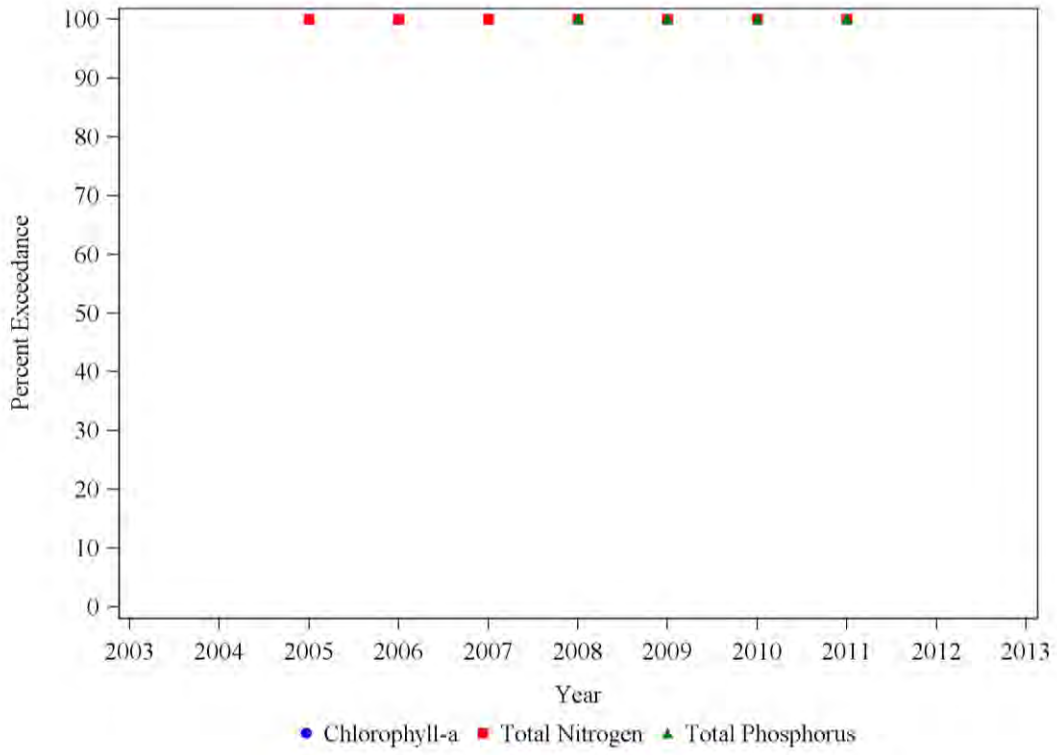
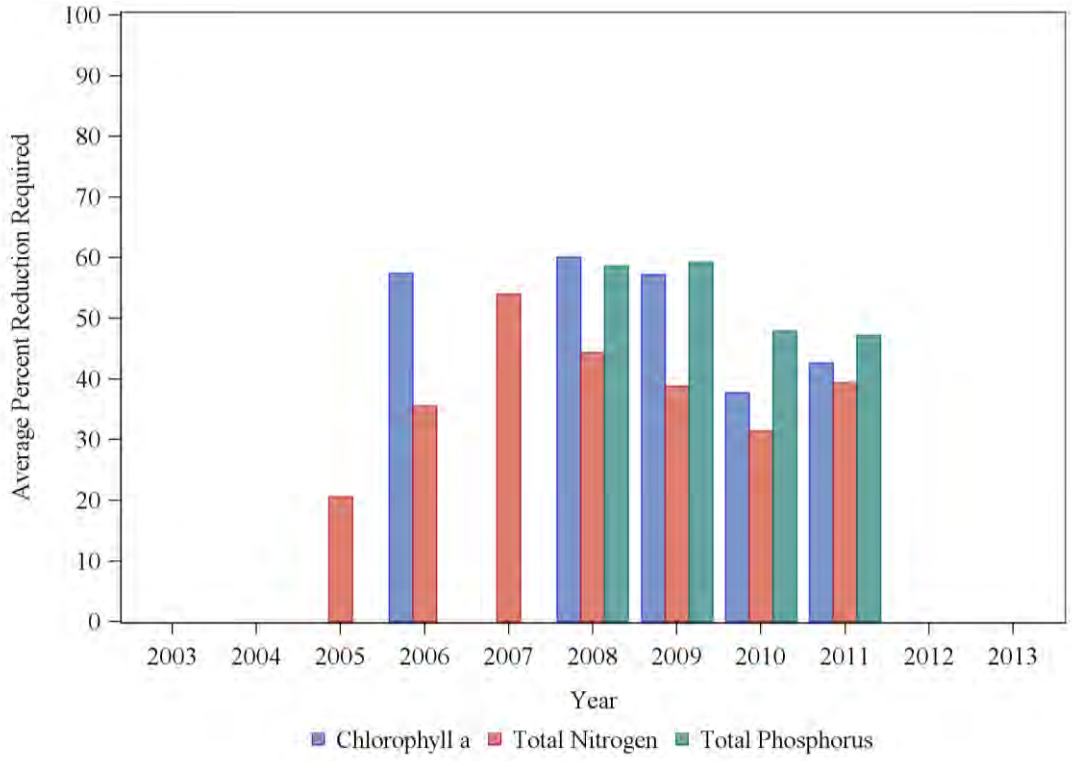


Figure 88. Lake May average percent concentration reduction required to meet the NNC from 2003-2013.



4.35. Lake Howard (WBID 1521F)

Lake Howard (**Figure 89**) was declared impaired for nutrients due to TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Lake Howard. The impairment status of Lake Howard was evaluated using NNC over the verified period used for the initial impairment. Lake Howard is considered a clear, alkaline lake based on a long-term geometric mean color of 15 PCU and alkalinity of 51 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Howard was impaired for elevated TN concentrations during the verified period using the NNC (**Table 71**). There were insufficient chlorophyll-a and TP data to determine impairment status over the initial verified period.

In addition, Lake Howard water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Howard remained characterized as a clear, alkaline lake (color=14 PCU, alkalinity=53 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Howard continues to be impaired for TN with the addition of chlorophyll-a and TP (**Table 72**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 90**). The percent exceedance was frequently 100 percent for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 91**). The calculated required chlorophyll-a percent concentration reductions ranged from 20 to 43 percent, TN concentration reductions ranged from 17 to 54 percent and TP concentration reductions from 6 to 22 percent to obtain compliance with NNC.

Figure 89. Location of water quality sampling sites in Lake Howard (WBID 1521F).

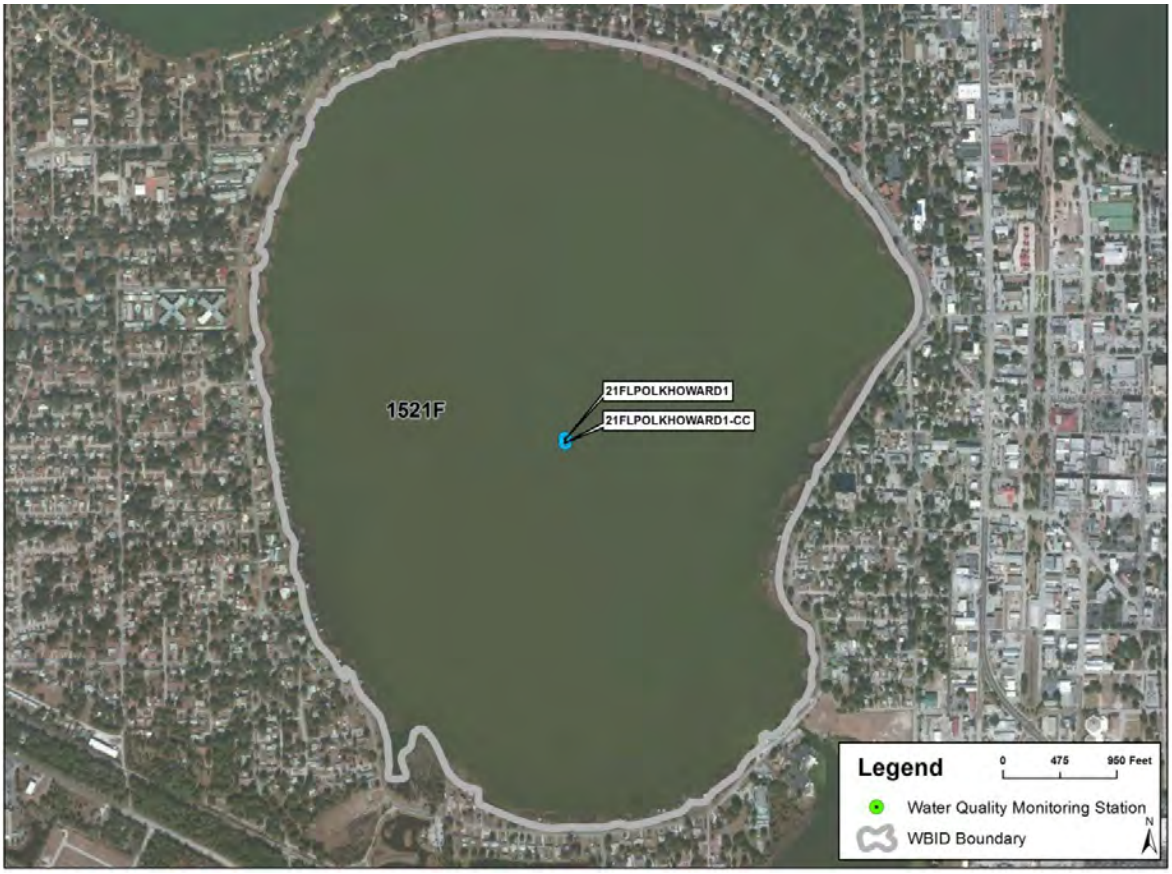


Table 71. Results of NNC evaluation for Lake Howard (WBID 1521F) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521F	LAKE HOWARD	2002	-	-	-
1521F	LAKE HOWARD	2003	-	-	-
1521F	LAKE HOWARD	2004	-	-	-
1521F	LAKE HOWARD	2005	-	**1.266**	-
1521F	LAKE HOWARD	2006	**36.0**	**1.528**	-
1521F	LAKE HOWARD	2007	-	**2.288**	-
1521F	LAKE HOWARD	2008	-	**1.758**	**0.039**
1521F	LAKE HOWARD	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 72. Results of NNC evaluation for Lake Howard (WBID 1521F) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521F	LAKE HOWARD	2003	-	-	-
1521F	LAKE HOWARD	2004	-	-	-
1521F	LAKE HOWARD	2005	-	**1.266**	-
1521F	LAKE HOWARD	2006	**36.0**	**1.528**	-
1521F	LAKE HOWARD	2007	-	**2.288**	-
1521F	LAKE HOWARD	2008	-	**1.758**	**0.039**
1521F	LAKE HOWARD	2009	**33.3**	**1.653**	**0.033**
1521F	LAKE HOWARD	2010	**24.7**	**1.381**	-
1521F	LAKE HOWARD	2011	**30.0**	**1.629**	0.028
1521F	LAKE HOWARD	2012	**30.7**	**1.600**	0.026
1521F	LAKE HOWARD	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 90. Percent of Lake Howard Samples which Exceed Criteria from 2003-2013.

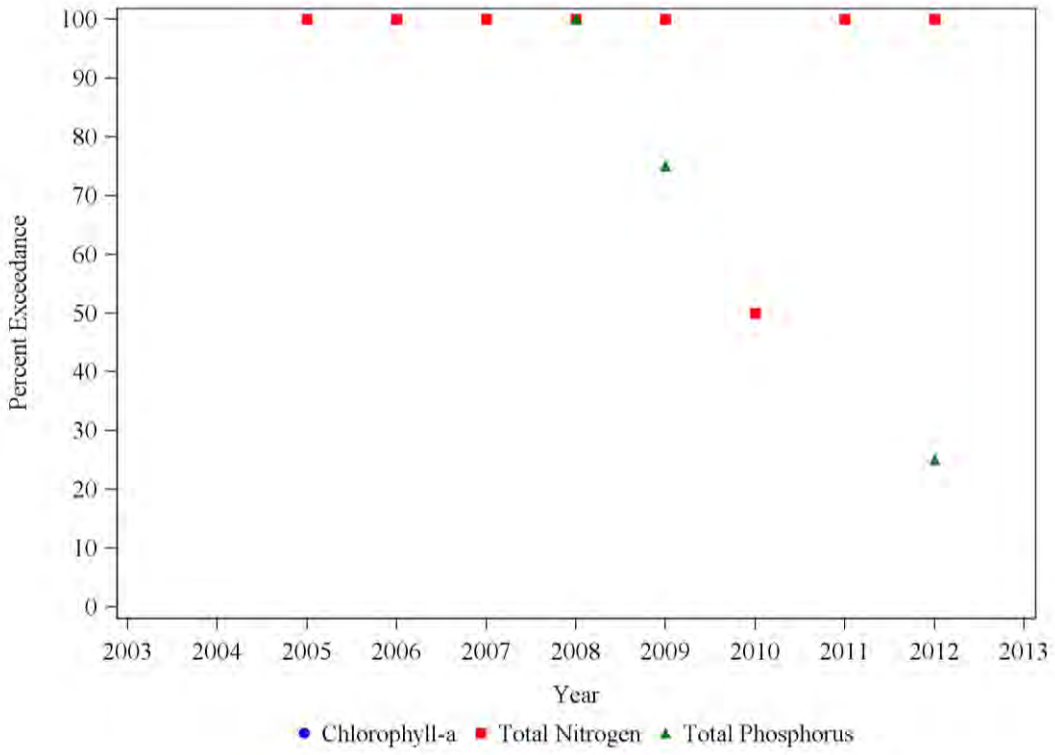
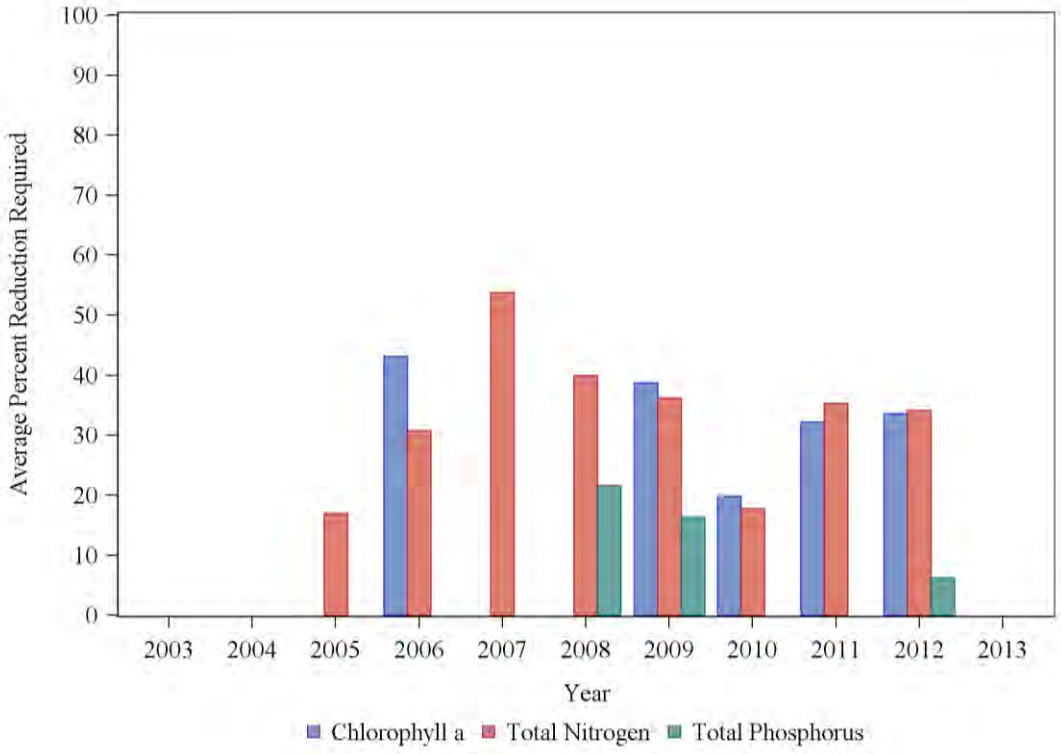


Figure 91. Lake Howard average percent concentration reduction required to meet the NNC from 2003-2013.



4.36. Lake Mirror (WBID 1521G)

Lake Mirror (**Figure 92**) was declared impaired for nutrients due to TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Lake Mirror. The impairment status of Lake Mirror was evaluated using NNC over the verified period used for the initial impairment. Lake Mirror is considered a clear, alkaline lake based on a long-term geometric mean color of 16 PCU and alkalinity of 47 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L The results of the analysis support the initial impairment determination and indicate that Lake Mirror was impaired for elevated TN concentrations during the verified period using the NNC (**Table 73**). There were insufficient chlorophyll-a and TP data to determine impairment status over the initial verified period.

In addition, Lake Mirror water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Mirror remained characterized as a clear, alkaline lake (color=16 PCU, alkalinity=45 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Mirror continues to be impaired for TN (**Table 74**). There were insufficient chlorophyll-a data to determine impairment status over the 2003 to 2013 period. The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 93**). The percent exceedance was frequently greater than 70 percent for TN. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 94**). The calculated required TN percent concentration reductions ranged from 2 to 37 percent to obtain compliance with NNC.

Figure 92. Location of water quality sampling sites in Lake Mirror (WBID 1521G).

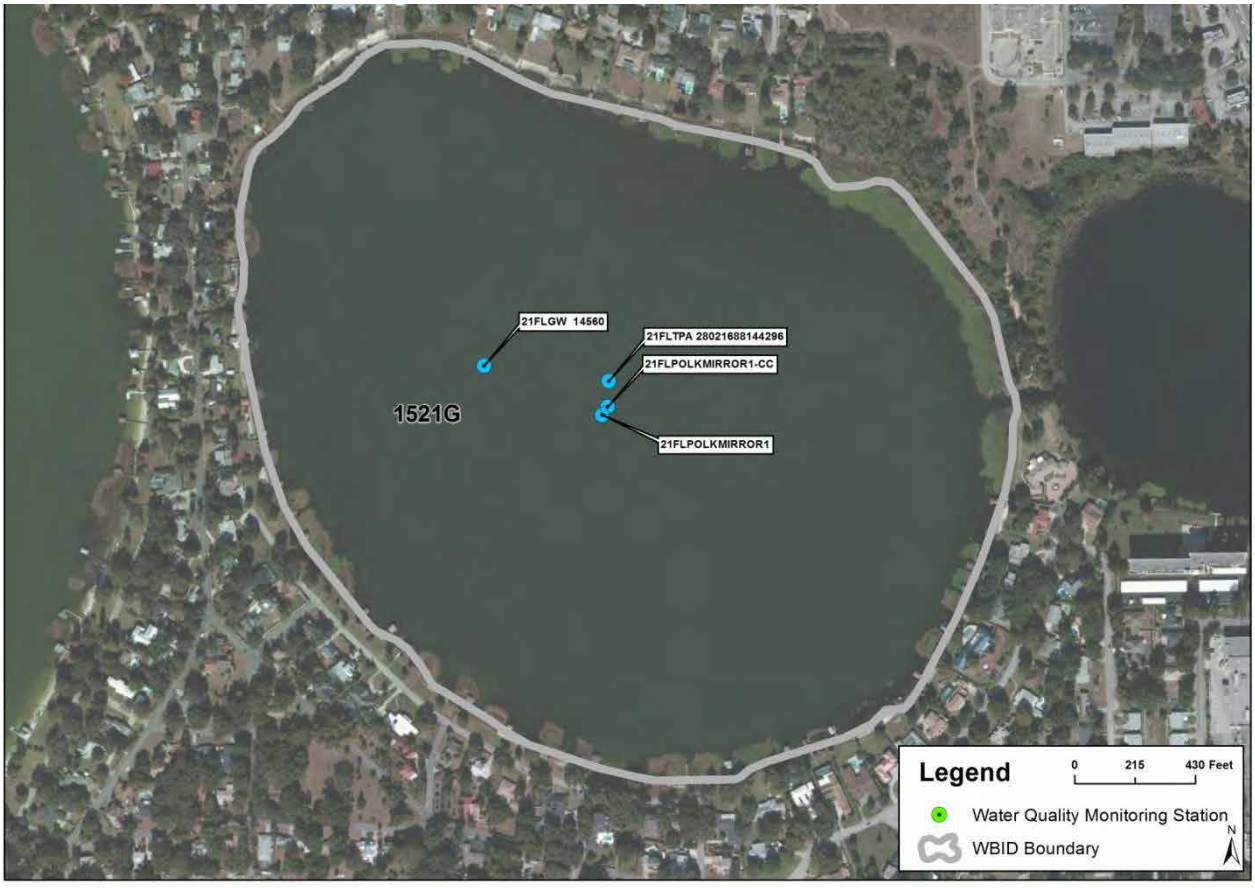


Table 73. Results of NNC evaluation for Lake Mirror (WBID 1521G) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521G	LAKE MIRROR	2002	-	**1.792**	-
1521G	LAKE MIRROR	2003	**49.3**	**1.796**	**0.054**
1521G	LAKE MIRROR	2004	-	-	-
1521G	LAKE MIRROR	2005	-	**1.161**	-
1521G	LAKE MIRROR	2006	-	**1.092**	-
1521G	LAKE MIRROR	2007	-	**1.246**	**0.031**
1521G	LAKE MIRROR	2008	-	**1.235**	0.029
1521G	LAKE MIRROR	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 74. Results of NNC evaluation for Lake Mirror (WBID 1521G) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521G	LAKE MIRROR	2003	**49.3**	**1.796**	**0.054**
1521G	LAKE MIRROR	2004	-	-	-
1521G	LAKE MIRROR	2005	-	**1.161**	-
1521G	LAKE MIRROR	2006	-	**1.092**	-
1521G	LAKE MIRROR	2007	-	**1.246**	**0.031**
1521G	LAKE MIRROR	2008	-	**1.235**	0.029
1521G	LAKE MIRROR	2009	-	**1.138**	0.025
1521G	LAKE MIRROR	2010	17.5	1.023	0.026
1521G	LAKE MIRROR	2011	-	-	-
1521G	LAKE MIRROR	2012	-	-	-
1521G	LAKE MIRROR	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 93. Percent of Lake Mirror Samples which Exceed Criteria from 2003-2013.

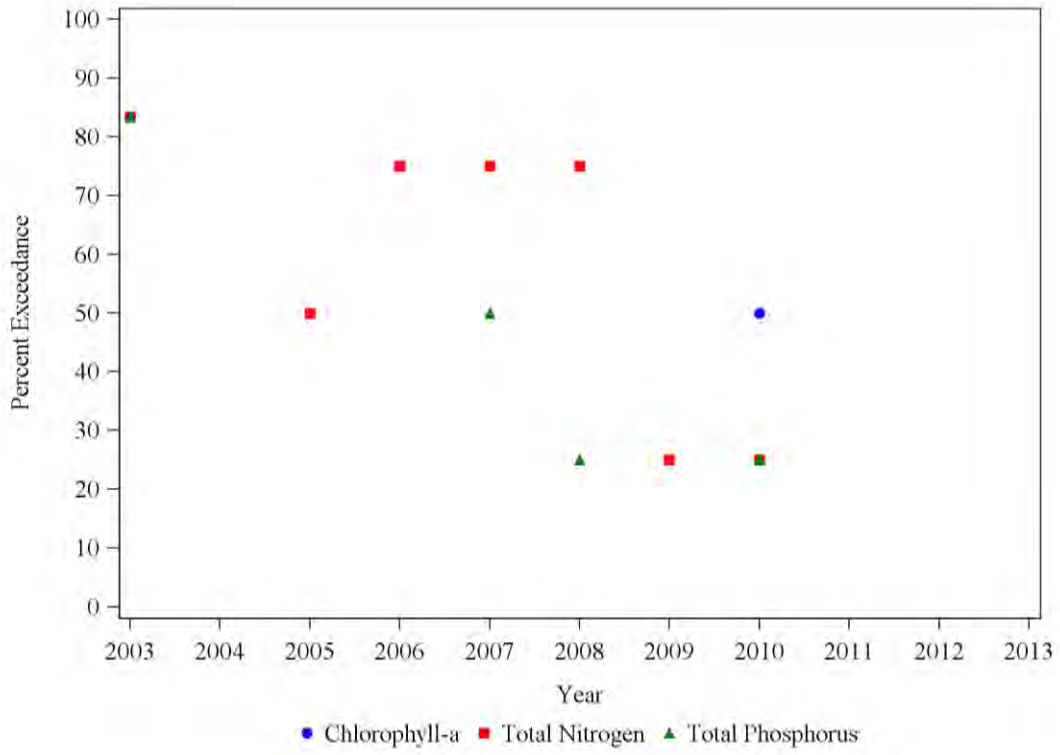
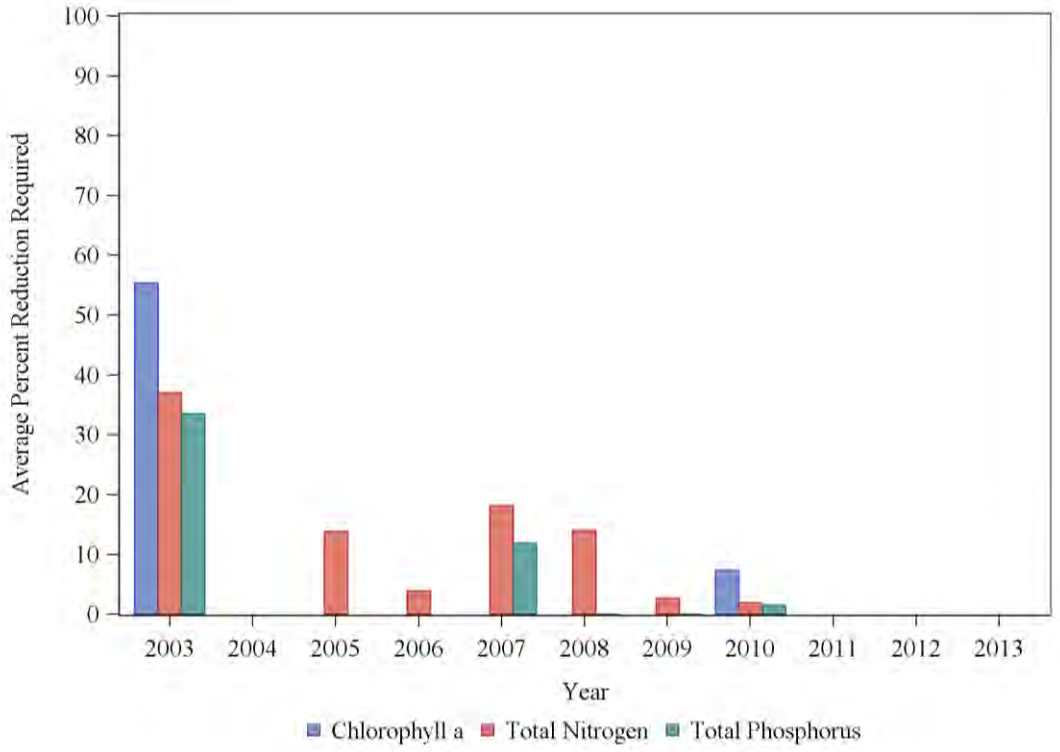


Figure 94. Lake Mirror average percent concentration reduction required to meet the NNC from 2003-2013.



4.37. Lake Cannon (WBID 1521H)

Lake Cannon (**Figure 95**) was declared impaired for nutrients due to TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Lake Cannon. The impairment status of Lake Cannon was evaluated using NNC over the verified period used for the initial impairment. Lake Cannon is considered a clear, alkaline lake based on a long-term geometric mean color of 17 PCU and alkalinity of 54 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Cannon was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period using the NNC (**Table 75**).

In addition, Lake Cannon water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Cannon remained characterized as a clear, alkaline lake (color=17 PCU, alkalinity=54 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Cannon continues to be impaired for chlorophyll-a, TN and TP (**Table 76**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 96**). The percent exceedance was variable for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 97**). The calculated required chlorophyll-a percent concentration reductions ranged from 8 to 44 percent, TN concentration reductions ranged from 0 to 23 percent and TP concentration reductions from 2 to 24 percent to obtain compliance with NNC.

Figure 95. Location of water quality sampling sites in Lake Cannon (WBID 1521H).

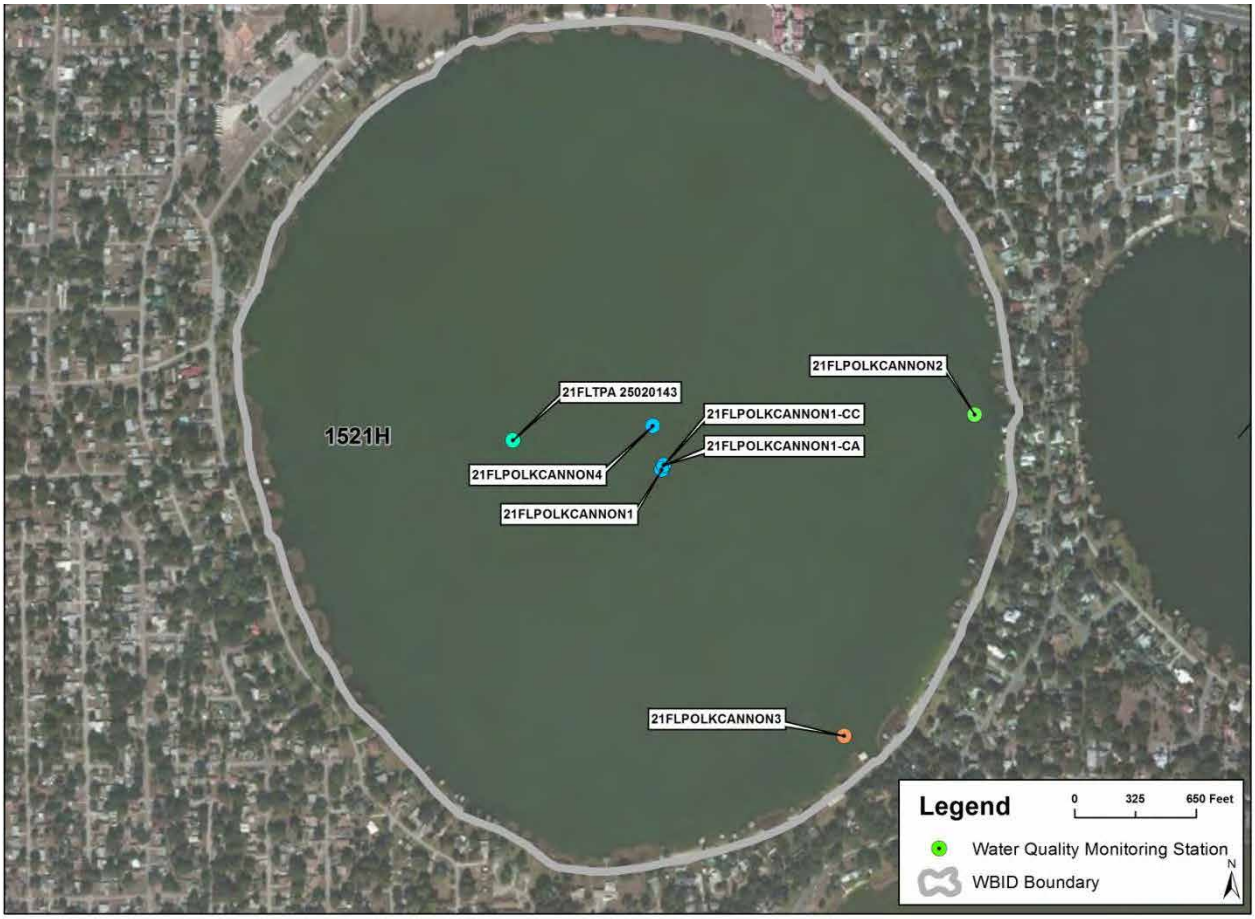


Table 75. Results of NNC evaluation for Lake Cannon (WBID 1521H) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521H	LAKE CANNON	2002	**25.6**	**1.342**	0.027
1521H	LAKE CANNON	2003	**37.9**	**1.341**	**0.037**
1521H	LAKE CANNON	2004	**20.1**	**1.062**	-
1521H	LAKE CANNON	2005	-	**1.062**	-
1521H	LAKE CANNON	2006	-	0.856	-
1521H	LAKE CANNON	2007	-	**1.137**	**0.035**
1521H	LAKE CANNON	2008	**23.7**	1.047	**0.030**
1521H	LAKE CANNON	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 76. Results of NNC evaluation for Lake Cannon (WBID 1521H) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521H	LAKE CANNON	2003	**37.9**	**1.341**	**0.037**
1521H	LAKE CANNON	2004	**20.1**	**1.062**	-
1521H	LAKE CANNON	2005	-	**1.062**	-
1521H	LAKE CANNON	2006	-	0.856	-
1521H	LAKE CANNON	2007	-	**1.137**	**0.035**
1521H	LAKE CANNON	2008	**23.7**	1.047	**0.030**
1521H	LAKE CANNON	2009	**32.2**	**1.306**	0.027
1521H	LAKE CANNON	2010	**28.0**	**1.206**	-
1521H	LAKE CANNON	2011	**28.7**	**1.328**	**0.031**
1521H	LAKE CANNON	2012	**23.1**	**1.165**	0.030
1521H	LAKE CANNON	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 96. Percent of Lake Cannon Samples which Exceed Criteria from 2003-2013.

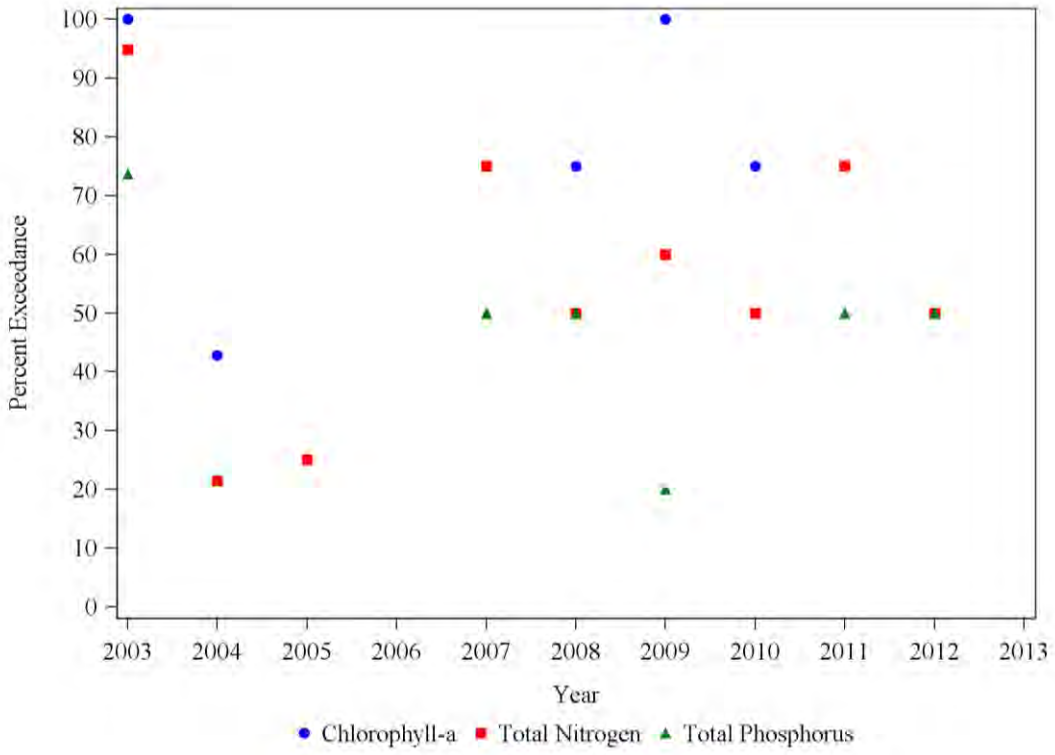
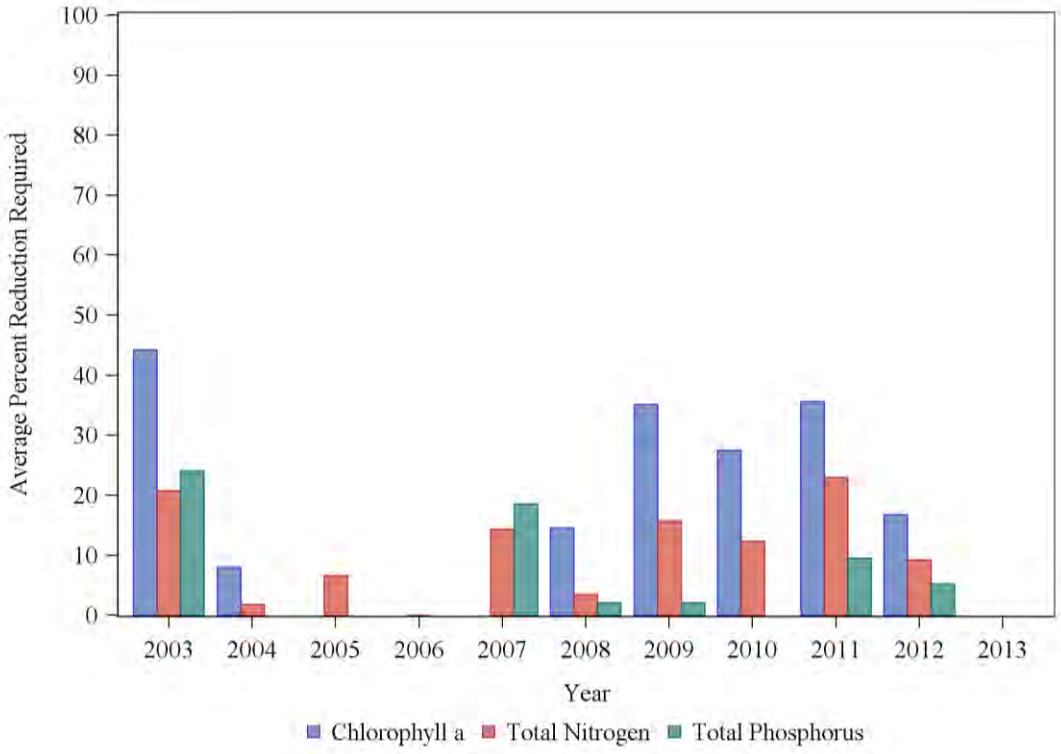


Figure 97. Lake Cannon average percent concentration reduction required to meet the NNC from 2003-2013.



4.38. Lake Idylwild (WBID 1521J)

Lake Idylwild (**Figure 98**) was declared impaired for nutrients due to TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Lake Idylwild. The impairment status of Lake Idylwild was evaluated using NNC over the verified period used for the initial impairment. Lake Idylwild is considered a clear, alkaline lake based on a long-term geometric mean color of 17 PCU and alkalinity of 38 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L The results of the analysis support the initial impairment determination and indicate that Lake Idylwild was impaired for elevated chlorophyll-a and TP concentrations during the verified period using the NNC (**Table 77**).

In addition, Lake Idylwild water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Idylwild remained characterized as a clear, alkaline lake (color=17 PCU, alkalinity=41 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Idylwild continues to be impaired for chlorophyll-a and TP with the addition of TN (**Table 78**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 99**). The percent exceedance was variable for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 100**). The calculated required chlorophyll-a percent concentration reductions ranged from 12 to 37 percent, TN concentration reductions ranged from 0 to 31 percent and TP concentration reductions from 0 to 15 percent to obtain compliance with NNC.

Figure 98. Location of water quality sampling sites in Lake Idylwild (WBID 1521J).

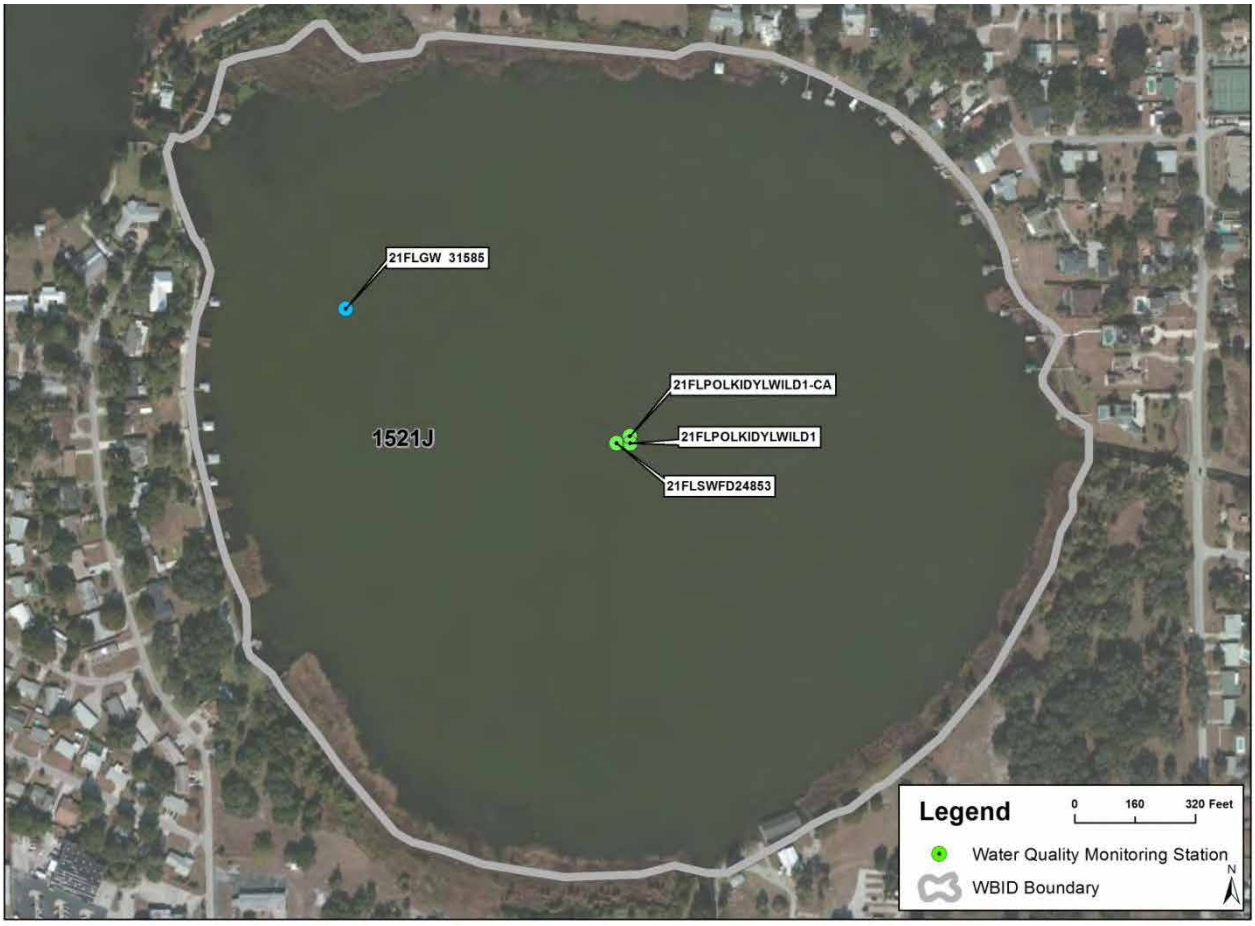


Table 77. Results of NNC evaluation for Lake Idylwild (WBID 1521J) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521J	LAKE IDYLWILD	2002	-	-	-
1521J	LAKE IDYLWILD	2003	-	-	-
1521J	LAKE IDYLWILD	2004	-	-	-
1521J	LAKE IDYLWILD	2005	-	0.900	-
1521J	LAKE IDYLWILD	2006	**23.6**	0.841	**0.030**
1521J	LAKE IDYLWILD	2007	**20.8**	0.964	**0.040**
1521J	LAKE IDYLWILD	2008	**27.8**	**1.219**	**0.037**
1521J	LAKE IDYLWILD	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 78. Results of NNC evaluation for Lake Idylwild (WBID 1521J) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521J	LAKE IDYLWILD	2003	-	-	-
1521J	LAKE IDYLWILD	2004	-	-	-
1521J	LAKE IDYLWILD	2005	-	0.900	-
1521J	LAKE IDYLWILD	2006	**23.6**	0.841	**0.030**
1521J	LAKE IDYLWILD	2007	**20.8**	0.964	**0.040**
1521J	LAKE IDYLWILD	2008	**27.8**	**1.219**	**0.037**
1521J	LAKE IDYLWILD	2009	-	**1.541**	**0.036**
1521J	LAKE IDYLWILD	2010	**33.2**	**1.328**	-
1521J	LAKE IDYLWILD	2011	**23.3**	**1.288**	0.028
1521J	LAKE IDYLWILD	2012	**21.0**	**1.263**	0.029
1521J	LAKE IDYLWILD	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 99. Percent of Lake Idylwild Samples which Exceed Criteria from 2003-2013.

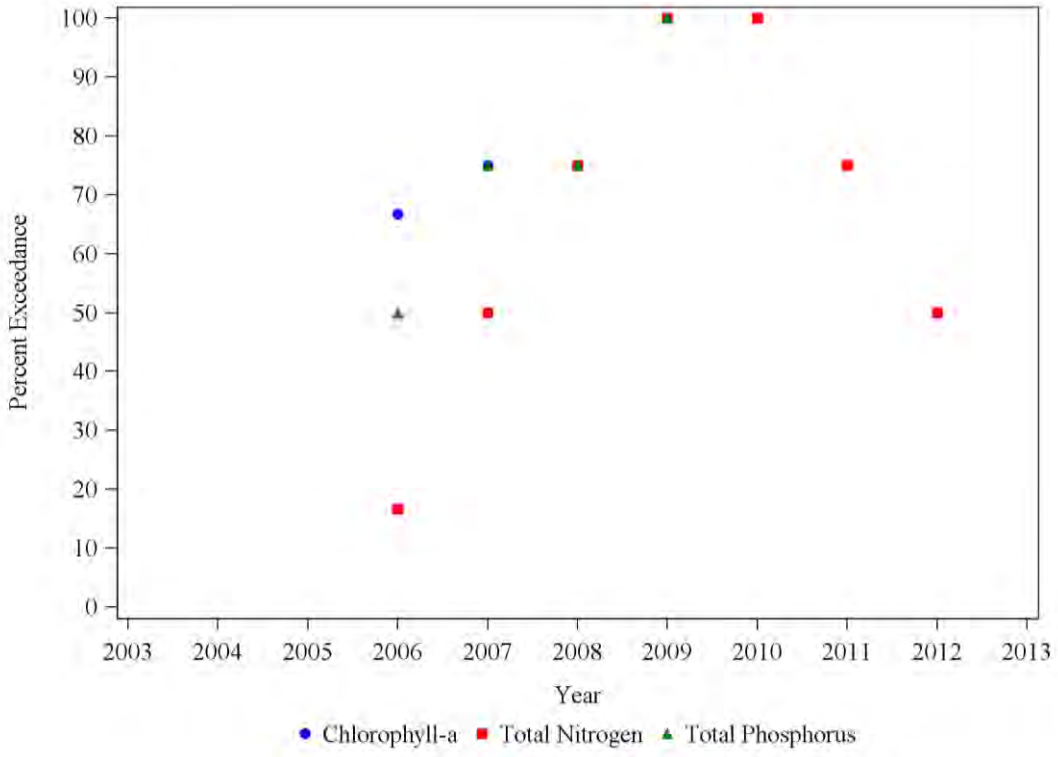
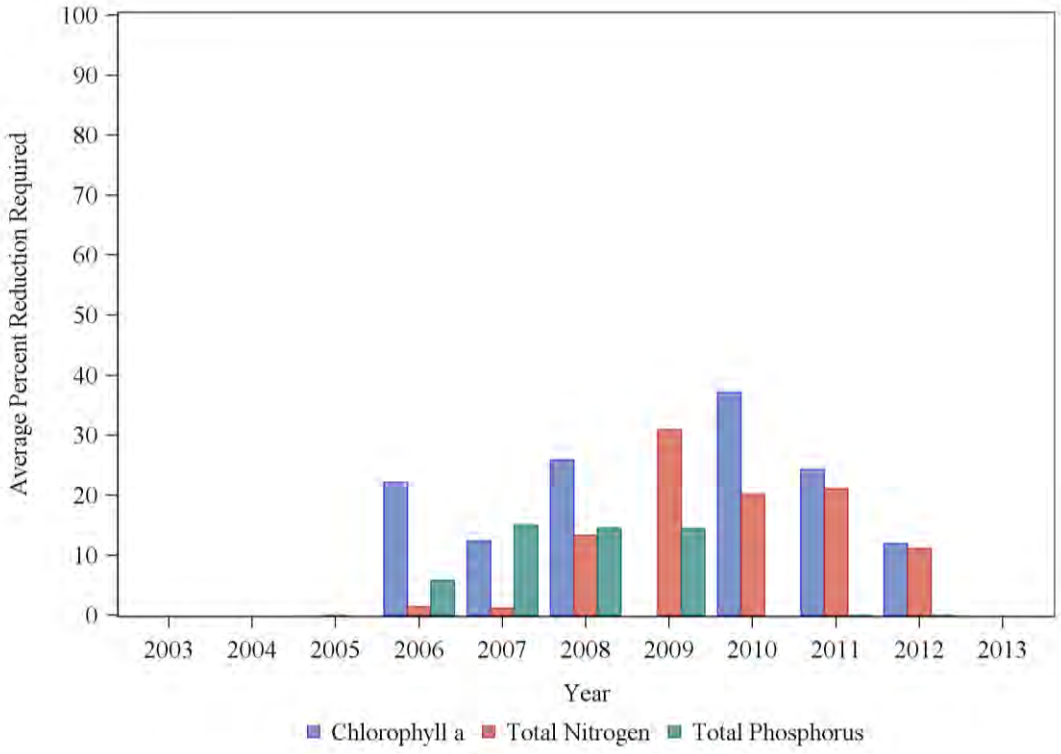


Figure 100. Lake Idylwild average percent concentration reduction required to meet the NNC from 2003-2013.



4.39. Lake Jessie (WBID 1521K)

Lake Jessie (**Figure 101**) was declared impaired for nutrients due to TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Lake Jessie. The impairment status of Lake Jessie was evaluated using NNC over the verified period used for the initial impairment. Lake Jessie is considered a clear, alkaline lake based on a long-term geometric mean color of 20 PCU and alkalinity of 48 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L The results of the analysis support the initial impairment determination and indicate that Lake Jessie was impaired for elevated chlorophyll-a and TP concentrations during the verified period using the NNC (**Table 79**).

In addition, Lake Jessie water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Jessie remained characterized as a clear, alkaline lake (color=19 PCU, alkalinity=51 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Jessie continues to be impaired for chlorophyll-a and TP with the addition of TN (**Table 80**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 102**). The percent exceedance was frequently greater than 70 percent for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 103**). The calculated required chlorophyll-a percent concentration reductions ranged from 18 to 36 percent, TN concentration reductions ranged from 0 to 15 percent and TP concentration reductions from 9 to 29 percent to obtain compliance with NNC.

Figure 101. Location of water quality sampling sites in Lake Jessie (WBID 1521K).

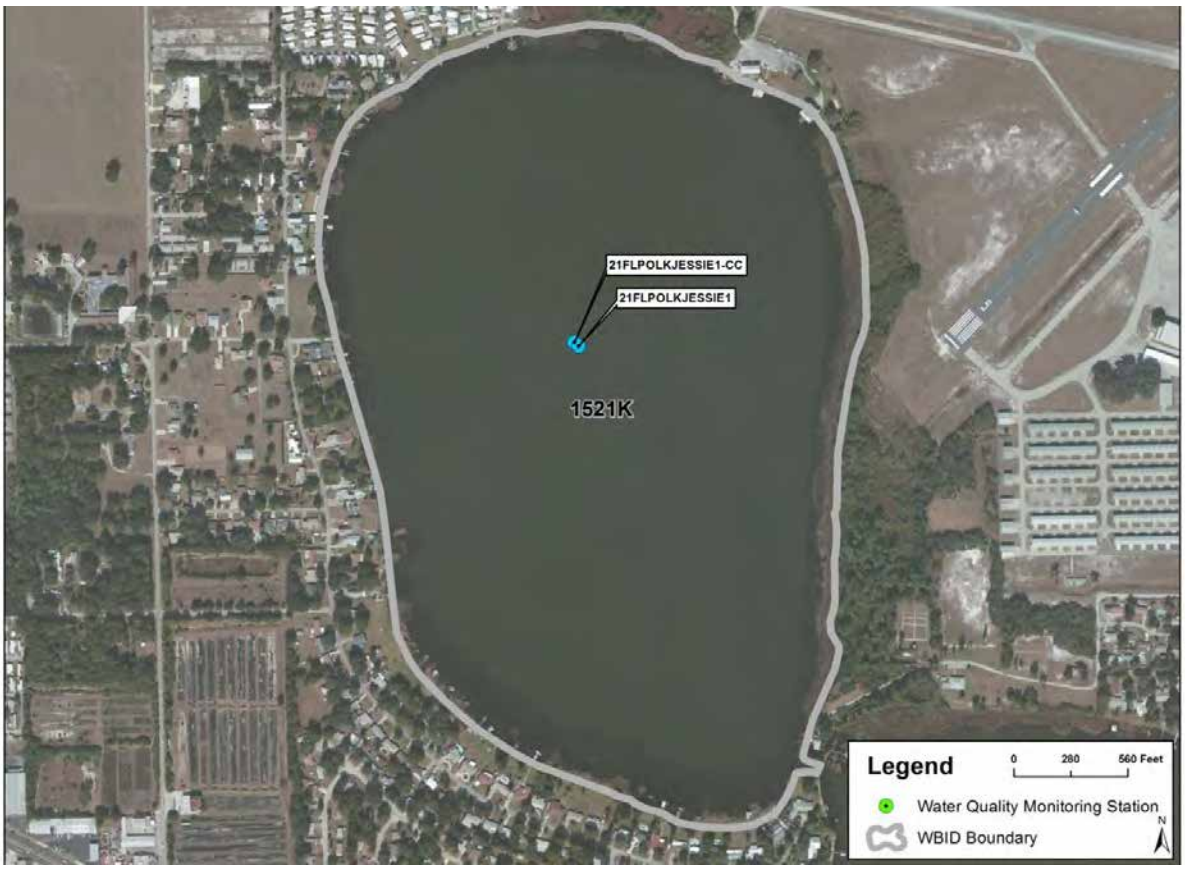


Table 79. Results of NNC evaluation for Lake Jessie (WBID 1521K) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521K	LAKE JESSIE	2002	-	-	-
1521K	LAKE JESSIE	2003	-	-	-
1521K	LAKE JESSIE	2004	-	-	-
1521K	LAKE JESSIE	2005	-	0.980	-
1521K	LAKE JESSIE	2006	**28.4**	0.925	-
1521K	LAKE JESSIE	2007	-	0.917	**0.040**
1521K	LAKE JESSIE	2008	**25.4**	**1.063**	**0.047**
1521K	LAKE JESSIE	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 80. Results of NNC evaluation for Lake Jessie (WBID 1521K) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521K	LAKE JESSIE	2003	-	-	-
1521K	LAKE JESSIE	2004	-	-	-
1521K	LAKE JESSIE	2005	-	0.980	-
1521K	LAKE JESSIE	2006	**28.4**	0.925	-
1521K	LAKE JESSIE	2007	-	0.917	**0.040**
1521K	LAKE JESSIE	2008	**25.4**	**1.063**	**0.047**
1521K	LAKE JESSIE	2009	**30.9**	**1.140**	**0.038**
1521K	LAKE JESSIE	2010	**31.9**	**1.197**	-
1521K	LAKE JESSIE	2011	**25.0**	**1.209**	**0.035**
1521K	LAKE JESSIE	2012	**24.0**	**1.166**	**0.035**
1521K	LAKE JESSIE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 102. Percent of Lake Jessie Samples which Exceed Criteria from 2003-2013.

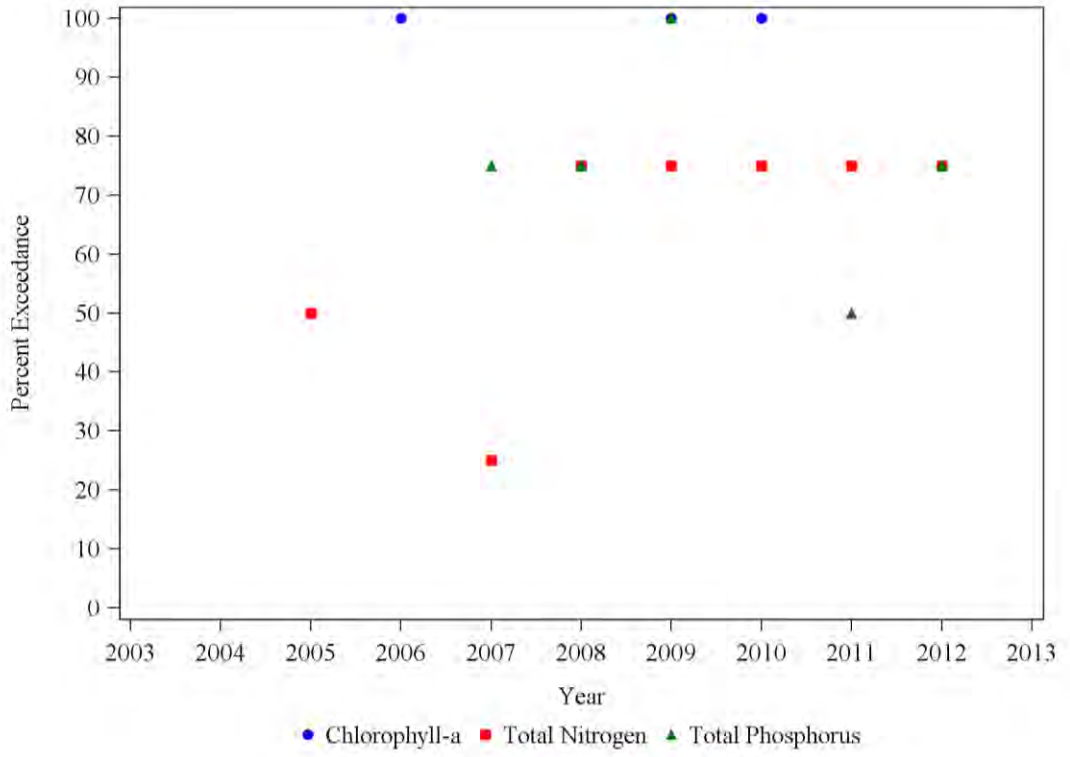
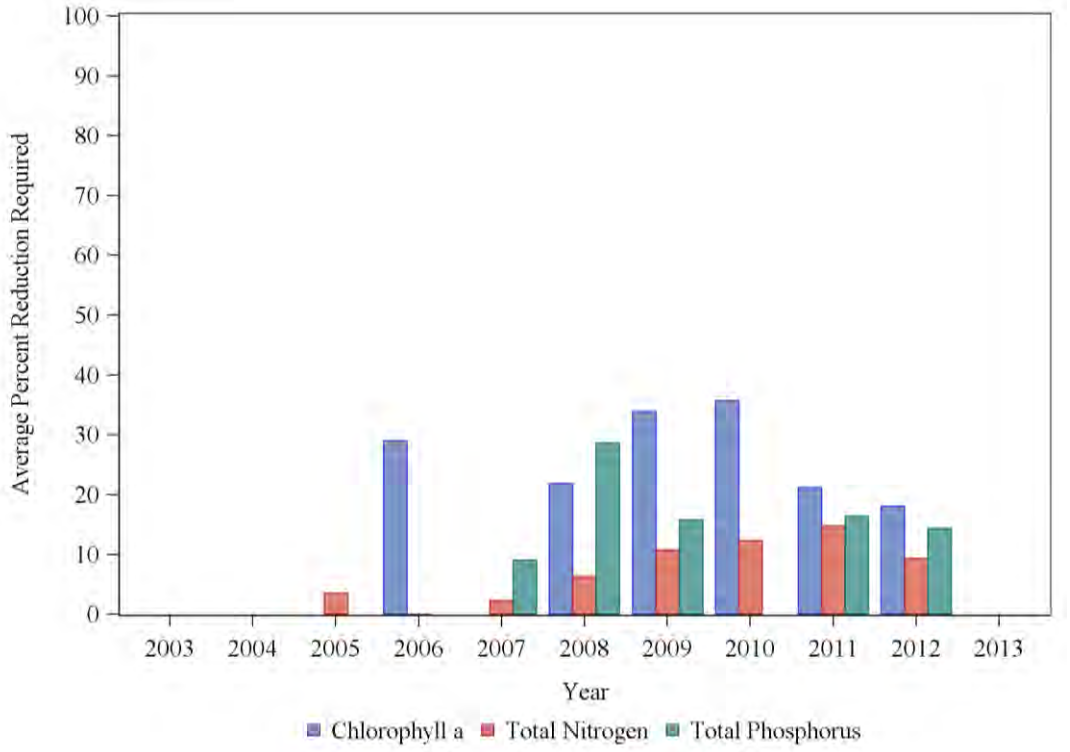


Figure 103. Lake Jessie average percent concentration reduction required to meet the NNC from 2003-2013.



4.40. Lake Marianna (WBID 1521L)

Lake Marianna (**Figure 104**) was declared impaired for nutrients due to TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Marianna was evaluated using NNC over the verified period used for the initial impairment. Lake Marianna is considered a clear, alkaline lake based on a long-term geometric mean color of 15 PCU and alkalinity of 51 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Marianna was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period using the NNC (**Table 81**).

In addition, Lake Marianna water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Marianna remained characterized as a clear, alkaline lake (color=15 PCU, alkalinity=55 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Marianna continues to be impaired for chlorophyll-a, TN and TP (**Table 82**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 105**). The percent exceedance was variable for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 106**). The calculated required chlorophyll-a percent concentration reductions ranged from 21 to 52 percent, TN concentration reductions ranged from 2 to 39 percent and TP concentration reductions from 7 to 56 percent to obtain compliance with NNC.

Figure 104. Location of water quality sampling sites in Lake Marianna (WBID 1521L).

Table 81. Results of NNC evaluation for Lake Marianna (WBID 1521L) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521L	LAKE MARIANNA	2002	-	-	-
1521L	LAKE MARIANNA	2003	**31.1**	**1.435**	-
1521L	LAKE MARIANNA	2004	-	**1.390**	**0.042**
1521L	LAKE MARIANNA	2005	**26.9**	**1.075**	-
1521L	LAKE MARIANNA	2006	**25.5**	1.025	-
1521L	LAKE MARIANNA	2007	**28.9**	**1.251**	**0.031**
1521L	LAKE MARIANNA	2008	-	-	**0.035**
1521L	LAKE MARIANNA	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 82. Results of NNC evaluation for Lake Marianna (WBID 1521L) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521L	LAKE MARIANNA	2003	**31.1**	**1.435**	-
1521L	LAKE MARIANNA	2004	-	**1.390**	**0.042**
1521L	LAKE MARIANNA	2005	**26.9**	**1.075**	-
1521L	LAKE MARIANNA	2006	**25.5**	1.025	-
1521L	LAKE MARIANNA	2007	**28.9**	**1.251**	**0.031**
1521L	LAKE MARIANNA	2008	-	-	**0.035**
1521L	LAKE MARIANNA	2009	-	**1.686**	0.029
1521L	LAKE MARIANNA	2010	**25.4**	**1.472**	**0.031**
1521L	LAKE MARIANNA	2011	**42.1**	**1.727**	**0.031**
1521L	LAKE MARIANNA	2012	**32.4**	**1.461**	**0.033**
1521L	LAKE MARIANNA	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 105. Percent of Lake Marianna Samples which Exceed Criteria from 2003-2013.

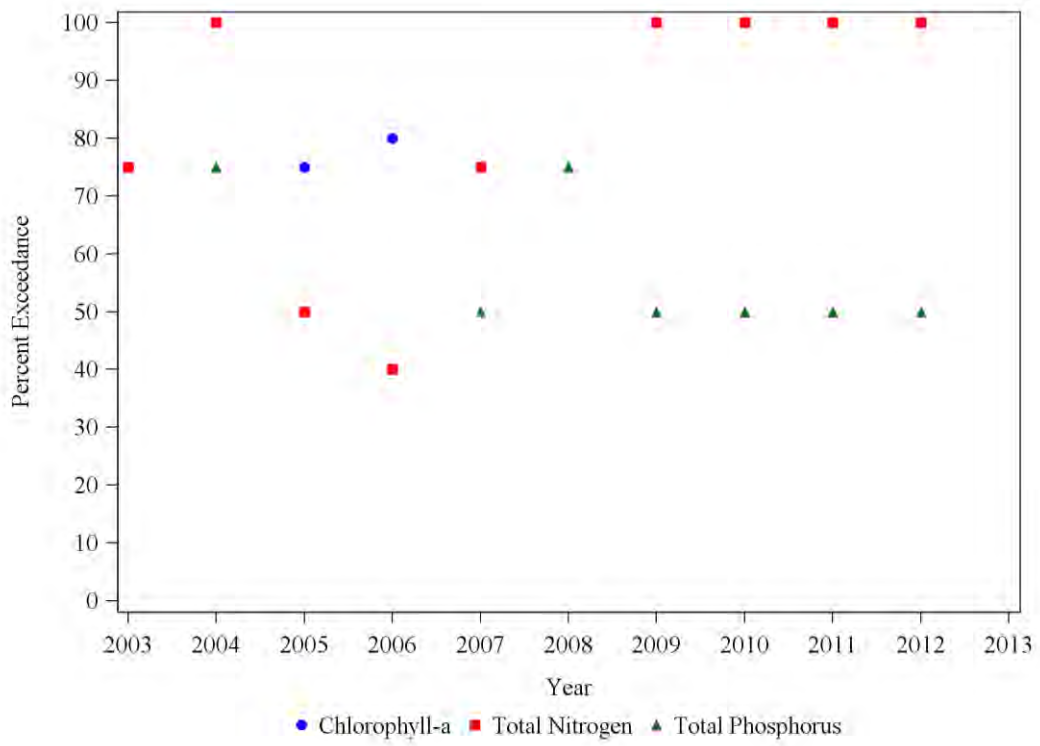
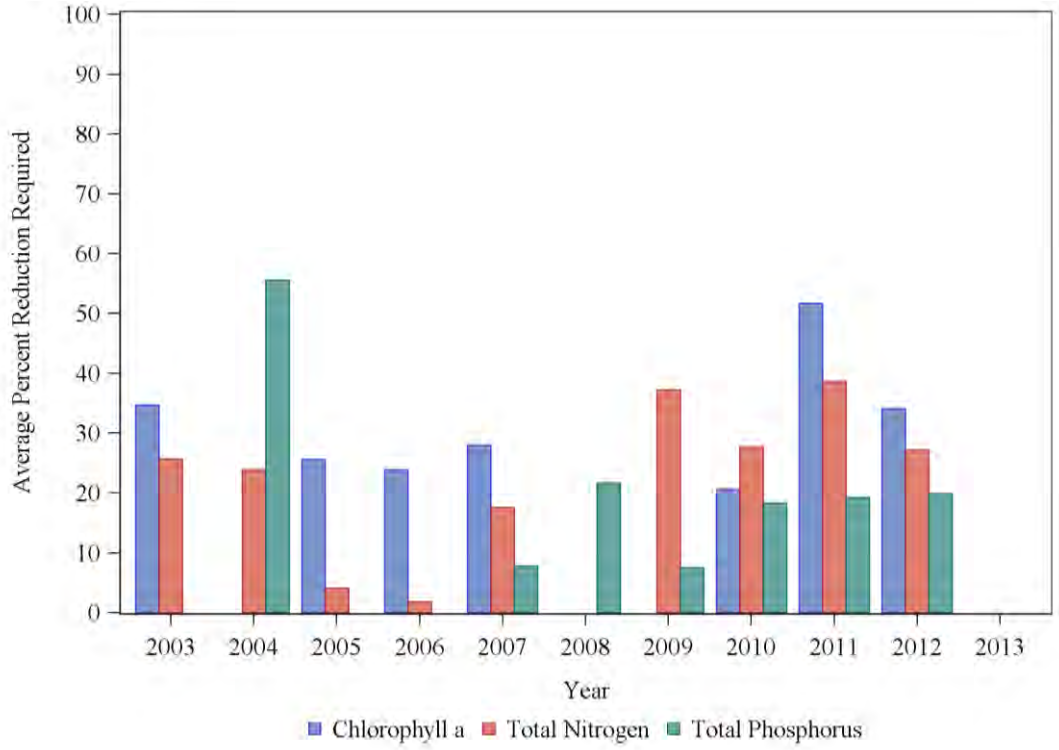


Figure 106. Lake Marianna average percent concentration reduction required to meet the NNC from 2003-2013.



4.41. Deer Lake (WBID 1521P)

Deer Lake (**Figure 107**) was declared impaired for nutrients due to TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Deer Lake was evaluated using NNC over the verified period used for the initial impairment. Deer Lake is considered a clear, alkaline lake based on a long-term geometric mean color of 21 PCU and alkalinity of 39 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Deer Lake was impaired for elevated chlorophyll-a and TN concentrations during the verified period using the NNC (**Table 83**). There were insufficient TP data to determine impairment status over the initial verified period.

In addition, Deer Lake water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Deer Lake remained characterized as a clear, alkaline lake (color=21 PCU, alkalinity=39 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Deer Lake continues to be impaired for chlorophyll-a and TN with the addition of TP (**Table 84**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 108**). The percent exceedance was variable for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 109**). The calculated required chlorophyll-a percent concentration reductions ranged from 0 to 35 percent, TN concentration reductions ranged from 0 to 35 percent and TP concentration reductions from 9 to 25 percent to obtain compliance with NNC.

Figure 107. Location of water quality sampling sites in Deer Lake (WBID 1521P).

Table 83. Results of NNC evaluation for Deer Lake (WBID 1521P) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521P	DEER LAKE	2002	-	-	-
1521P	DEER LAKE	2003	-	-	-
1521P	DEER LAKE	2004	-	-	-
1521P	DEER LAKE	2005	16.4	0.955	-
1521P	DEER LAKE	2006	17.2	0.939	-
1521P	DEER LAKE	2007	**21.6**	**1.235**	**0.034**
1521P	DEER LAKE	2008	**31.6**	**1.425**	0.028
1521P	DEER LAKE	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 84. Results of NNC evaluation for Deer Lake (WBID 1521P) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521P	DEER LAKE	2003	-	-	-
1521P	DEER LAKE	2004	-	-	-
1521P	DEER LAKE	2005	16.4	0.955	-
1521P	DEER LAKE	2006	17.2	0.939	-
1521P	DEER LAKE	2007	**21.6**	**1.235**	**0.034**
1521P	DEER LAKE	2008	**31.6**	**1.425**	0.028
1521P	DEER LAKE	2009	-	**1.512**	**0.031**
1521P	DEER LAKE	2010	**20.9**	**1.531**	**0.034**
1521P	DEER LAKE	2011	-	**1.129**	0.027
1521P	DEER LAKE	2012	**29.7**	**1.619**	**0.036**
1521P	DEER LAKE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 108. Percent of Deer Lake Samples which Exceed Criteria from 2003-2013.

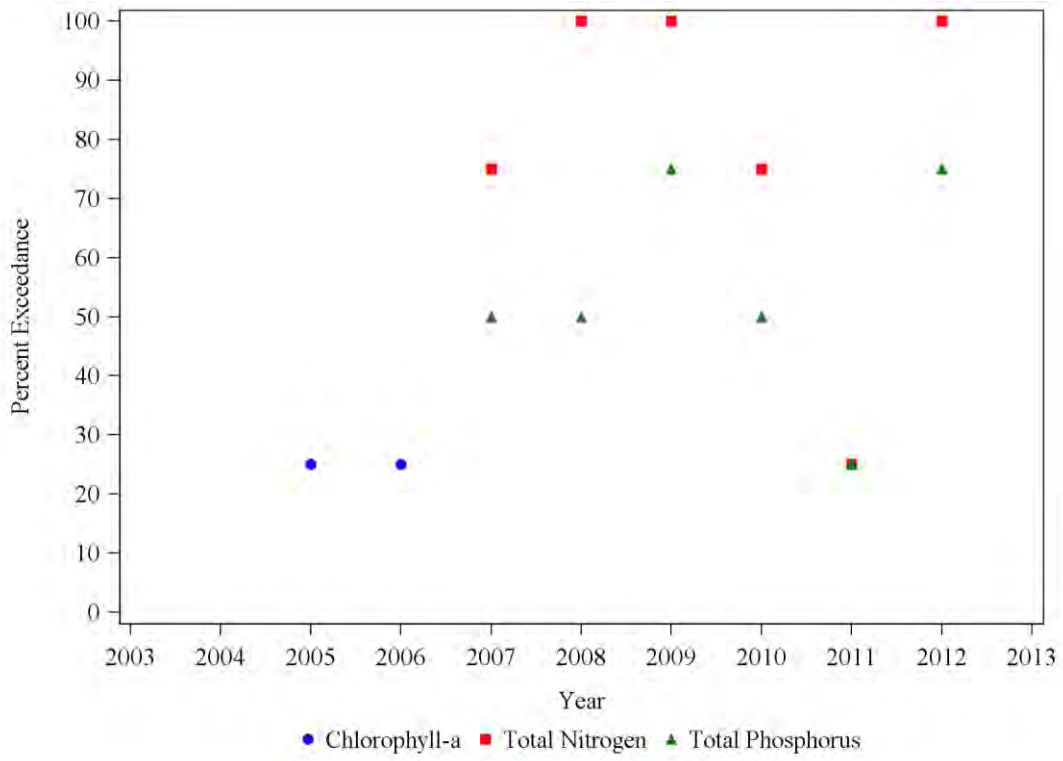
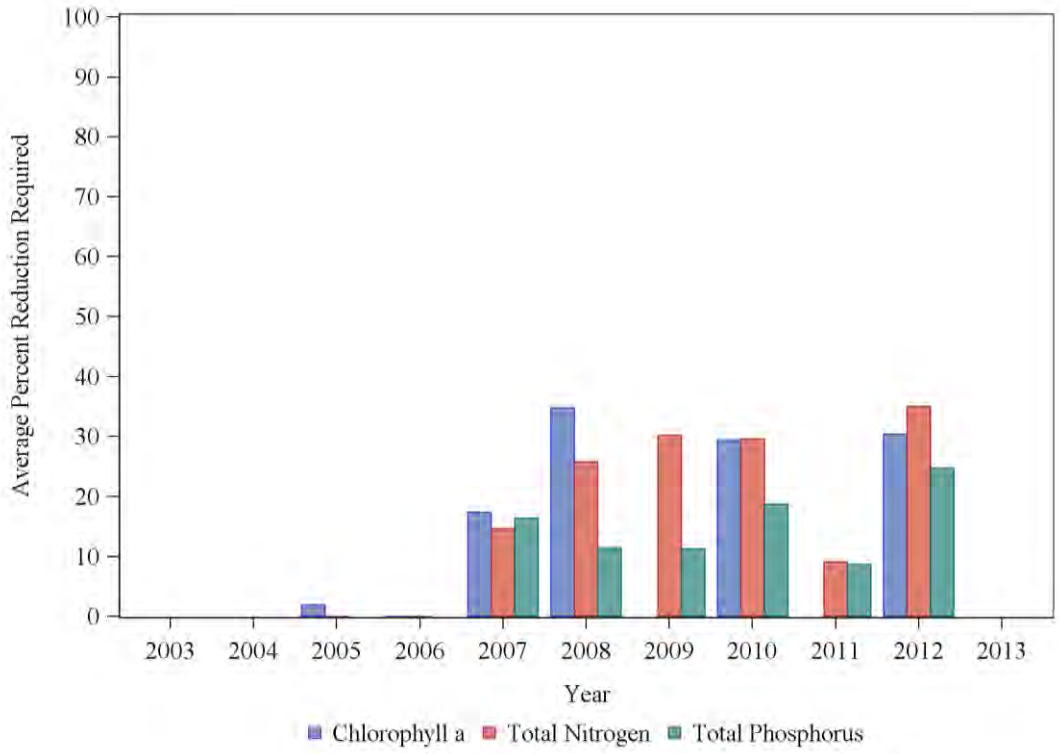


Figure 109. Deer Lake average percent concentration reduction required to meet the NNC from 2003-2013.



4.42. Lake Blue (WBID 1521Q)

Lake Blue (**Figure 110**) was declared impaired for nutrients due to TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Blue was evaluated using NNC over the verified period used for the initial impairment. Lake Blue is considered a clear, alkaline lake based on a long-term geometric mean color of 26 PCU and alkalinity of 21 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Blue was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period using the NNC (**Table 85**).

In addition, Lake Blue water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Blue remained characterized as a clear, alkaline lake (color=25 PCU, alkalinity=46 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Blue continues to be impaired for chlorophyll-a, TN and TP (**Table 86**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 111**). When sufficient data were available, the percent exceedance was 100 percent for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 112**). The calculated required chlorophyll-a percent concentration reductions ranged from 50 to 81 percent, TN concentration reductions ranged from 41 to 69 percent and TP concentration reductions from 48 to 64 percent to obtain compliance with NNC.

Figure 110. Location of water quality sampling sites in Lake Blue (WBID 1521Q).

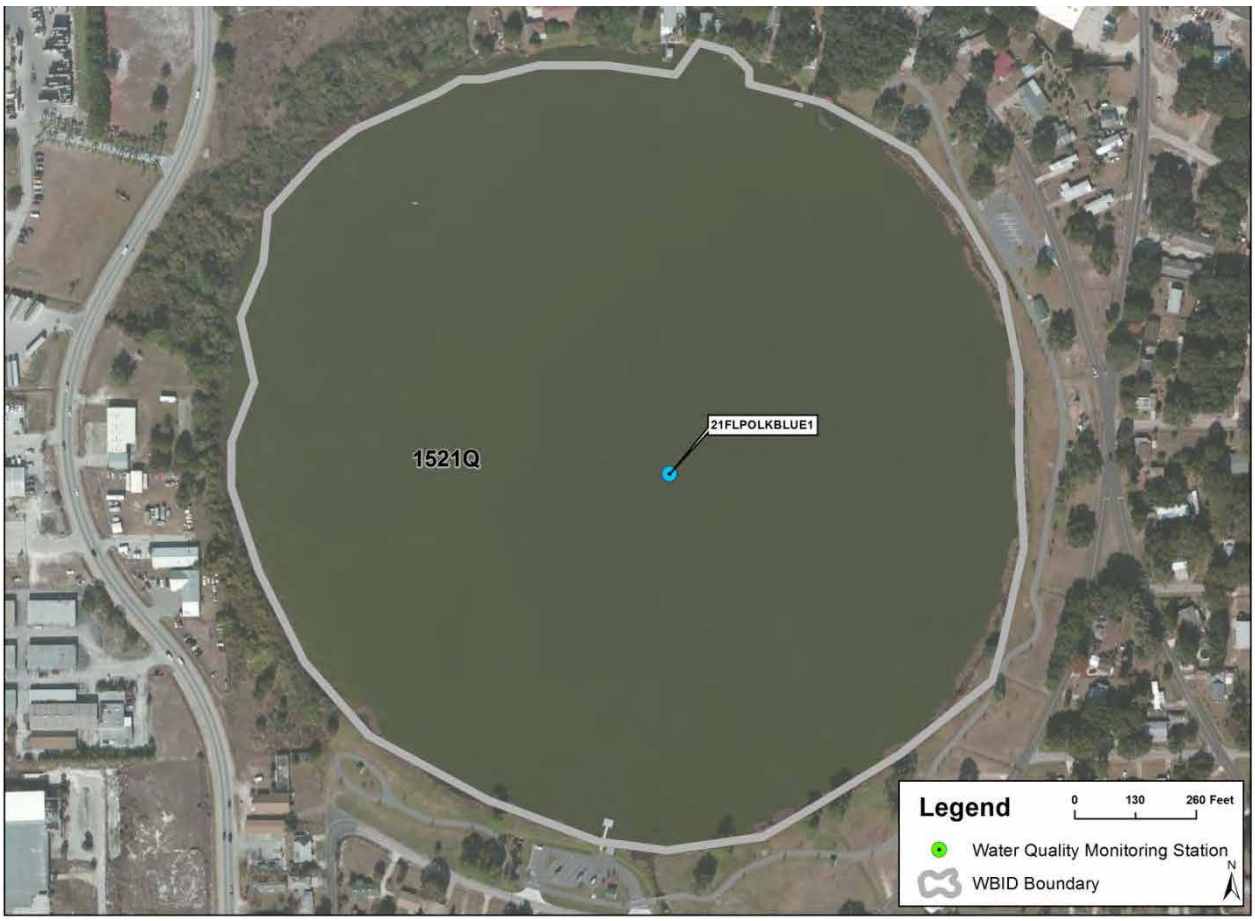


Table 85. Results of NNC evaluation for Lake Blue (WBID 1521Q) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521Q	LAKE BLUE	2002	-	-	-
1521Q	LAKE BLUE	2003	-	**2.665**	**0.086**
1521Q	LAKE BLUE	2004	-	**2.477**	-
1521Q	LAKE BLUE	2005	**53.8**	**1.836**	-
1521Q	LAKE BLUE	2006	**66.8**	**2.240**	-
1521Q	LAKE BLUE	2007	**115.8**	**3.455**	**0.087**
1521Q	LAKE BLUE	2008	**75.4**	**2.629**	**0.070**
1521Q	LAKE BLUE	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 86. Results of NNC evaluation for Lake Blue (WBID 1521Q) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521Q	LAKE BLUE	2003	-	**2.665**	**0.086**
1521Q	LAKE BLUE	2004	-	**2.477**	-
1521Q	LAKE BLUE	2005	**53.8**	**1.836**	-
1521Q	LAKE BLUE	2006	**66.8**	**2.240**	-
1521Q	LAKE BLUE	2007	**115.8**	**3.455**	**0.087**
1521Q	LAKE BLUE	2008	**75.4**	**2.629**	**0.070**
1521Q	LAKE BLUE	2009	-	-	-
1521Q	LAKE BLUE	2010	**58.8**	**2.508**	**0.061**
1521Q	LAKE BLUE	2011	-	**3.155**	**0.062**
1521Q	LAKE BLUE	2012	**34.4**	**2.311**	**0.055**
1521Q	LAKE BLUE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 111. Percent of Lake Blue Samples which Exceed Criteria from 2003-2013.

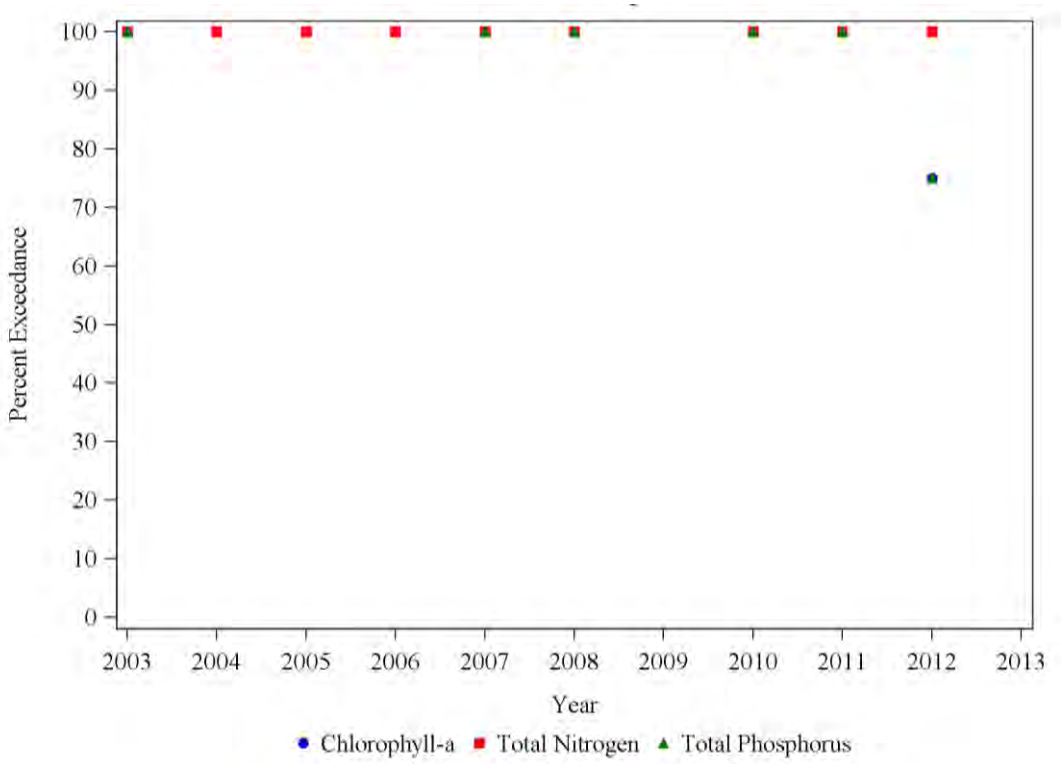
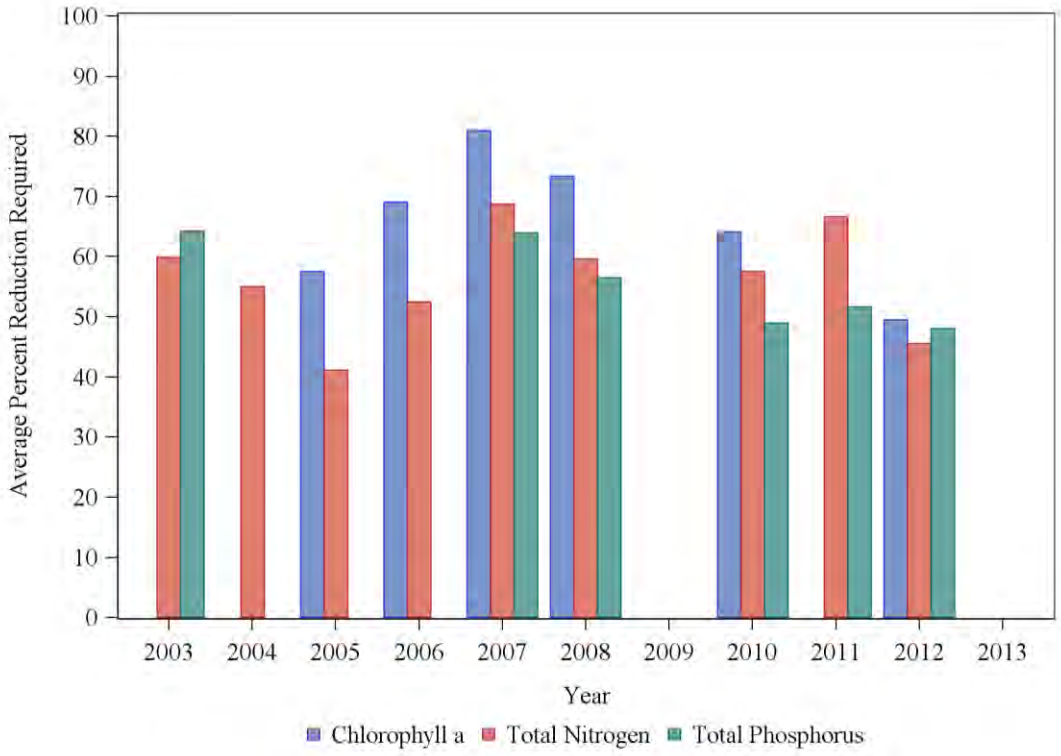


Figure 112. Lake Blue average percent concentration reduction required to meet the NNC from 2003-2013.



4.43. Lake Pierce (WBID 1532A)

Lake Pierce (**Figure 113**) was declared impaired for nutrients due to TSI during the January 1, 2003 to June 30, 2010 verified period as part of the Group 4, Cycle 2 review. The impairment status of Lake Pierce was evaluated using NNC over the verified period used for the initial impairment. Lake Pierce is considered a clear, alkaline lake based on a long-term geometric mean color of 35 PCU and alkalinity of 47 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Pierce was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period using the NNC (**Table 87**).

In addition, Lake Pierce water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Pierce remained characterized as a clear, alkaline lake (color=36 PCU, alkalinity=41 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Pierce continues to be impaired for chlorophyll-a, TN and TP (**Table 88**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 114**). The percent exceedance was frequently 100 percent for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 115**). The calculated required chlorophyll-a percent concentration reductions ranged from 32 to 74 percent, TN concentration reductions ranged from 12 to 60 percent and TP concentration reductions from 39 to 62 percent to obtain compliance with NNC.

Figure 113. Location of water quality sampling sites in Lake Pierce (WBID 1532A).

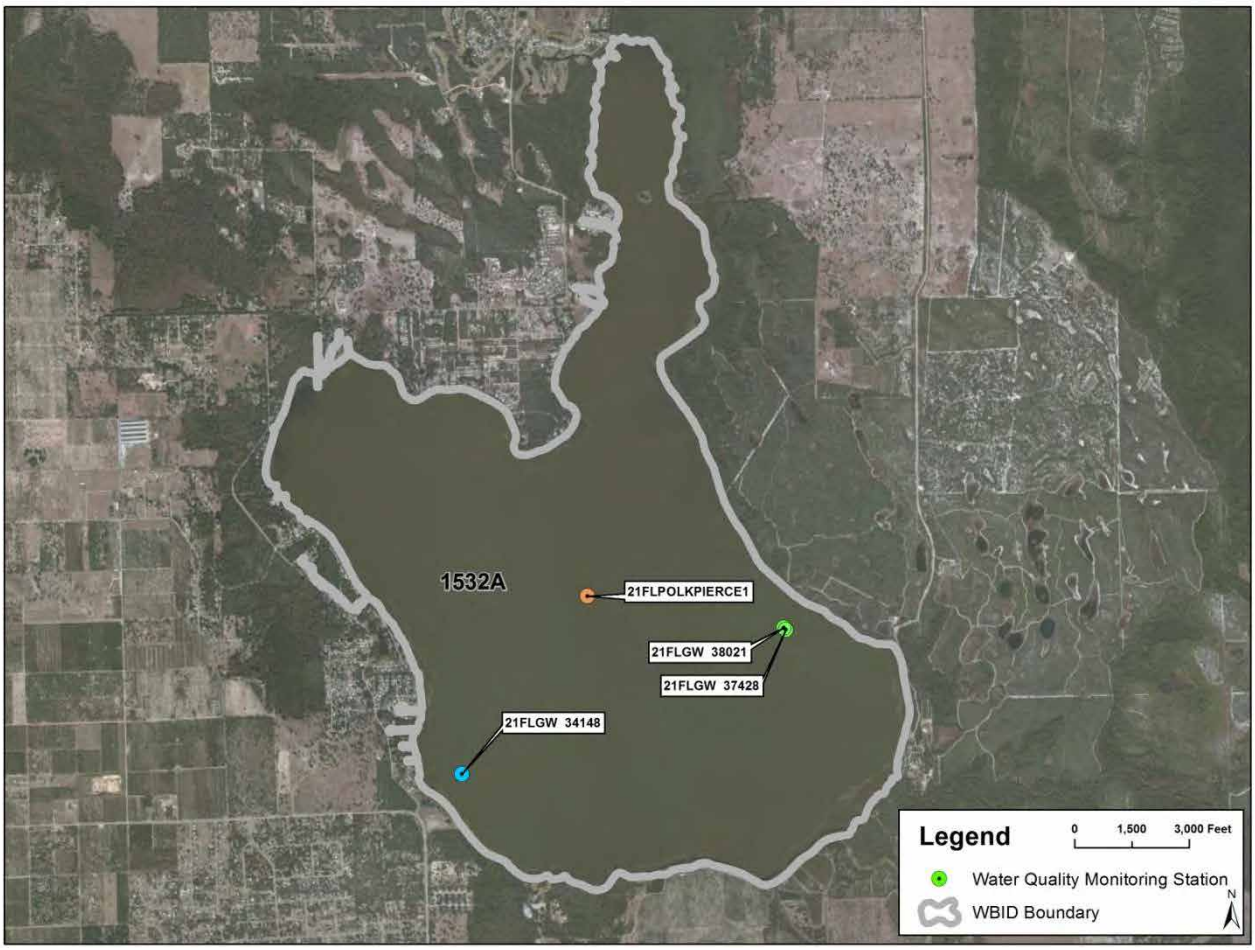


Table 87. Results of NNC evaluation for Lake Pierce (WBID 1532A) over verified period for TSI impairment (January 1, 2003 to June 30, 2010).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1532A	LAKE PIERCE	2003	-	-	-
1532A	LAKE PIERCE	2004	-	-	-
1532A	LAKE PIERCE	2005	**26.2**	**1.312**	-
1532A	LAKE PIERCE	2006	**40.9**	**1.685**	-
1532A	LAKE PIERCE	2007	**50.2**	**1.974**	**0.066**
1532A	LAKE PIERCE	2008	**84.8**	**2.589**	-
1532A	LAKE PIERCE	2009	**61.2**	**2.548**	**0.082**
1532A	LAKE PIERCE	2010	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 88. Results of NNC evaluation for Lake Pierce (WBID 1532A) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1532A	LAKE PIERCE	2003	-	-	-
1532A	LAKE PIERCE	2004	-	-	-
1532A	LAKE PIERCE	2005	**26.2**	**1.312**	-
1532A	LAKE PIERCE	2006	**40.9**	**1.685**	-
1532A	LAKE PIERCE	2007	**50.2**	**1.974**	**0.066**
1532A	LAKE PIERCE	2008	**84.8**	**2.589**	-
1532A	LAKE PIERCE	2009	**61.2**	**2.548**	**0.082**
1532A	LAKE PIERCE	2010	-	**2.172**	**0.059**
1532A	LAKE PIERCE	2011	**54.6**	**2.244**	**0.051**
1532A	LAKE PIERCE	2012	-	**2.640**	**0.057**
1532A	LAKE PIERCE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 114. Percent of Lake Pierce Samples which Exceed Criteria from 2003-2013.

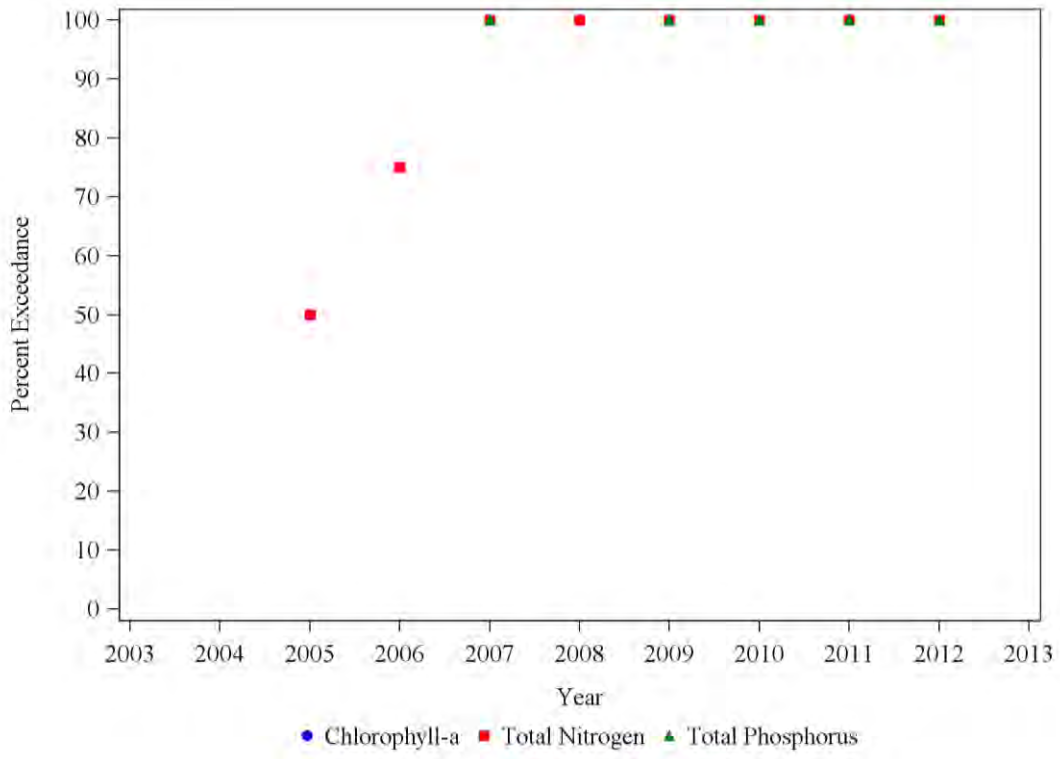
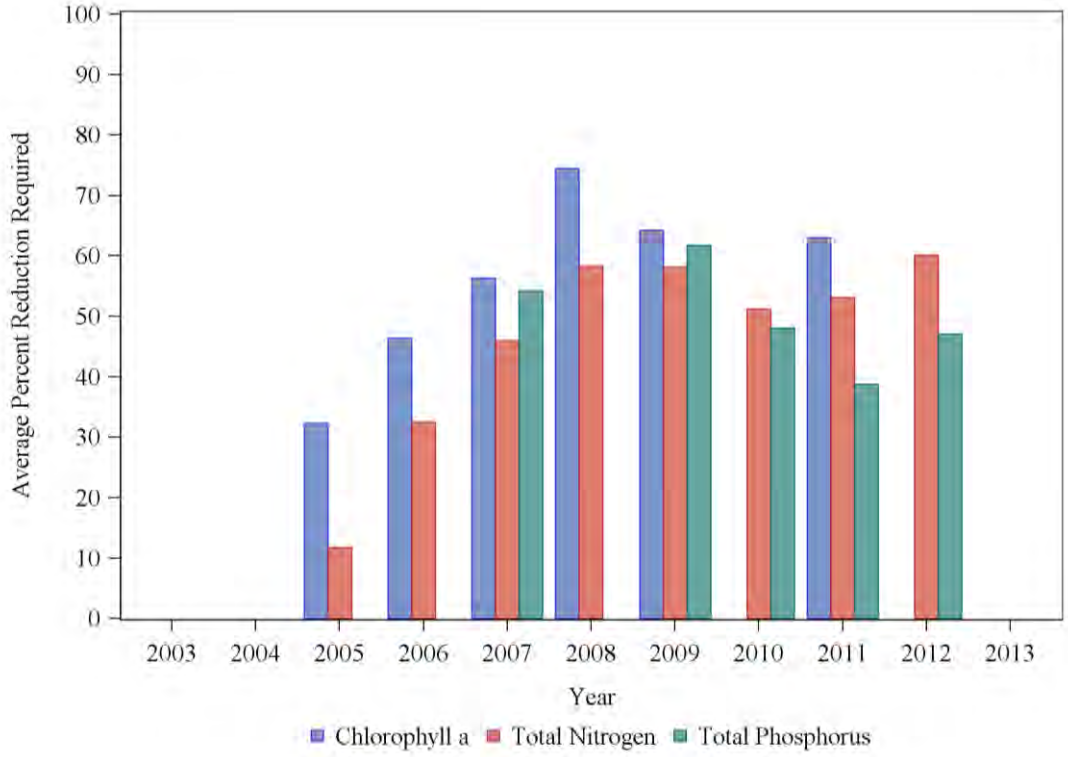


Figure 115. Lake Pierce average percent concentration reduction required to meet the NNC from 2003-2013.



4.44. Lake Marie (WBID 1532B)

Lake Marie (**Figure 116**) was declared impaired for nutrients due to elevated TSI during the January 1, 2003 to June 30, 2010 verified period as part of the Group 4, Cycle 2 review. The impairment status of Lake Marie was evaluated using NNC over the verified period used for the initial impairment. Lake Marie is considered a clear, alkaline lake based on a long-term geometric mean color of 19 PCU and alkalinity of 42 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis were not consistent with the initial impairment determination and indicate that Lake Marie was not found to be impaired for chlorophyll-a, TN and TP during the verified period using the NNC (**Table 89**).

In addition, Lake Marie water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Marie remained classified as a clear, alkaline lake (color=19 PCU, alkalinity=41 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Marie was unimpaired for all three parameters using the NNC (**Table 90**).

Figure 116. Location of water quality sampling sites in Lake Marie (WBID 1532B).

Table 89. Results of NNC evaluation for Lake Marie (WBID 1532B) over verified period for TSI impairment (January 1, 2003 to June 30, 2010).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1532B	LAKE MARIE	2003	-	0.913	-
1532B	LAKE MARIE	2004	-	0.709	0.016
1532B	LAKE MARIE	2005	-	0.664	0.021
1532B	LAKE MARIE	2006	6.9	0.675	0.020
1532B	LAKE MARIE	2007	5.7	0.720	0.021
1532B	LAKE MARIE	2008	-	0.766	0.020
1532B	LAKE MARIE	2009	5.0	0.846	0.019
1532B	LAKE MARIE	2010	-	0.897	0.018
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 90. Results of NNC evaluation for Lake Marie (WBID 1532B) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1532B	LAKE MARIE	2003	-	0.913	-
1532B	LAKE MARIE	2004	-	0.709	0.016
1532B	LAKE MARIE	2005	-	0.664	0.021
1532B	LAKE MARIE	2006	6.9	0.675	0.020
1532B	LAKE MARIE	2007	5.7	0.720	0.021
1532B	LAKE MARIE	2008	-	0.766	0.020
1532B	LAKE MARIE	2009	5.0	0.846	0.019
1532B	LAKE MARIE	2010	6.4	0.809	0.019
1532B	LAKE MARIE	2011	8.4	1.155	0.026
1532B	LAKE MARIE	2012	9.0	1.058	0.034
1532B	LAKE MARIE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

4.45. Lake Wire (WBID 1537)

Lake Wire (**Figure 117**) was declared impaired for nutrients due to elevated TSI during the January 1, 2001 to June 30, 2008 verified period as part of the Group 2, Cycle 2 review. The impairment status of Lake Wire was evaluated using NNC over the verified period used for the initial impairment. Lake Wire was assumed to be a clear, alkaline lake based on a long-term geometric mean color of alkalinity of 41 mg/L. Color and conductivity data were unavailable to assist in the determination the characterization. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis indicate there were insufficient data for chlorophyll-a, TN and TP to determine the impairment status for Lake Wire using the NNC (**Table 91**).

In addition, Lake Wire water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Wire remained classified as a clear, alkalinity lake (alkalinity=40 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data again indicate that here were insufficient data for chlorophyll-a, TN and TP to determine the impairment status for Lake Wire using the NNC over the 2003-2013 time period (**Table 92**).

Figure 117. Location of water quality sampling sites in Lake Wire (WBID 1537).

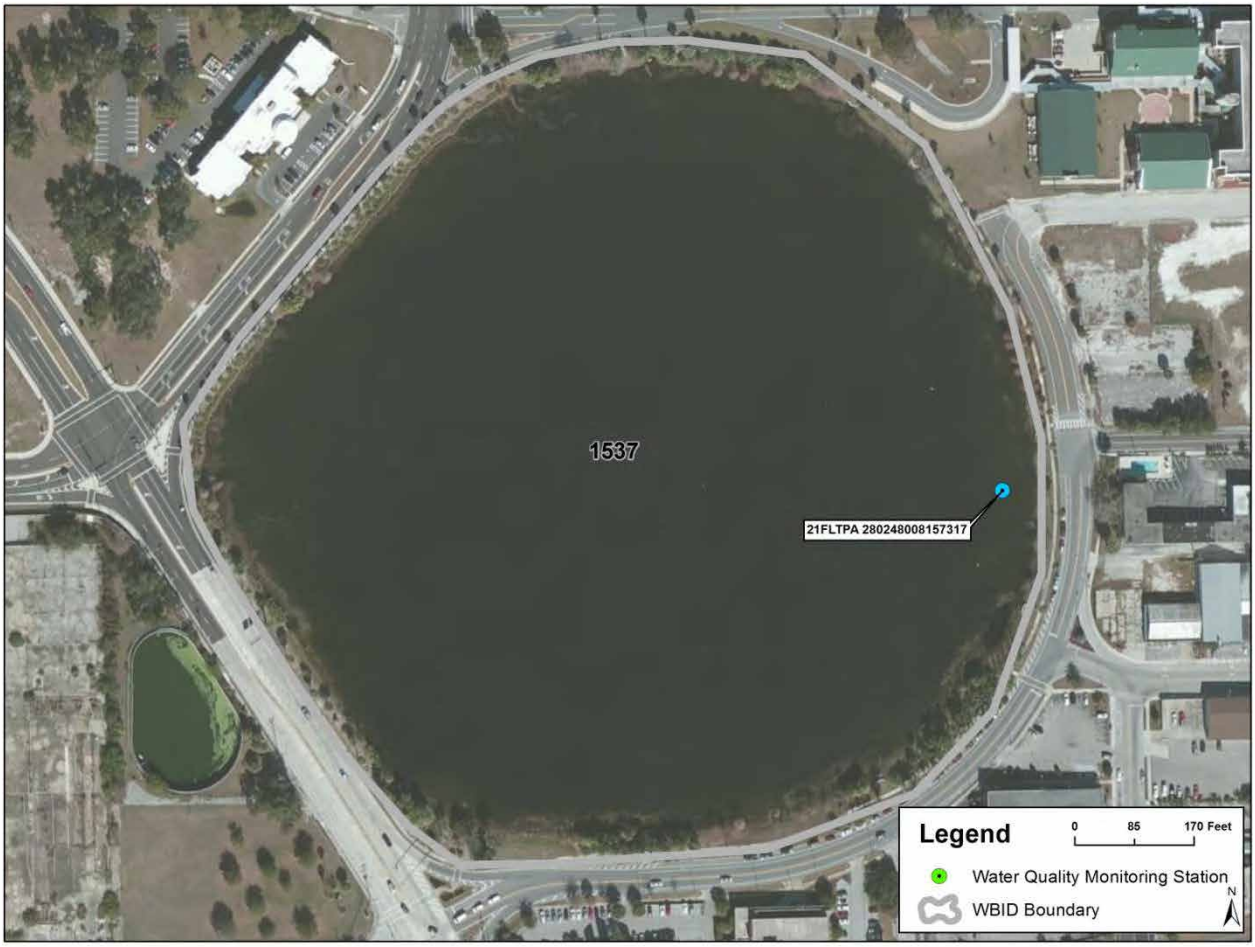


Table 91. Results of NNC evaluation for Lake Wire (WBID 1537) over verified period for TSI impairment (January 1, 2001 to June 30, 2008).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1537	LAKE WIRE	2001	-	-	-
1537	LAKE WIRE	2002	-	-	-
1537	LAKE WIRE	2003	-	-	-
1537	LAKE WIRE	2004	-	-	-
1537	LAKE WIRE	2005	-	-	-
1537	LAKE WIRE	2006	-	-	-
1537	LAKE WIRE	2007	10.3	0.846	0.080
1537	LAKE WIRE	2008	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 92. Results of NNC evaluation for Lake Wire (WBID 1537) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1537	LAKE WIRE	2003	-	-	-
1537	LAKE WIRE	2004	-	-	-
1537	LAKE WIRE	2005	-	-	-
1537	LAKE WIRE	2006	-	-	-
1537	LAKE WIRE	2007	10.3	0.846	0.080
1537	LAKE WIRE	2008	-	-	-
1537	LAKE WIRE	2009	-	-	-
1537	LAKE WIRE	2010	-	-	-
1537	LAKE WIRE	2011	-	-	-
1537	LAKE WIRE	2012	-	-	-
1537	LAKE WIRE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

4.46. Lake Annie (WBID 1539C)

Lake Annie (**Figure 118**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Annie was evaluated using NNC over the verified period used for the initial impairment. Lake Annie is considered a clear, acidic lake based on a long-term geometric mean color of 13 PCU and alkalinity of 6 mg/L. Based on the clear, acidic characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 6.0 µg/L. The results of the analysis were not consistent with the initial impairment determination and indicate that Lake Annie was not found to be impaired for chlorophyll-a or TN during the verified period using the NNC (**Table 93**). There were insufficient TP data to determine impairment status over the initial verified period.

In addition, Lake Annie water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Annie remained classified as a clear, acidic lake (color=13 PCU, alkalinity=13 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 6.0 µg/L. Results of the water quality comparison using current data indicate that Lake Annie was unimpaired for all three parameters using the NNC (**Table 94**).

Figure 118. Location of water quality sampling sites in Lake Annie (WBID 1539C).

Table 93. Results of NNC evaluation for Lake Annie (WBID 1539C) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1539C	LAKE ANNIE	2002	-	-	-
1539C	LAKE ANNIE	2003	-	-	-
1539C	LAKE ANNIE	2004	-	-	-
1539C	LAKE ANNIE	2005	**7.1**	**0.798**	-
1539C	LAKE ANNIE	2006	4.2	0.817	-
1539C	LAKE ANNIE	2007	3.8	0.865	0.020
1539C	LAKE ANNIE	2008	-	**0.820**	**0.018**
1539C	LAKE ANNIE	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 94. Results of NNC evaluation for Lake Annie (WBID 1539C) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1539C	LAKE ANNIE	2003	-	-	-
1539C	LAKE ANNIE	2004	-	-	-
1539C	LAKE ANNIE	2005	**7.1**	**0.798**	-
1539C	LAKE ANNIE	2006	4.2	0.817	-
1539C	LAKE ANNIE	2007	3.8	0.865	0.020
1539C	LAKE ANNIE	2008	-	**0.820**	**0.018**
1539C	LAKE ANNIE	2009	3.3	0.726	0.016
1539C	LAKE ANNIE	2010	3.4	0.754	0.020
1539C	LAKE ANNIE	2011	-	**0.857**	**0.015**
1539C	LAKE ANNIE	2012	3.3	0.829	0.020
1539C	LAKE ANNIE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

4.47. Lake Ned (WBID 1539Q)

Lake Ned (**Figure 119**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Ned was evaluated using NNC over the verified period used for the initial impairment. Lake Ned is considered a clear, alkaline lake based on a long-term geometric mean color of 21 PCU and alkalinity of 29 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis were not consistent with the initial impairment determination and indicate that Lake Ned was not found to be impaired for chlorophyll-a, TN and TP during the verified period using the NNC (**Table 95**).

In addition, Lake Ned water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Ned remained classified as a clear, alkaline lake (color=21 PCU, alkalinity=31 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Ned was unimpaired for all three parameters using the NNC (**Table 96**).

Figure 119. Location of water quality sampling sites in Lake Ned (WBID 1539Q).

Table 95. Results of NNC evaluation for Lake Ned (WBID 1539Q) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1539Q	LAKE NED	2002	-	-	-
1539Q	LAKE NED	2003	-	0.647	-
1539Q	LAKE NED	2004	-	-	-
1539Q	LAKE NED	2005	-	0.659	-
1539Q	LAKE NED	2006	5.4	0.650	-
1539Q	LAKE NED	2007	4.9	0.627	0.025
1539Q	LAKE NED	2008	-	0.610	0.021
1539Q	LAKE NED	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 96. Results of NNC evaluation for Lake Ned (WBID 1539Q) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1539Q	LAKE NED	2003	-	0.647	-
1539Q	LAKE NED	2004	-	-	-
1539Q	LAKE NED	2005	-	0.659	-
1539Q	LAKE NED	2006	5.4	0.650	-
1539Q	LAKE NED	2007	4.9	0.627	0.025
1539Q	LAKE NED	2008	-	0.610	0.021
1539Q	LAKE NED	2009	-	0.662	0.024
1539Q	LAKE NED	2010	10.0	0.768	0.027
1539Q	LAKE NED	2011	3.6	0.657	0.022
1539Q	LAKE NED	2012	10.7	0.811	0.032
1539Q	LAKE NED	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

4.48. Lake Daisy (WBID 1539R)

Lake Daisy (**Figure 120**) was declared impaired for nutrients due to TSI during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. The impairment status of Lake Daisy was evaluated using NNC over the verified period used for the initial impairment. Lake Daisy is considered a clear, acidic lake based on a long-term geometric mean color of 16 PCU and alkalinity of 1 mg/L. Based on the clear, acidic characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 6.0 µg/L The results of the analysis support the initial impairment determination and indicate that Lake Daisy was impaired for elevated chlorophyll-a and TP concentrations during the verified period using the NNC (**Table 97**).

In addition, Lake Daisy water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Daisy remained characterized as a clear, acidic lake (color=18 PCU, alkalinity=3 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 6.0 µg/L. Results of the water quality comparison using current data indicate that Lake Daisy was impaired for TN and TP (**Table 98**). There were insufficient chlorophyll-a data to determine impairment status over the 2003 to 2013 time period. The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 121**). The percent exceedance was variable for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 122**). The calculated required TN percent concentration reductions ranged from 0 to 36 percent and TP concentration reductions from 0 to 34 percent to obtain compliance with NNC.

Figure 120. Location of water quality sampling sites in Lake Daisy (WBID 1539R).

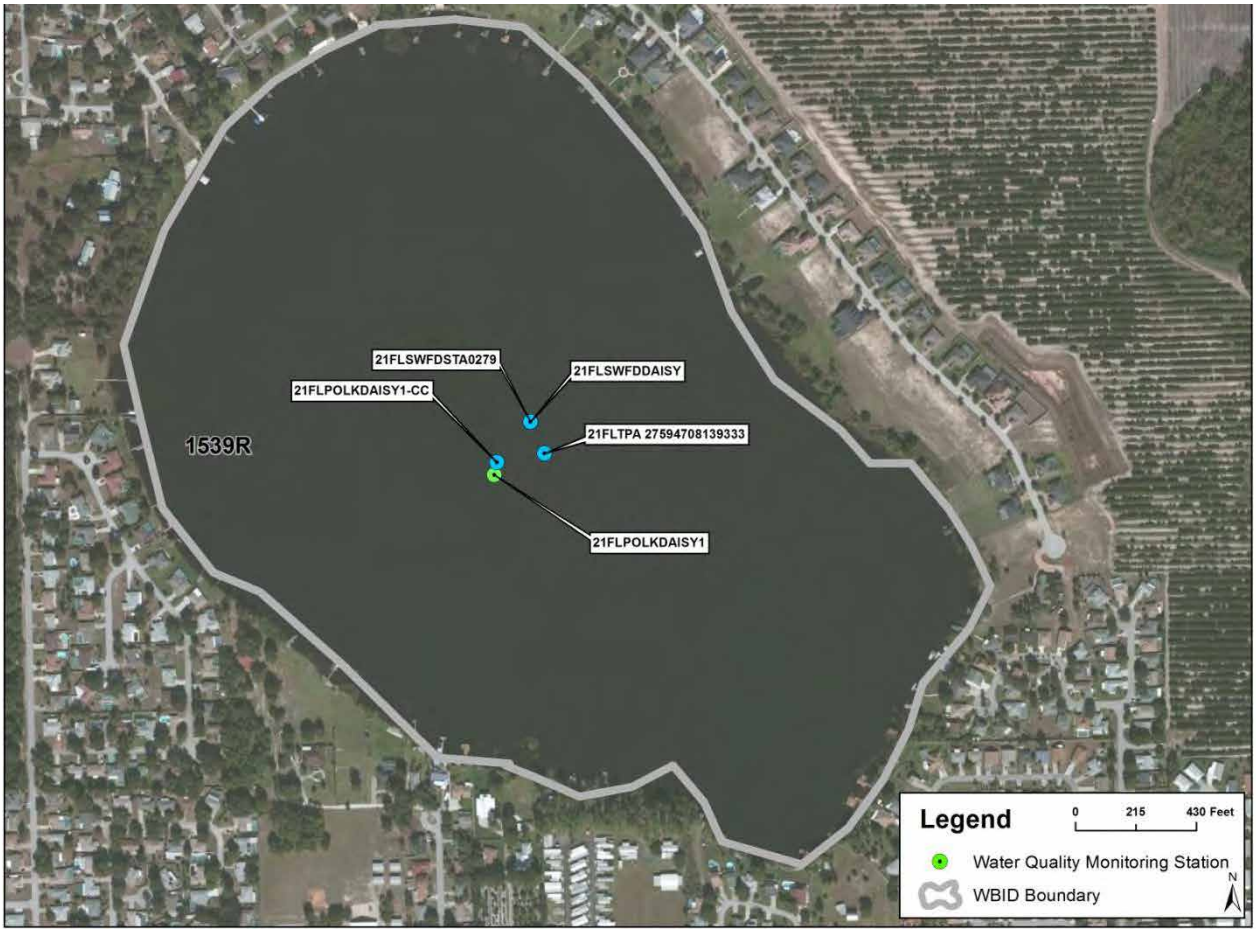


Table 97. Results of NNC evaluation for Lake Daisy (WBID 1539R) over verified period for TSI impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1539R	LAKE DAISY	1997	-	0.405	**0.042**
1539R	LAKE DAISY	1998	-	**0.525**	**0.043**
1539R	LAKE DAISY	1999	4.5	0.550	0.018
1539R	LAKE DAISY	2000	5.7	0.506	0.020
1539R	LAKE DAISY	2001	**6.0**	0.473	**0.023**
1539R	LAKE DAISY	2002	**7.1**	-	-
1539R	LAKE DAISY	2003	-	**0.537**	**0.032**
1539R	LAKE DAISY	2004	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 98. Results of NNC evaluation for Lake Daisy (WBID 1539R) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1539R	LAKE DAISY	2003	-	**0.537**	**0.032**
1539R	LAKE DAISY	2004	-	-	-
1539R	LAKE DAISY	2005	-	**0.599**	-
1539R	LAKE DAISY	2006	-	-	-
1539R	LAKE DAISY	2007	-	-	-
1539R	LAKE DAISY	2008	-	**0.532**	**0.028**
1539R	LAKE DAISY	2009	-	**0.559**	**0.030**
1539R	LAKE DAISY	2010	4.3	0.539	0.026
1539R	LAKE DAISY	2011	-	**0.532**	**0.024**
1539R	LAKE DAISY	2012	-	**0.511**	**0.027**
1539R	LAKE DAISY	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 121. Percent of Lake Daisy Samples which Exceed Criteria from 2003-2013.

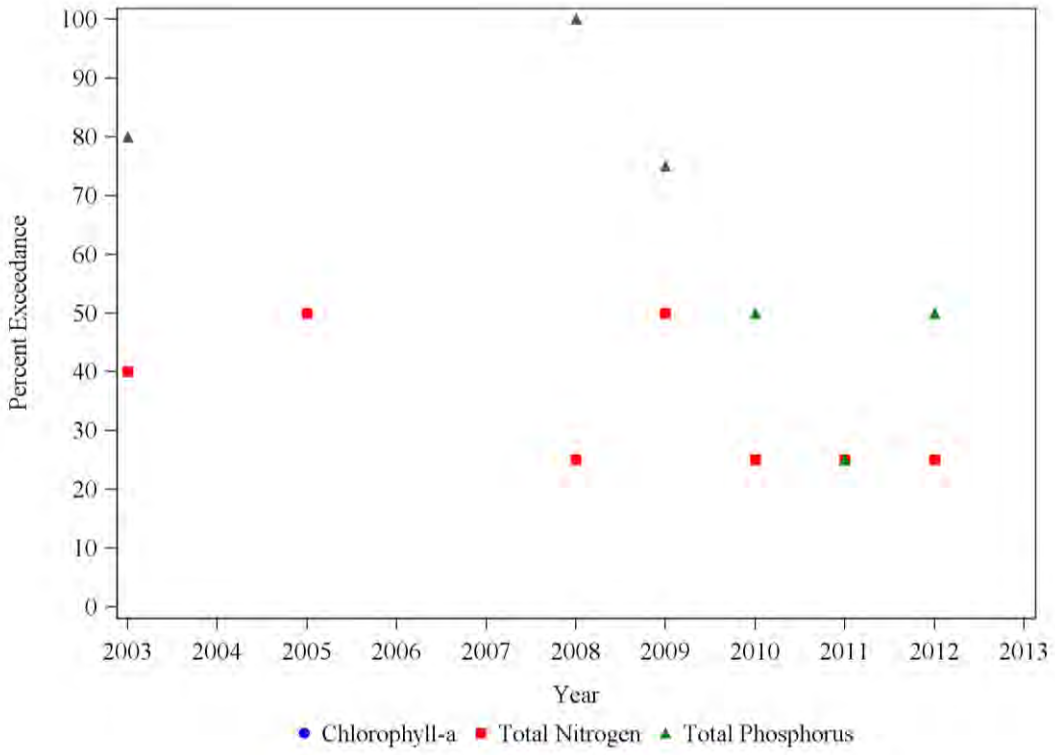
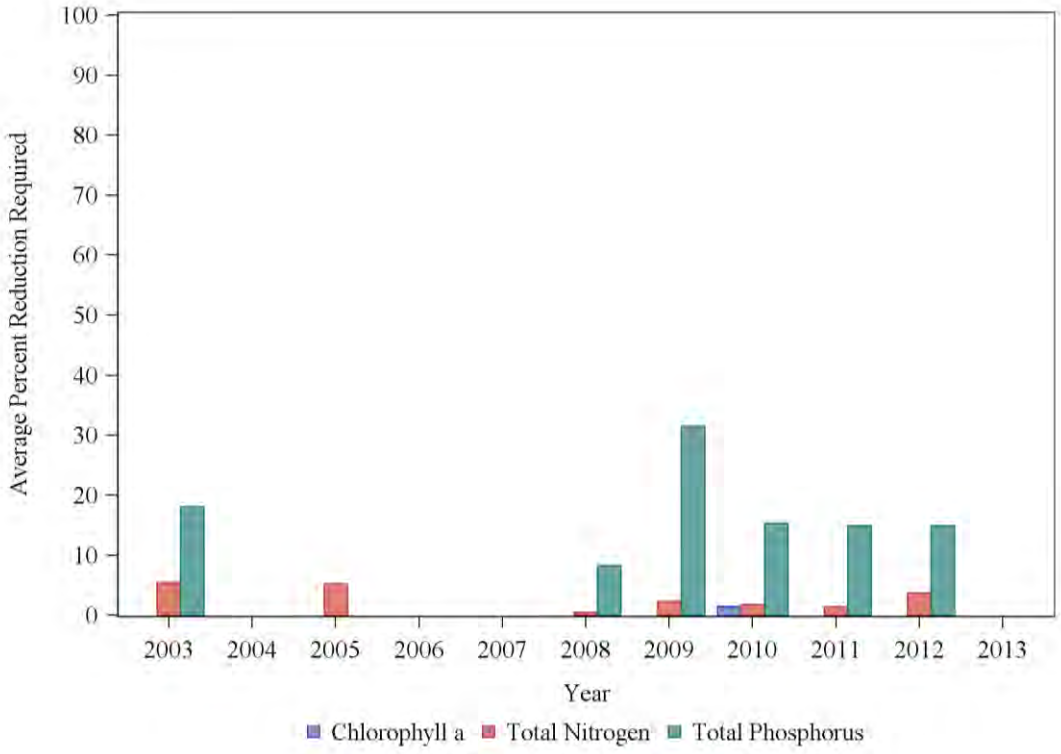


Figure 122. Lake Daisy average percent concentration reduction required to meet the NNC from 2003-2013.



4.49. Lake Menzie (WBID 1539Z)

Lake Menzie (**Figure 123**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Menzie was evaluated using NNC over the verified period used for the initial impairment. Lake Menzie is considered a clear, alkaline lake based on a long-term geometric mean color of 15 PCU and alkalinity of 62 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis were not consistent with the initial impairment determination and indicate that Lake Menzie was not found to be impaired for chlorophyll-a, TN and TP during the verified period using the NNC (**Table 99**).

In addition, Lake Menzie water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Menzie remained classified as a clear, alkaline lake (color=15 PCU, alkalinity=55 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Menzie was unimpaired for all three parameters using the NNC (**Table 100**).

Figure 123. Location of water quality sampling sites in Lake Menzie (WBID 1539Z).

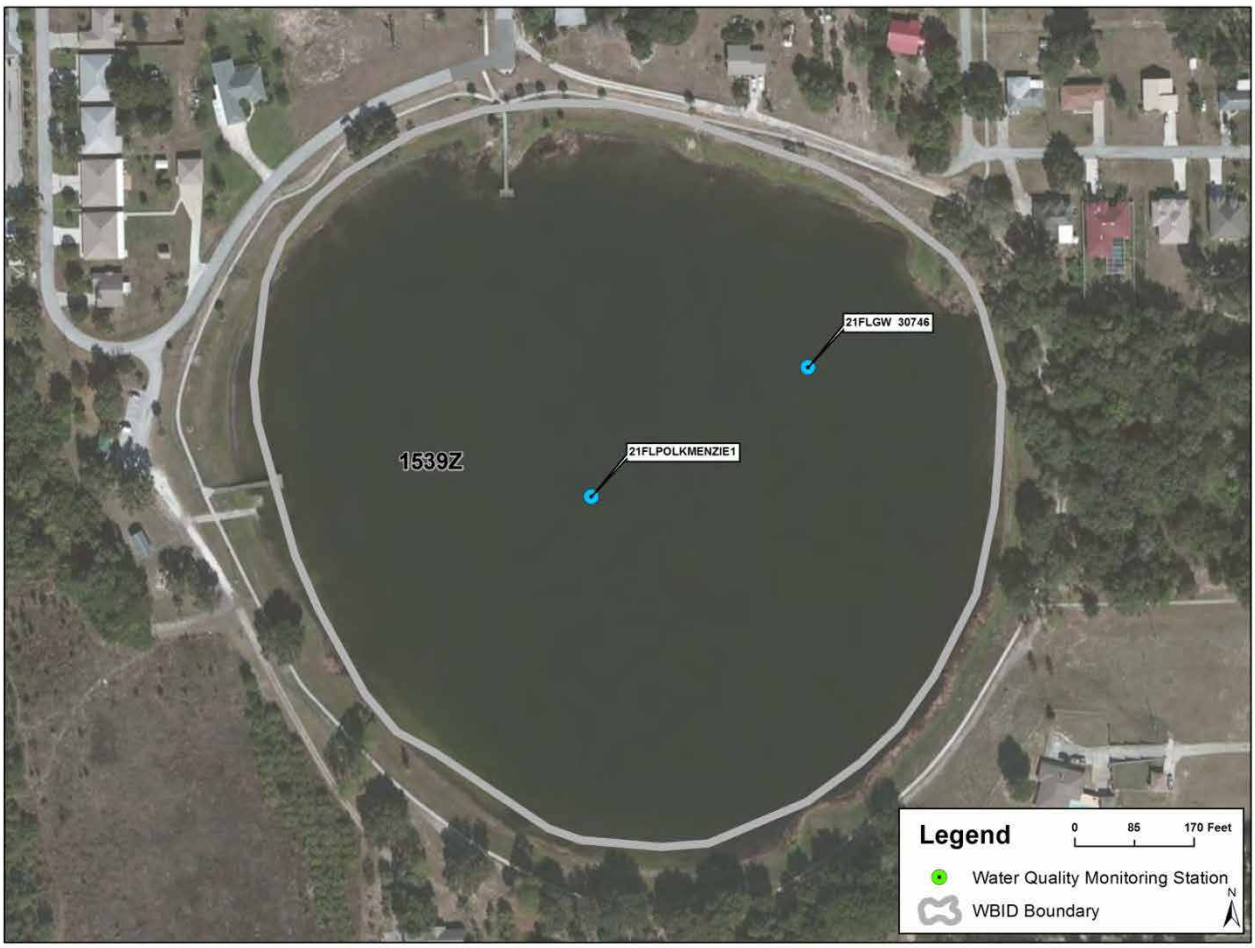


Table 99. Results of NNC evaluation for Lake Menzie (WBID 1539Z) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1539Z	LAKE MENZIE	2002	-	-	-
1539Z	LAKE MENZIE	2003	-	-	-
1539Z	LAKE MENZIE	2004	-	-	-
1539Z	LAKE MENZIE	2005	4.1	0.638	-
1539Z	LAKE MENZIE	2006	4.0	0.749	0.022
1539Z	LAKE MENZIE	2007	6.9	0.803	0.024
1539Z	LAKE MENZIE	2008	-	0.750	0.025
1539Z	LAKE MENZIE	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 100. Results of NNC evaluation for Lake Menzie (WBID 1539Z) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1539Z	LAKE MENZIE	2003	-	-	-
1539Z	LAKE MENZIE	2004	-	-	-
1539Z	LAKE MENZIE	2005	4.1	0.638	-
1539Z	LAKE MENZIE	2006	4.0	0.749	0.022
1539Z	LAKE MENZIE	2007	6.9	0.803	0.024
1539Z	LAKE MENZIE	2008	-	0.750	0.025
1539Z	LAKE MENZIE	2009	-	-	-
1539Z	LAKE MENZIE	2010	-	-	-
1539Z	LAKE MENZIE	2011	-	-	-
1539Z	LAKE MENZIE	2012	-	-	-
1539Z	LAKE MENZIE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

4.50. Lake Hunter (WBID 1543)

Lake Hunter (**Figure 124**) was declared impaired for nutrients due to TSI during the January 1, 2001 to June 30, 2008 verified period as part of the Group 2, Cycle 2 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Lake Hunter. The impairment status of Lake Hunter was evaluated using NNC over the verified period used for the initial impairment. Lake Hunter is considered a clear, alkaline lake based on a long-term geometric mean color of 18 PCU and alkalinity of 69 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Hunter was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period using the NNC (**Table 101**).

In addition, Lake Hunter water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Hunter remained characterized as a clear, alkaline lake (color=18 PCU, alkalinity=64 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Hunter continues to be impaired for chlorophyll-a, TN and TP (**Table 102**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 125**). The percent exceedance was frequently 100 percent for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 126**). The calculated required chlorophyll-a percent concentration reductions ranged from 72 to 86 percent, TN concentration reductions ranged from 40 to 69 percent and TP concentration reductions from 60 to 87 percent to obtain compliance with NNC.

Figure 124. Location of water quality sampling sites in Lake Hunter (WBID 1543).

Table 101. Results of NNC evaluation for Lake Hunter (WBID 1543) over verified period for TSI impairment (January 1, 2001 to June 30, 2008).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1543	LAKE HUNTER	2001	-	-	-
1543	LAKE HUNTER	2002	-	-	-
1543	LAKE HUNTER	2003	-	**3.473**	**0.244**
1543	LAKE HUNTER	2004	**126.2**	**3.245**	**0.217**
1543	LAKE HUNTER	2005	**79.0**	**2.110**	-
1543	LAKE HUNTER	2006	-	**2.465**	-
1543	LAKE HUNTER	2007	**102.9**	**2.347**	**0.159**
1543	LAKE HUNTER	2008	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 102. Results of NNC evaluation for Lake Hunter (WBID 1543) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1543	LAKE HUNTER	2003	-	**3.473**	**0.244**
1543	LAKE HUNTER	2004	**126.2**	**3.245**	**0.217**
1543	LAKE HUNTER	2005	**79.0**	**2.110**	-
1543	LAKE HUNTER	2006	-	**2.465**	-
1543	LAKE HUNTER	2007	**102.9**	**2.347**	**0.159**
1543	LAKE HUNTER	2008	-	-	**0.177**
1543	LAKE HUNTER	2009	-	**1.898**	**0.110**
1543	LAKE HUNTER	2010	-	**2.233**	**0.148**
1543	LAKE HUNTER	2011	**147.2**	**3.457**	**0.177**
1543	LAKE HUNTER	2012	-	**3.371**	**0.200**
1543	LAKE HUNTER	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 125. Percent of Lake Hunter Samples which Exceed Criteria from 2003-2013.

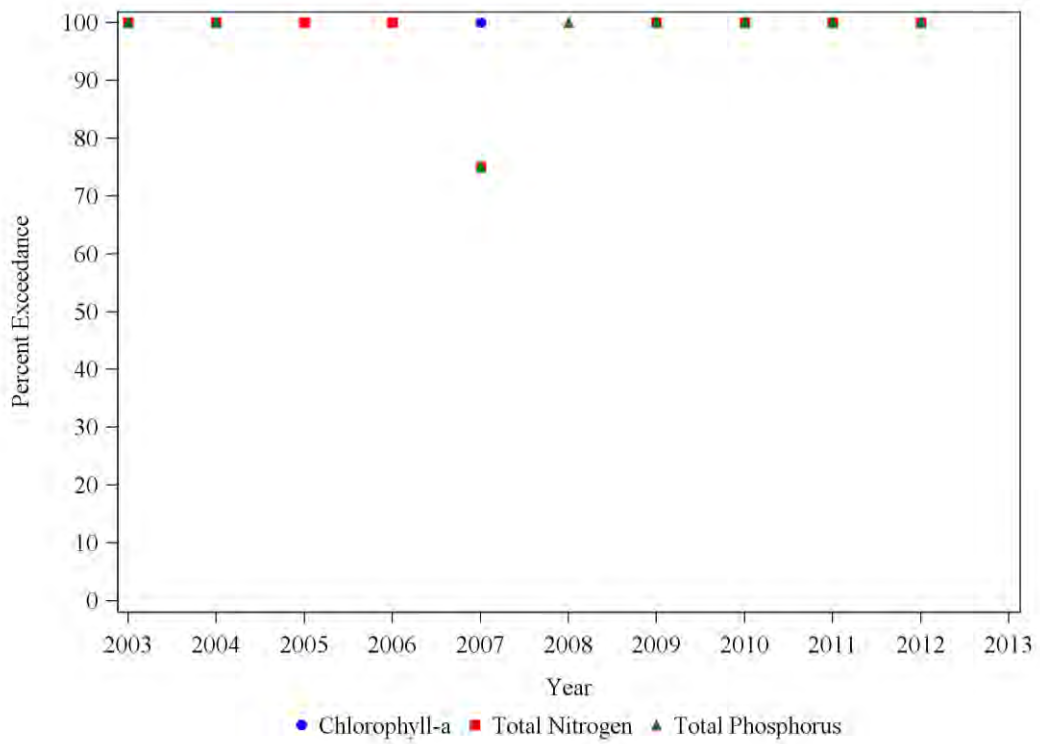
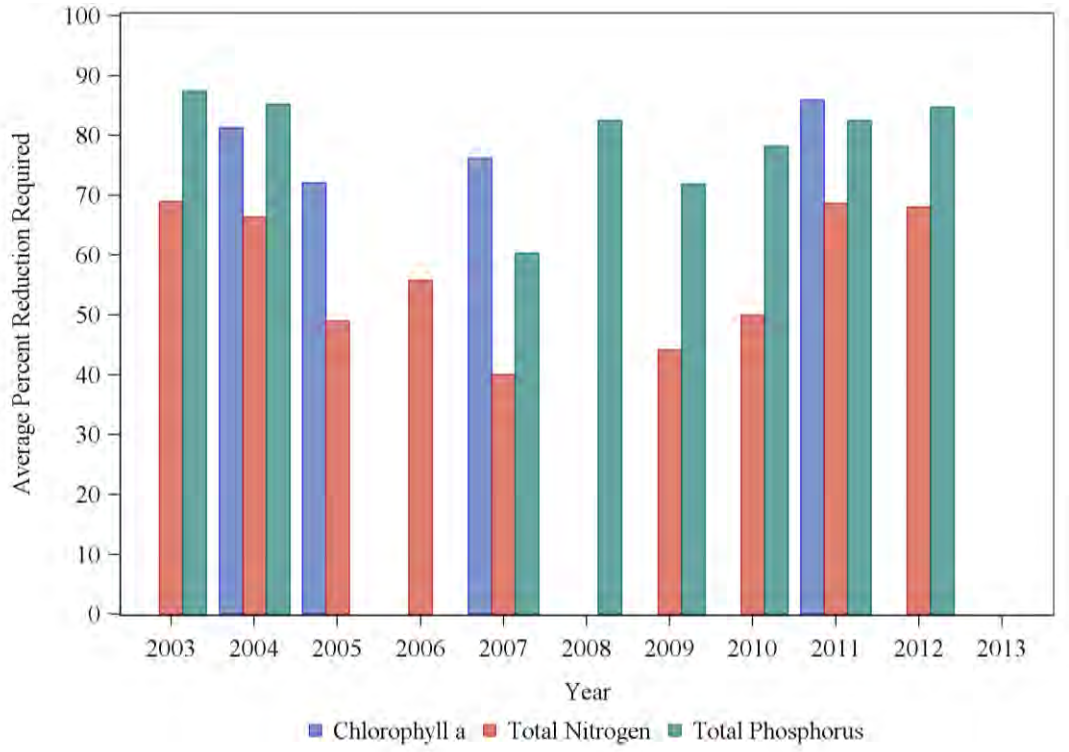


Figure 126. Lake Hunter average percent concentration reduction required to meet the NNC from 2003-2013.



4.51. Lake Elbert (WBID 1548)

Lake Elbert (**Figure 127**) was declared impaired for nutrients due to elevated TSI during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. The impairment status of Lake Elbert was evaluated using NNC over the verified period used for the initial impairment. Lake Elbert is considered a clear, alkaline lake based on a long-term geometric mean color of 10 PCU and alkalinity of 28 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Elbert was impaired for elevated TP concentrations during the verified period using the NNC (**Table 103**).

In addition, Lake Elbert water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Elbert remained classified as a clear, alkaline lake (color=10 PCU, alkalinity=31 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Elbert was unimpaired for all three parameters using the NNC (**Table 104**).

Figure 127. Location of water quality sampling sites in Lake Elbert (WBID 1548).

Table 103. Results of NNC evaluation for Lake Elbert (WBID 1548) over verified period for TSI impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1548	LAKE ELBERT	1997	-	0.590	**0.037**
1548	LAKE ELBERT	1998	-	0.581	**0.046**
1548	LAKE ELBERT	1999	9.7	0.754	0.026
1548	LAKE ELBERT	2000	6.0	0.590	0.018
1548	LAKE ELBERT	2001	3.5	0.429	0.018
1548	LAKE ELBERT	2002	4.1	0.496	0.018
1548	LAKE ELBERT	2003	5.8	0.399	0.018
1548	LAKE ELBERT	2004	-	0.410	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 104. Results of NNC evaluation for Lake Elbert (WBID 1548) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1548	LAKE ELBERT	2003	5.8	0.399	0.018
1548	LAKE ELBERT	2004	3.7	0.407	-
1548	LAKE ELBERT	2005	7.2	0.519	0.027
1548	LAKE ELBERT	2006	-	0.507	0.025
1548	LAKE ELBERT	2007	5.2	0.477	0.021
1548	LAKE ELBERT	2008	4.0	0.410	0.018
1548	LAKE ELBERT	2009	-	0.503	0.018
1548	LAKE ELBERT	2010	5.3	0.496	0.019
1548	LAKE ELBERT	2011	5.3	0.569	0.022
1548	LAKE ELBERT	2012	6.9	0.566	0.021
1548	LAKE ELBERT	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

4.52. Banana Lake (WBID 1549B)

Banana Lake (**Figure 128**) was declared impaired for nutrients due to elevated TSI during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. In Banana Lake, sampling station 21FLPOLK BANANA3 was reassigned to WBID 1549A as the coordinates position the station outside of the WBID boundary in the South Pit (Banana Lake Canal) not Banana Lake.

The impairment status of Banana Lake was evaluated using NNC over the verified period used for the initial impairment. Banana Lake is considered a clear, alkaline lake based on a long-term geometric mean color of 26 PCU and alkalinity of 68 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Banana Lake was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period (**Table 105**).

In addition, Banana Lake water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Banana Lake remained classified as a clear, alkaline lake (color=26 PCU, alkalinity=60 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Banana Lake continues to be impaired for elevated chlorophyll-a, TN and TP concentrations (**Table 106**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 129**). The percent exceedance was frequently 100 percent for all parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 130**). The calculated required chlorophyll-a percent concentration reductions ranged from 30 to 80 percent, TN concentration reductions ranged from 26 to 63 percent and TP concentration reductions from 41 to 95 percent to obtain compliance with NNC.

Figure 128. Location of water quality sampling sites in Banana Lake (WBID 1549B).

Table 105. Results of NNC evaluation for Banana Lake (WBID 1549B) over verified period for TSI impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1549B	BANANA LAKE	1997	-	**2.384**	**0.619**
1549B	BANANA LAKE	1998	-	**2.405**	**0.692**
1549B	BANANA LAKE	1999	**89.2**	**2.599**	**0.735**
1549B	BANANA LAKE	2000	**143.5**	**4.119**	**1.012**
1549B	BANANA LAKE	2001	**148.2**	**4.313**	**0.920**
1549B	BANANA LAKE	2002	**110.0**	**2.982**	**0.719**
1549B	BANANA LAKE	2003	**90.4**	**2.291**	**0.637**
1549B	BANANA LAKE	2004	**118.8**	**3.147**	**0.693**
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 106. Results of NNC evaluation for Banana Lake (WBID 1549B) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1549B	BANANA LAKE	2003	**90.4**	**2.291**	**0.637**
1549B	BANANA LAKE	2004	**104.7**	**2.453**	**0.688**
1549B	BANANA LAKE	2005	**103.4**	**2.696**	**0.483**
1549B	BANANA LAKE	2006	**103.6**	**3.059**	**0.341**
1549B	BANANA LAKE	2007	**25.3**	**1.394**	**0.102**
1549B	BANANA LAKE	2008	**74.0**	**2.259**	**0.209**
1549B	BANANA LAKE	2009	-	-	-
1549B	BANANA LAKE	2010	-	-	-
1549B	BANANA LAKE	2011	-	-	-
1549B	BANANA LAKE	2012	-	-	-
1549B	BANANA LAKE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 129. Percent of Banana Lake Samples which Exceed Criteria from 2003-2013.

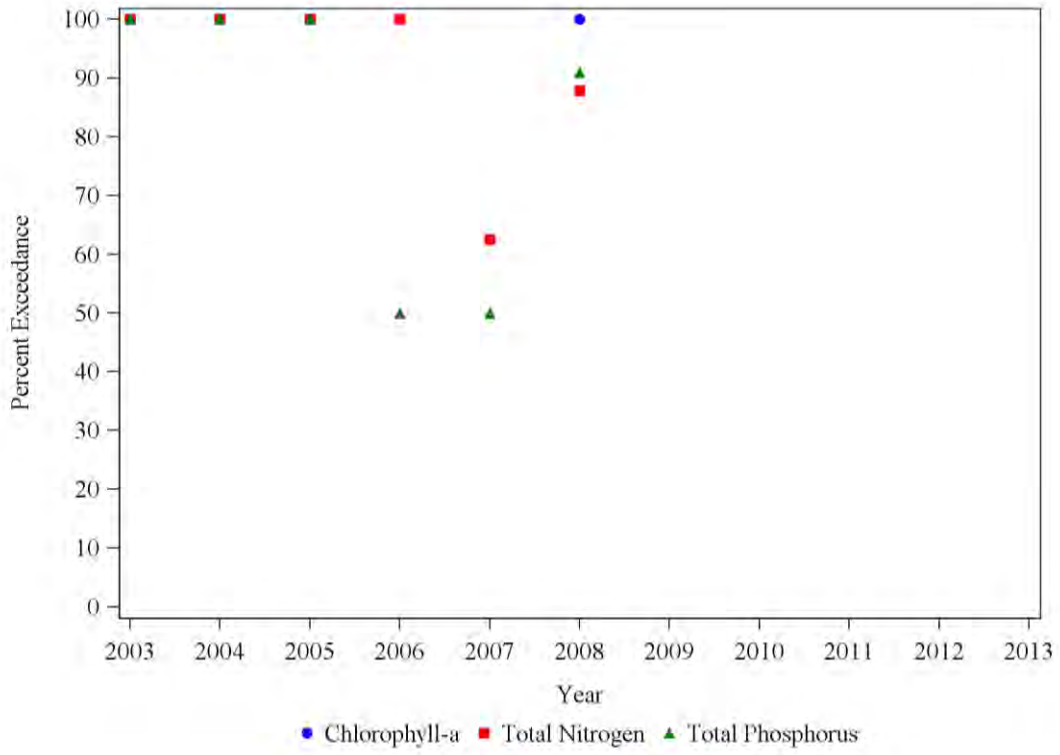
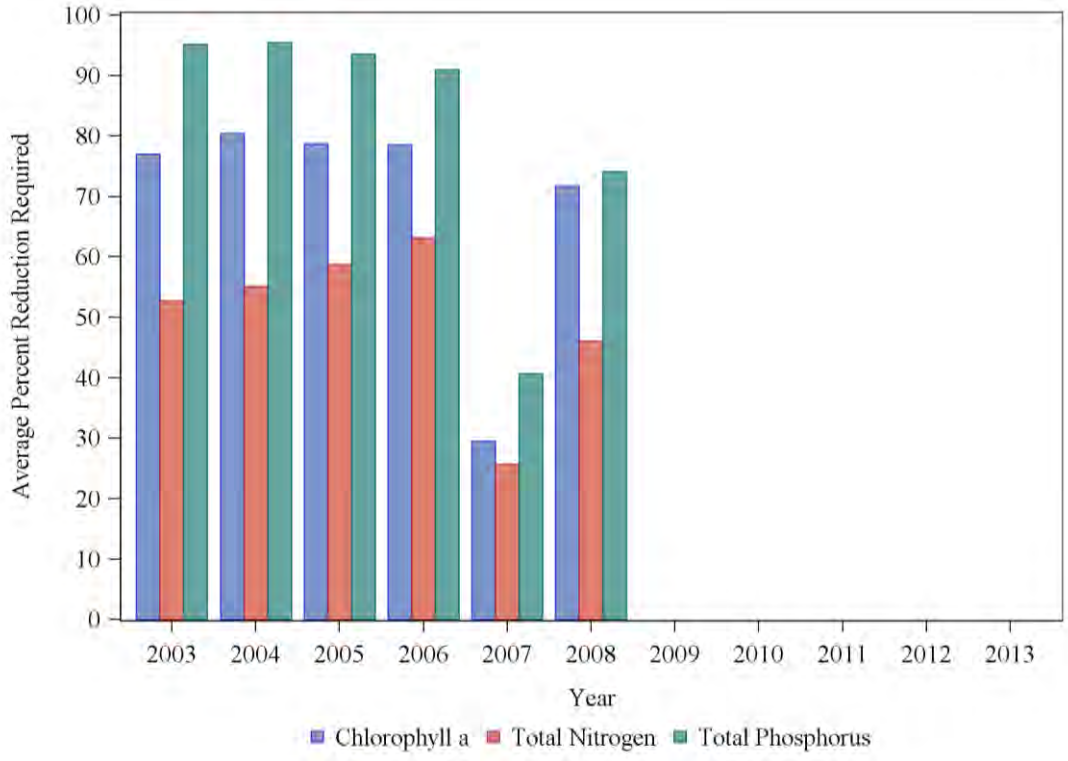


Figure 130. Banana Lake average percent reduction required to meet the NNC from 2003-2013.



4.53. Lake Stahl (WBID 1549B1)

Lake Stahl (**Figure 131**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake Stahl was evaluated using NNC over the verified period used for the initial impairment. Lake Stahl is considered a clear, alkaline lake based on a long-term geometric mean color of 36 PCU and alkalinity of 70 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Stahl was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period (**Table 107**).

In addition, Lake Stahl water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Stahl remained classified as a clear, alkaline lake (color=36 PCU, alkalinity=69 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Stahl continues to be impaired for elevated chlorophyll-a, TN and TP concentrations (**Table 108**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 132**). The percent exceedance was variable for all parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 133**). The calculated required chlorophyll-a percent concentration reductions ranged from 32 to 74 percent, TN concentration reductions ranged from 13 to 48 percent and TP concentration reductions from 41 to 92 percent to obtain compliance with NNC.

Figure 131. Location of water quality sampling sites in Lake Stahl (WBID 1549B1).

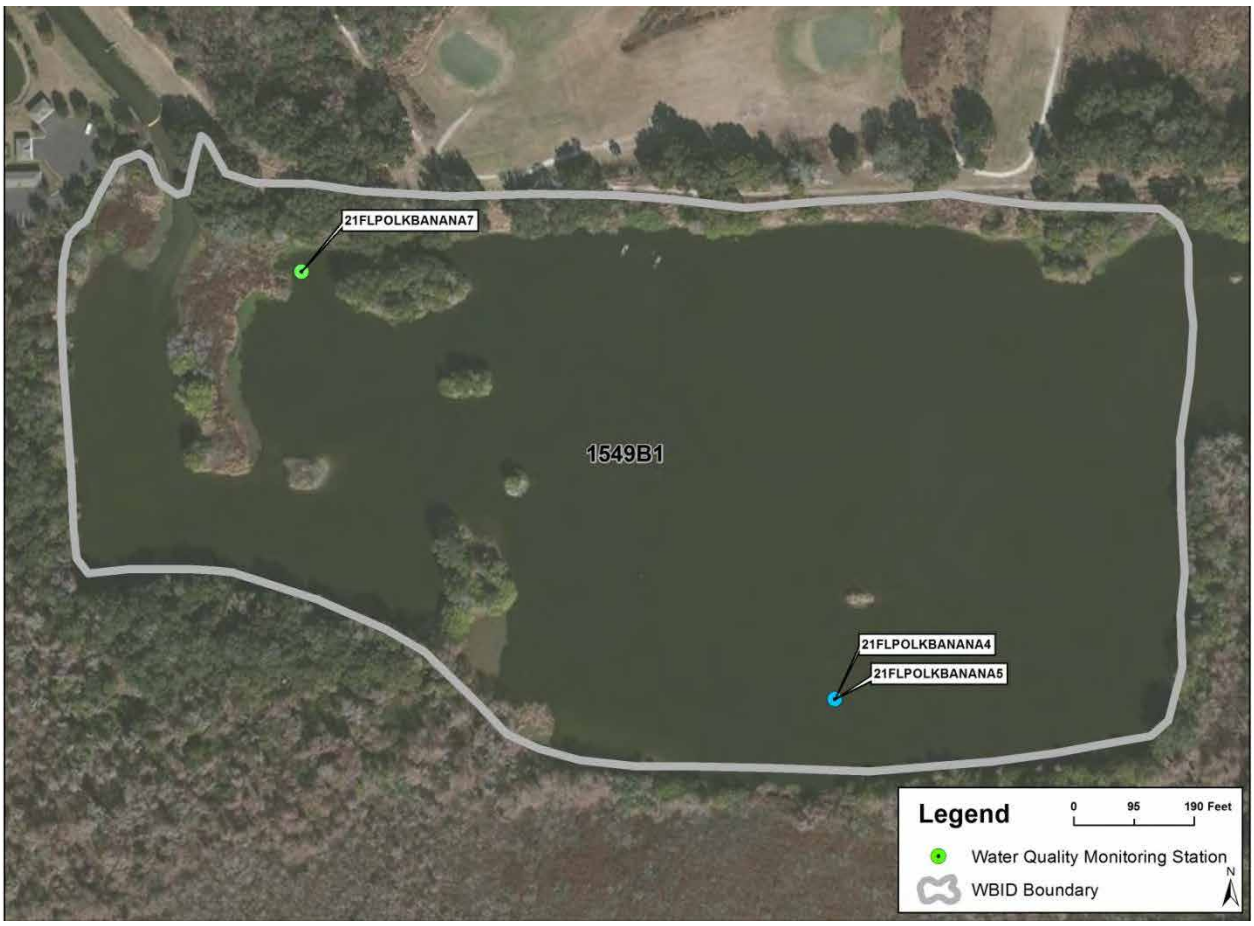


Table 107. Results of NNC evaluation for Lake Stahl (WBID 1549B1) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1549B1	LAKE STAHL	2002	-	-	-
1549B1	LAKE STAHL	2003	-	-	-
1549B1	LAKE STAHL	2004	-	-	-
1549B1	LAKE STAHL	2005	-	-	-
1549B1	LAKE STAHL	2006	-	-	-
1549B1	LAKE STAHL	2007	**31.5**	**1.217**	**0.167**
1549B1	LAKE STAHL	2008	**31.7**	**2.935**	**0.279**
1549B1	LAKE STAHL	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 108. Results of NNC evaluation for Lake Stahl (WBID 1549B1) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1549B1	LAKE STAHL	2003	-	-	-
1549B1	LAKE STAHL	2004	-	-	-
1549B1	LAKE STAHL	2005	-	-	-
1549B1	LAKE STAHL	2006	-	-	-
1549B1	LAKE STAHL	2007	**31.5**	**1.217**	**0.167**
1549B1	LAKE STAHL	2008	**31.7**	**2.935**	**0.279**
1549B1	LAKE STAHL	2009	-	**1.648**	**0.264**
1549B1	LAKE STAHL	2010	-	-	-
1549B1	LAKE STAHL	2011	**59.4**	**1.606**	**0.326**
1549B1	LAKE STAHL	2012	**78.9**	**2.083**	**0.411**
1549B1	LAKE STAHL	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 132. Percent of Lake Stahl Samples which Exceed Criteria from 2003-2013.

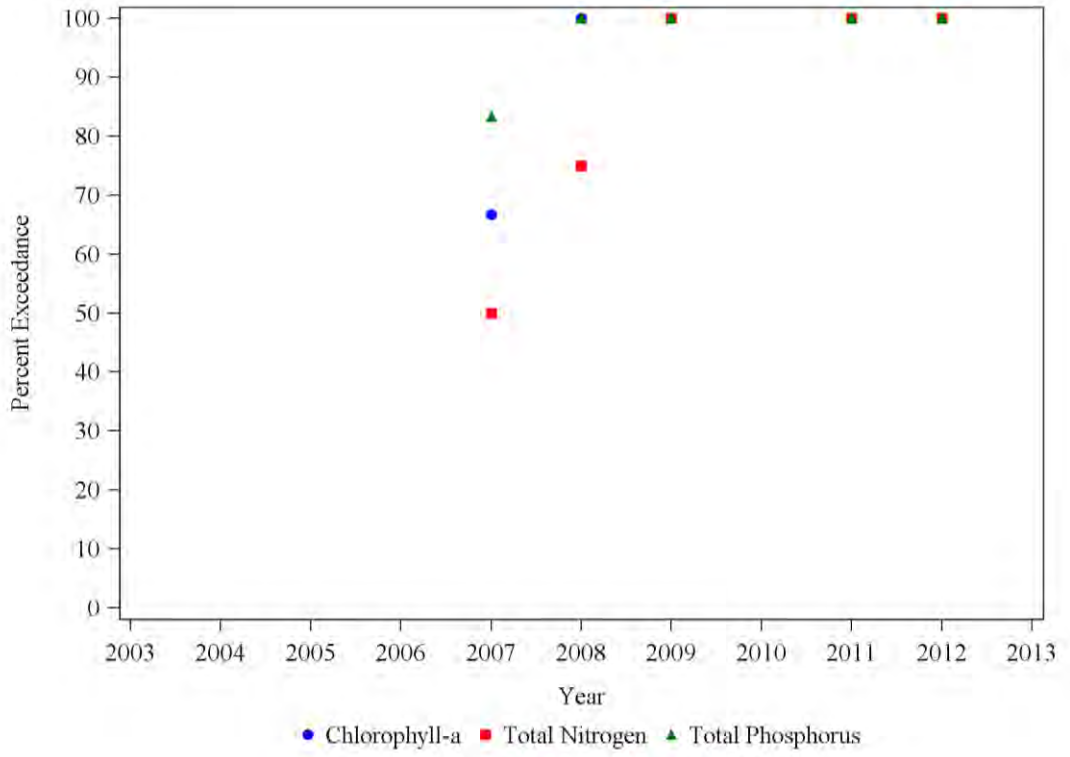
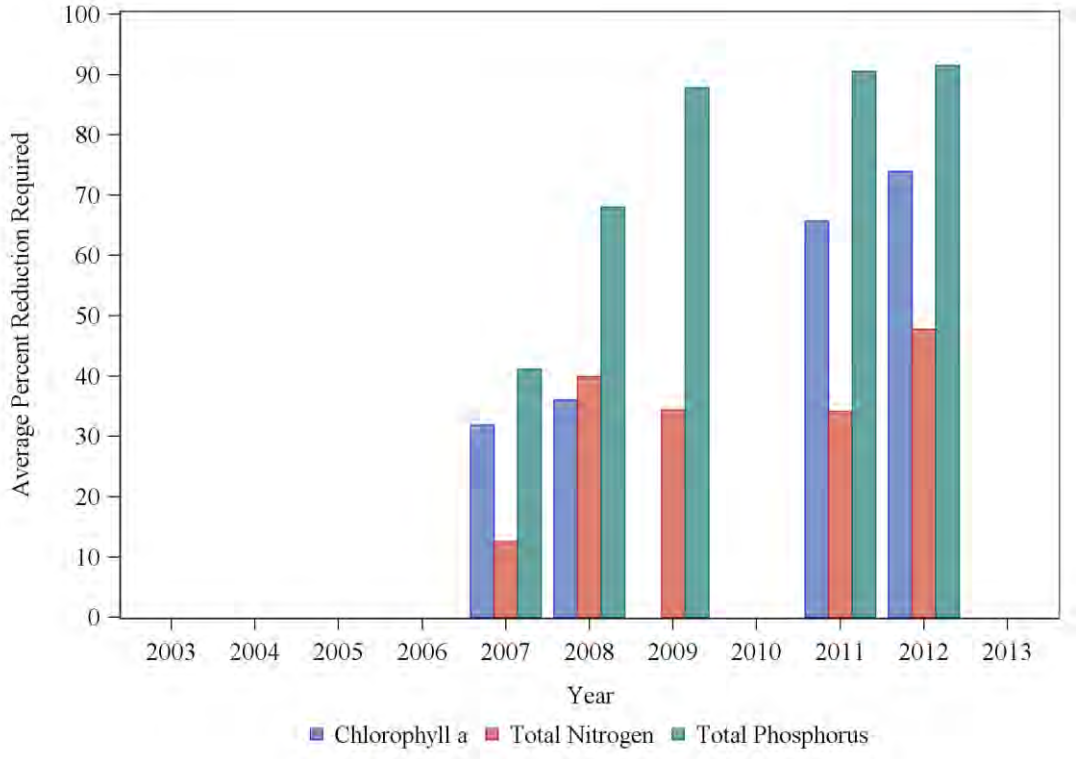


Figure 133. Lake Stahl average percent reduction required to meet the NNC from 2003-2013.



4.54. Lake Hollingsworth (WBID 1549X)

Lake Hollingsworth (**Figure 134**) was declared impaired for nutrients due to TSI during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. The impairment status of Lake Hollingsworth was evaluated using NNC over the verified period used for the initial impairment. Lake Hollingsworth is considered a clear, alkaline lake based on a long-term geometric mean color of 19 PCU and alkalinity of 53 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis indicate that there were insufficient data for chlorophyll-a, TN and TP to determine the impairment status for Lake Hollingsworth using the NNC over the verified period (**Table 109**).

In addition, Lake Hollingsworth water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Hollingsworth remained characterized as a clear, alkaline lake (color=17 PCU, alkalinity=45 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Hollingsworth is impaired for elevated TN and TP (**Table 110**). There were insufficient chlorophyll-a data to determine impairment status over the 2003 to 2013 period. The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 135**). The percent exceedance was frequently 100 percent for TN and TP. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 136**). The calculated required TN percent concentration reductions ranged from 25 to 60 percent and TP concentration reductions from 40 to 73 percent to obtain compliance with NNC.

Figure 134. Location of water quality sampling sites in Lake Hollingsworth (WBID 1549X).

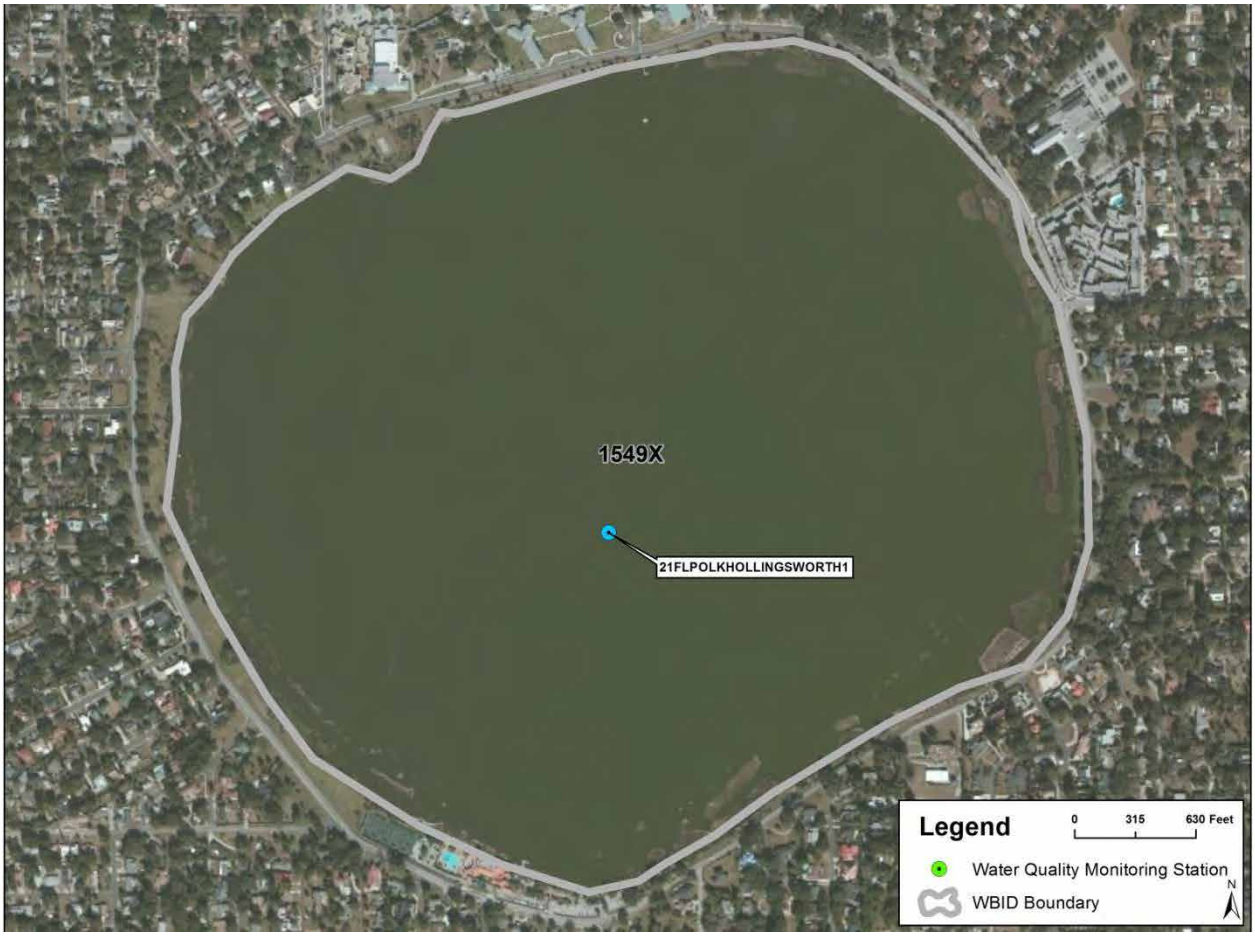


Table 109. Results of NNC evaluation for Lake Hollingsworth (WBID 1549X) over verified period for TSI impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1549X	LAKE HOLLINGSWORTH	1997		-	-
1549X	LAKE HOLLINGSWORTH	1998		-	-
1549X	LAKE HOLLINGSWORTH	1999	-	-	-
1549X	LAKE HOLLINGSWORTH	2000	-	-	-
1549X	LAKE HOLLINGSWORTH	2001	-	-	-
1549X	LAKE HOLLINGSWORTH	2002	-	-	-
1549X	LAKE HOLLINGSWORTH	2003	-	**1.905**	**0.094**
1549X	LAKE HOLLINGSWORTH	2004	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 110. Results of NNC evaluation for Lake Hollingsworth (WBID 1549X) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1549X	HOLLINGSWORTH LAKE	2003	-	**1.905**	**0.094**
1549X	HOLLINGSWORTH LAKE	2004	-	**1.383**	**0.053**
1549X	HOLLINGSWORTH LAKE	2005	**55.8**	**1.765**	-
1549X	HOLLINGSWORTH LAKE	2006	-	**1.998**	-
1549X	HOLLINGSWORTH LAKE	2007	-	**2.061**	**0.073**
1549X	HOLLINGSWORTH LAKE	2008	-	-	**0.084**
1549X	HOLLINGSWORTH LAKE	2009	-	**1.645**	**0.068**
1549X	HOLLINGSWORTH LAKE	2010	-	**1.744**	**0.086**
1549X	HOLLINGSWORTH LAKE	2011	**79.2**	**2.560**	**0.114**
1549X	HOLLINGSWORTH LAKE	2012	-	**2.661**	**0.085**
1549X	HOLLINGSWORTH LAKE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 135. Percent of Lake Hollingsworth Samples which Exceed Criteria from 2003-2013.

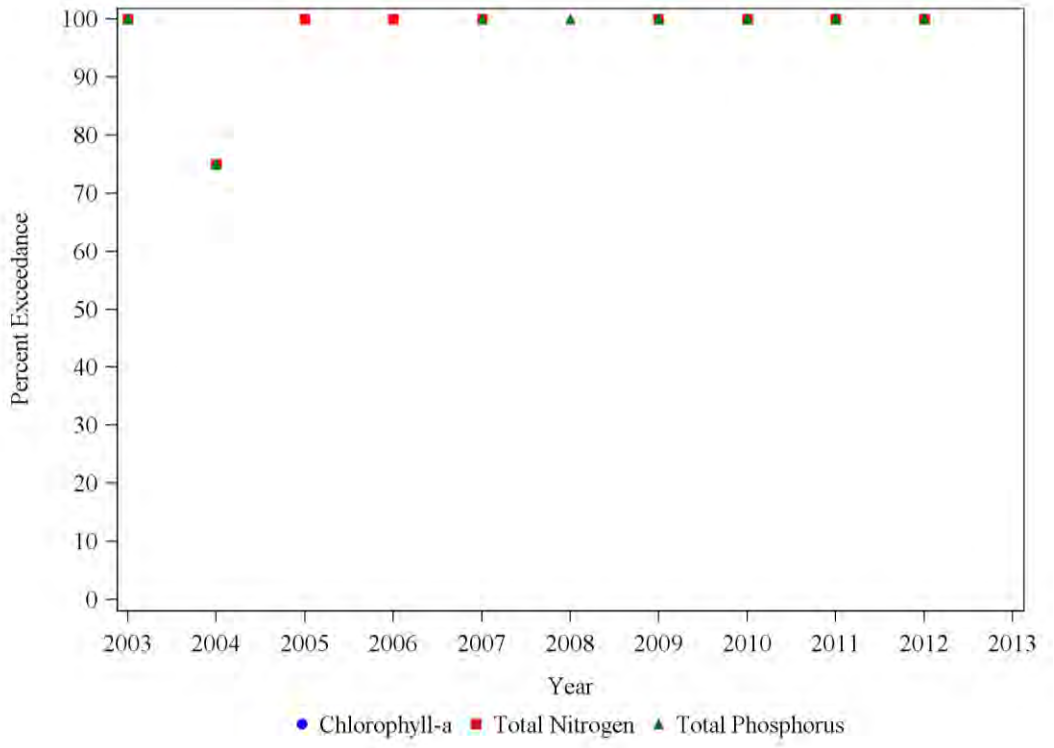
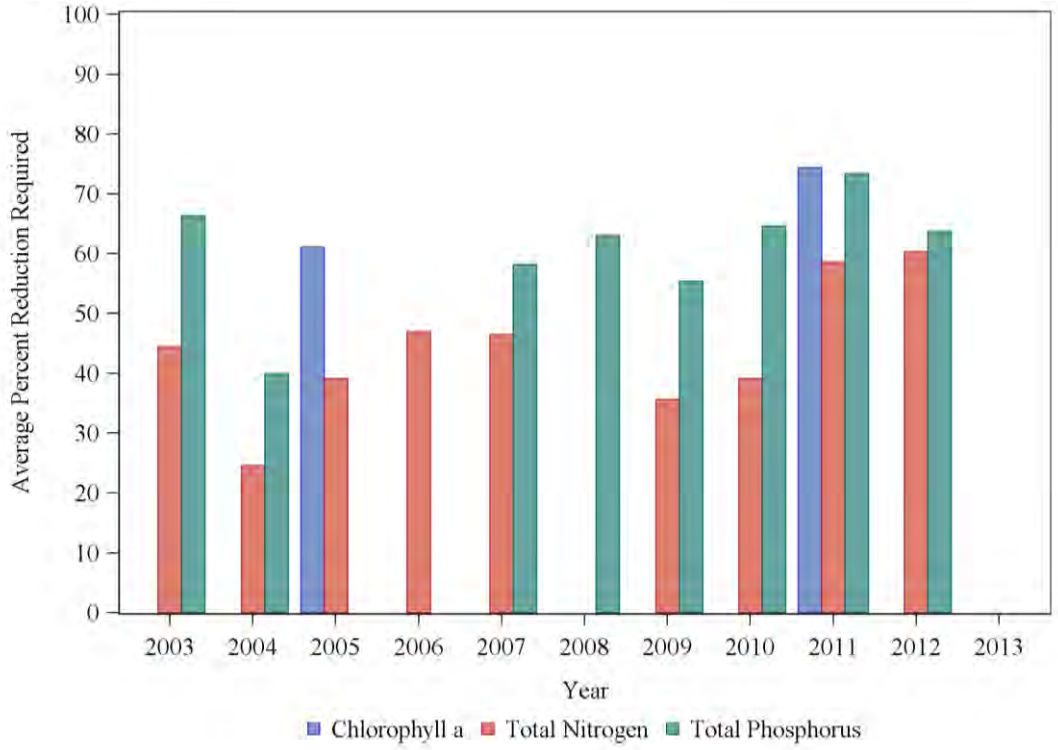


Figure 136. Lake Hollingsworth average percent concentration reduction required to meet the NNC from 2003-2013.



4.55. Lake Weohyakapka (WBID 1573E)

Lake Weohyakapka (**Figure 137**) was declared impaired for nutrients due to historic TSI during the January 1, 2003 to June 30, 2010 verified period as part of the Group 4, Cycle 2 review. The impairment status of Lake Weohyakapka was evaluated using NNC over the verified period used for the initial impairment. Lake Weohyakapka is considered a colored lake based on a long-term geometric mean color of 50 PCU. Based on the colored characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L The results of the analysis were not consistent with the initial impairment determination and indicate that Lake Weohyakapka was not found to be impaired for chlorophyll-a, TN and TP during the verified period using the NNC (**Table 111**).

In addition, Lake Weohyakapka water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Weohyakapka remained classified as a colored lake (color=50 PCU). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Weohyakapka is impaired for elevated chlorophyll-a (**Table 112**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 138**). When sufficient data were available for analysis, the percent exceedance was variable for chlorophyll-a. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 139**). The calculated required chlorophyll-a percent concentration reductions ranged from 0 to 17 percent to obtain compliance with NNC.

Figure 137. Location of water quality sampling sites in Lake Weohyakapka (WBID 1573E).

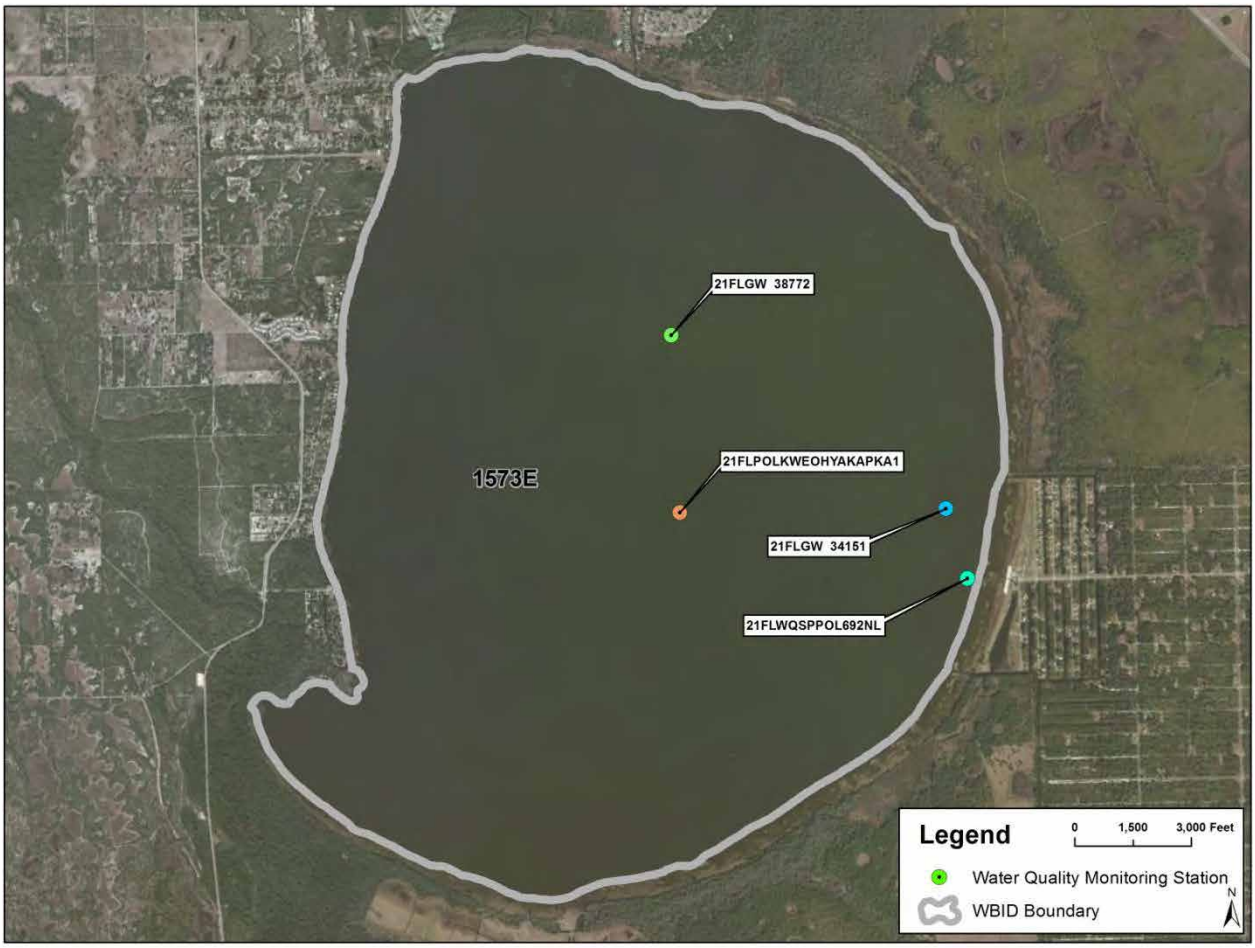


Table 111. Results of NNC evaluation for Lake Weohyakapka (WBID 1573E) over verified period for TSI impairment (January 1, 2003 to June 30, 2010).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1573E	LAKE WEOHYAKAPKA	2003	-	-	-
1573E	LAKE WEOHYAKAPKA	2004	-	-	-
1573E	LAKE WEOHYAKAPKA	2005	8.6	0.812	0.030
1573E	LAKE WEOHYAKAPKA	2006	9.3	0.746	-
1573E	LAKE WEOHYAKAPKA	2007	16.2	0.851	0.037
1573E	LAKE WEOHYAKAPKA	2008	-	1.042	0.047
1573E	LAKE WEOHYAKAPKA	2009	-	1.004	0.046
1573E	LAKE WEOHYAKAPKA	2010	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 112. Results of NNC evaluation for Lake Weohyakapka (WBID 1573E) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1573E	LAKE WEOHYAKAPKA	2003	-	-	-
1573E	LAKE WEOHYAKAPKA	2004	-	-	-
1573E	LAKE WEOHYAKAPKA	2005	8.6	0.812	0.030
1573E	LAKE WEOHYAKAPKA	2006	9.3	0.746	-
1573E	LAKE WEOHYAKAPKA	2007	16.2	0.851	0.037
1573E	LAKE WEOHYAKAPKA	2008	-	1.042	0.047
1573E	LAKE WEOHYAKAPKA	2009	-	1.004	0.046
1573E	LAKE WEOHYAKAPKA	2010	**23.0**	0.999	0.042
1573E	LAKE WEOHYAKAPKA	2011	**20.3**	0.978	0.032
1573E	LAKE WEOHYAKAPKA	2012	**21.5**	1.081	0.034
1573E	LAKE WEOHYAKAPKA	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 138. Percent of Lake Weohyakapka Samples which Exceed Criteria from 2003-2013.

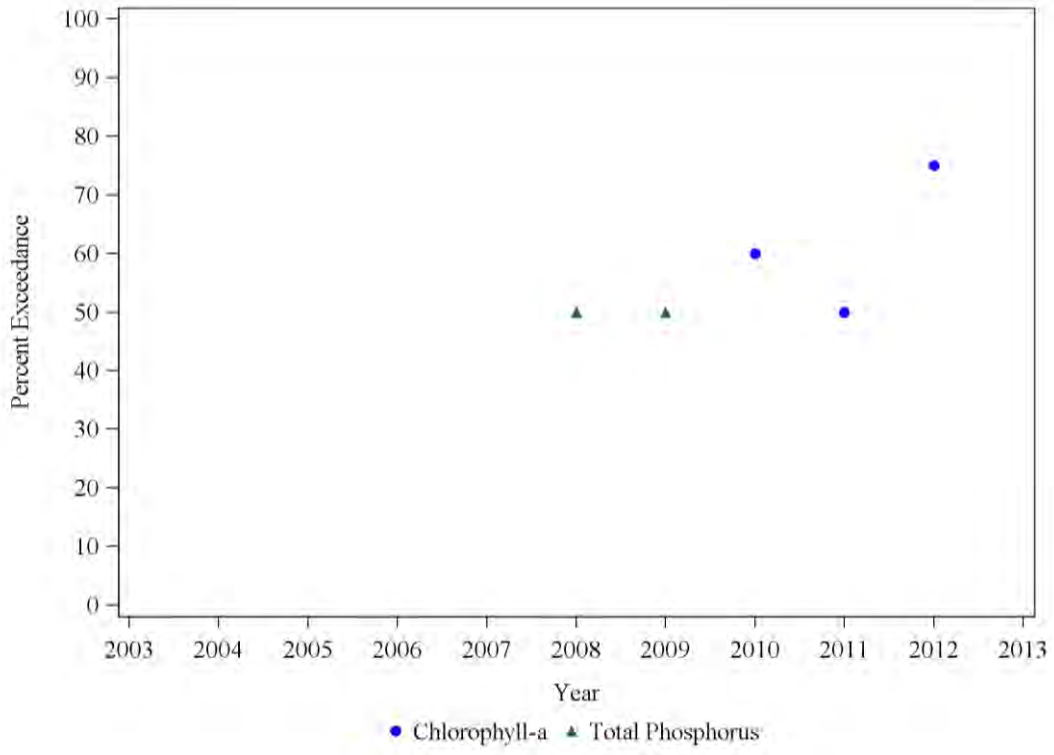
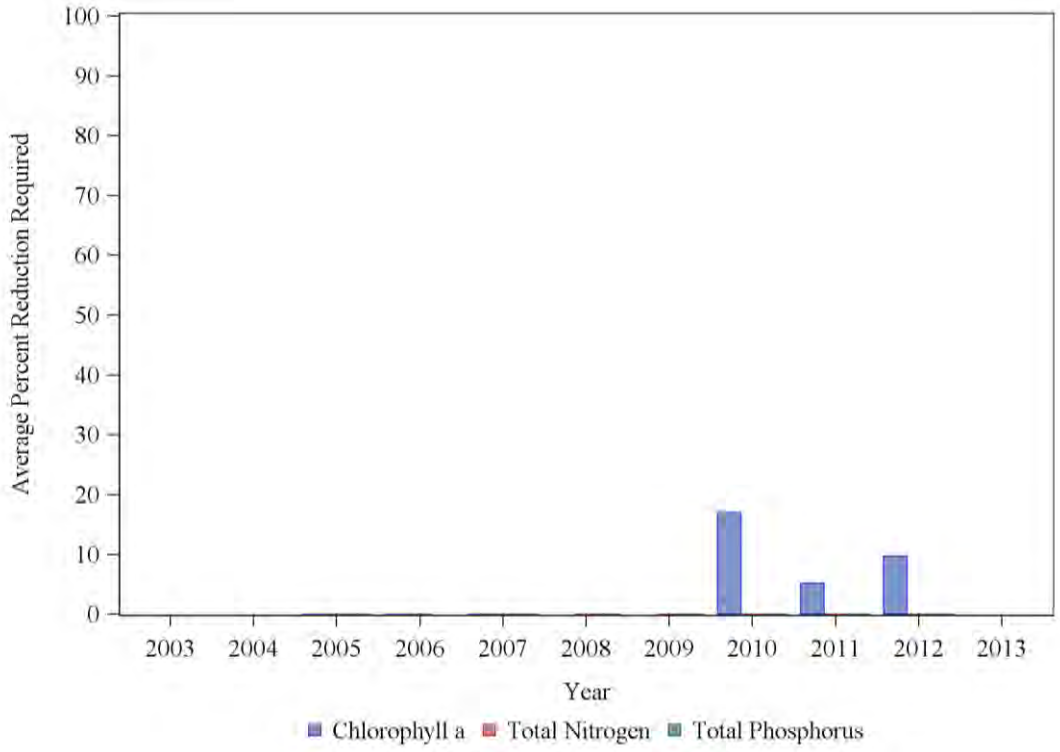


Figure 139. Lake Weohyakapka average percent reduction required to meet the NNC from 2003-2013.



4.56. Lake McLeod (WBID 1588A)

Lake McLeod (**Figure 140**) was declared impaired for nutrients due to TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Lake McLeod was evaluated using NNC over the verified period used for the initial impairment. Lake McLeod is considered a clear, acidic lake based on a long-term geometric mean color of 12 PCU and alkalinity of 2 mg/L. Based on the clear, acidic characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 6.0 µg/L The results of the analysis support the initial impairment determination and indicate that Lake McLeod was impaired for elevated chlorophyll-a and TP concentrations during the verified period using the NNC (**Table 113**).

In addition, Lake McLeod water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake McLeod remained characterized as a clear, acidic lake (color=12 PCU, alkalinity=2 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 6.0 µg/L. Results of the water quality comparison using current data indicate that Lake McLeod continues to be impaired for chlorophyll-a, TN and TP (**Table 114**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 141**). The percent exceedance was variable for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 142**). The calculated required chlorophyll-a percent concentration reductions ranged from 3 to 55 percent, TN concentration reductions ranged from 0 to 7 percent and TP concentration reductions from 0 to 30 percent to obtain compliance with NNC.

Figure 140. Location of water quality sampling sites in Lake McLeod (WBID 1588A).

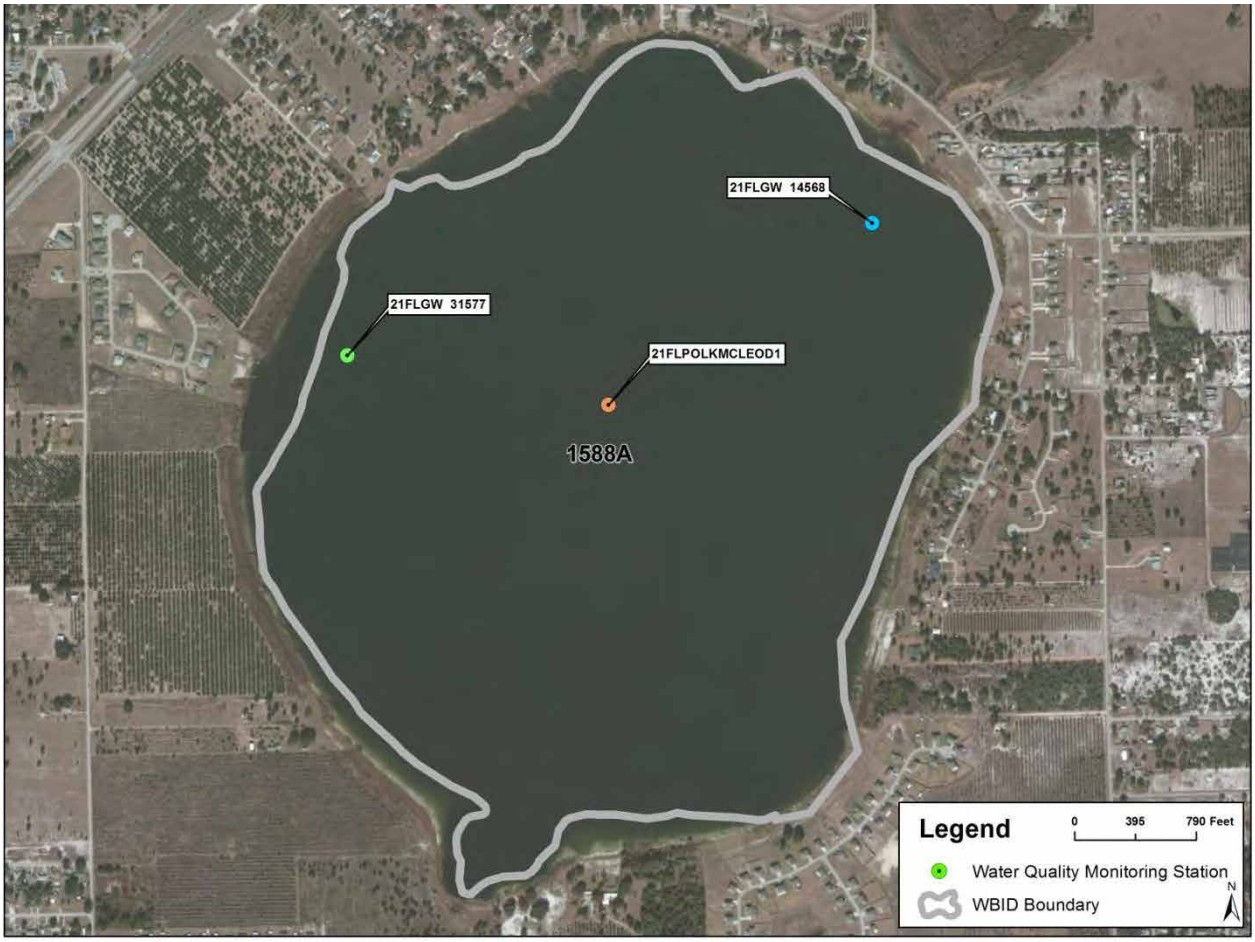


Table 113. Results of NNC evaluation for Lake McLeod (WBID 1588A) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1588A	LAKE MCLEOD	2002	-	-	-
1588A	LAKE MCLEOD	2003	-	-	-
1588A	LAKE MCLEOD	2004	-	-	-
1588A	LAKE MCLEOD	2005	**10.9**	**0.522**	-
1588A	LAKE MCLEOD	2006	**13.8**	**0.533**	**0.028**
1588A	LAKE MCLEOD	2007	**7.9**	0.461	**0.022**
1588A	LAKE MCLEOD	2008	**7.0**	0.405	**0.019**
1588A	LAKE MCLEOD	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 114. Results of NNC evaluation for Lake McLeod (WBID 1588A) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1588A	LAKE MCLEOD	2003	-	-	-
1588A	LAKE MCLEOD	2004	-	-	-
1588A	LAKE MCLEOD	2005	**10.9**	**0.522**	-
1588A	LAKE MCLEOD	2006	**13.8**	**0.533**	**0.028**
1588A	LAKE MCLEOD	2007	**7.9**	0.461	**0.022**
1588A	LAKE MCLEOD	2008	**7.0**	0.405	**0.019**
1588A	LAKE MCLEOD	2009	-	0.407	**0.019**
1588A	LAKE MCLEOD	2010	-	0.373	**0.029**
1588A	LAKE MCLEOD	2011	5.8	0.491	0.020
1588A	LAKE MCLEOD	2012	5.6	0.409	0.027
1588A	LAKE MCLEOD	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 141. Percent of Lake McLeod Samples which Exceed Criteria from 2003-2013.

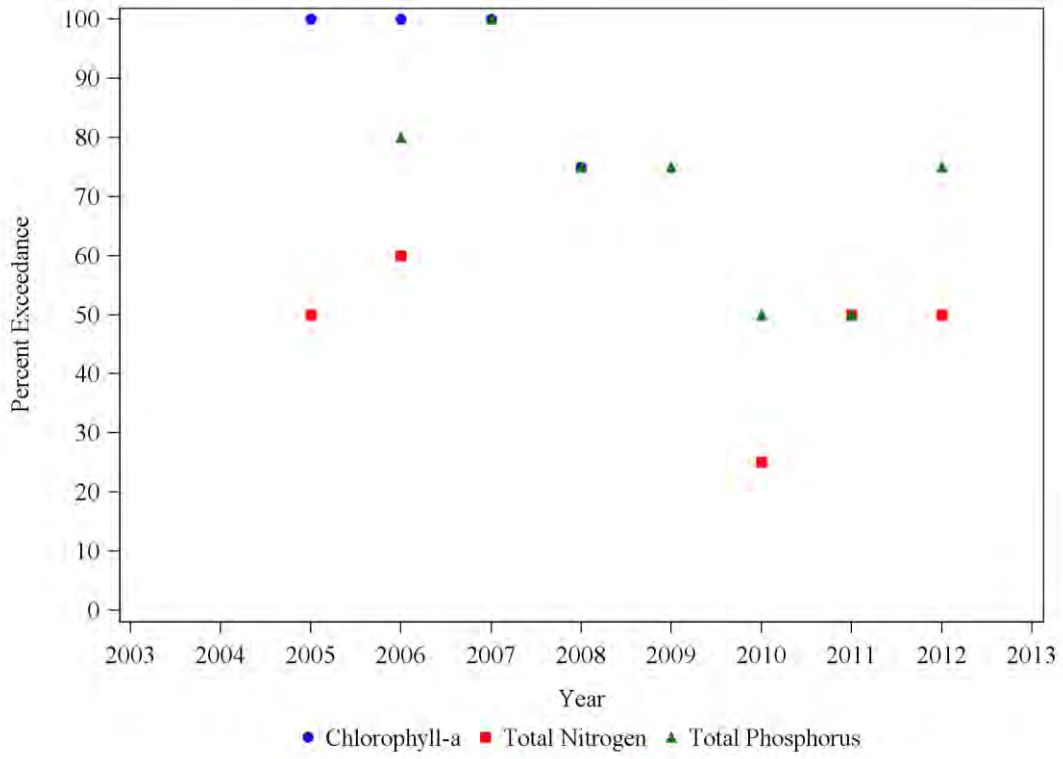
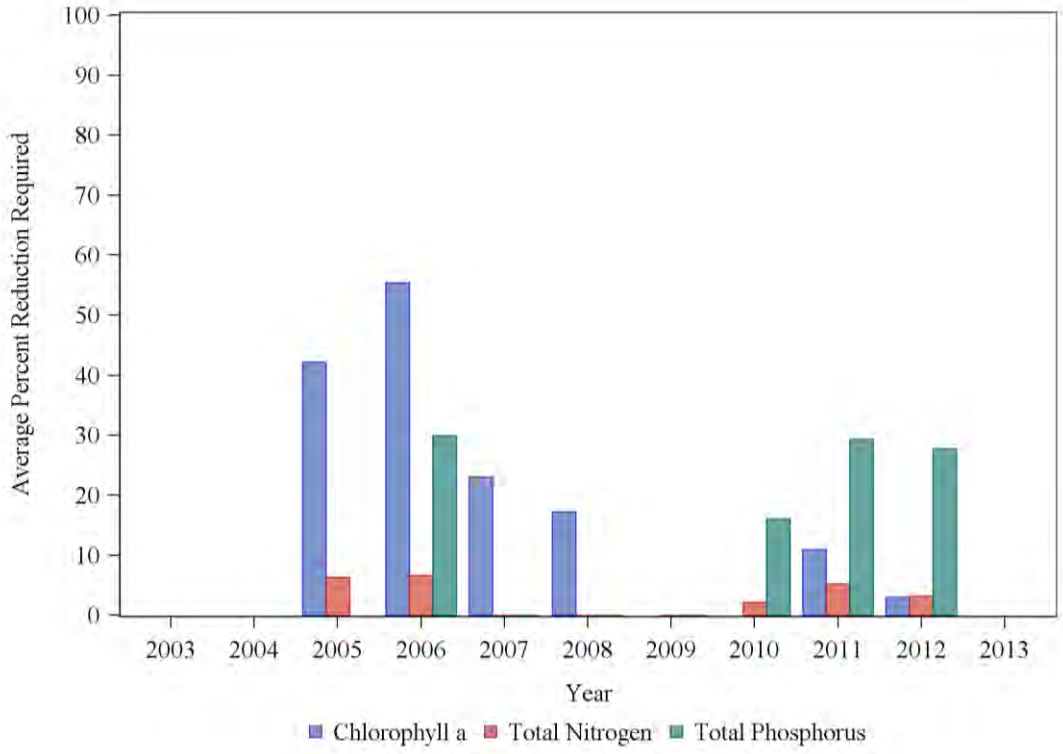


Figure 142. Lake McLeod average percent concentration reduction required to meet the NNC from 2003-2013.



4.57. Carter Road Park Lakes (WBID 1610)

Carter Road Park Lakes (**Figure 143**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 2001 to June 30, 2008 verified period as part of the Group 2, Cycle 2 review. Carter Road Park Lakes was originally classified by FDEP as stream and it was under this classification that the WBID was deemed impaired. For the purpose of this analysis, Carter Road Parks Lakes was evaluated using lake-specific criteria reflective of the current classification.

The impairment status of Carter Road Park Lakes was evaluated using NNC over the verified period used for the initial impairment. Carter Road Park Lakes is considered a clear, alkaline lake based on a long-term geometric mean color of 28 PCU and alkalinity of 57 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Carter Road Park Lakes was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period (**Table 115**).

In addition, Carter Road Park Lakes water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Carter Road Park Lakes remained characterized as a clear, alkaline lake (color=30 PCU, alkalinity=55 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Carter Road Park Lakes continues to be impaired for elevated chlorophyll-a, TN and TP concentrations (**Table 116**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 144**). The percent exceedance was variable but consistently above 50 percent for all parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 145**). The calculated required chlorophyll-a percent concentration reductions ranged from 39 to 78 percent, TN concentration reductions ranged from 17 to 35 percent and TP concentration reductions from 31 to 94 percent to obtain compliance with NNC.

Figure 143. Location of water quality sampling sites in Carter Road Park Lakes (WBID 1610).

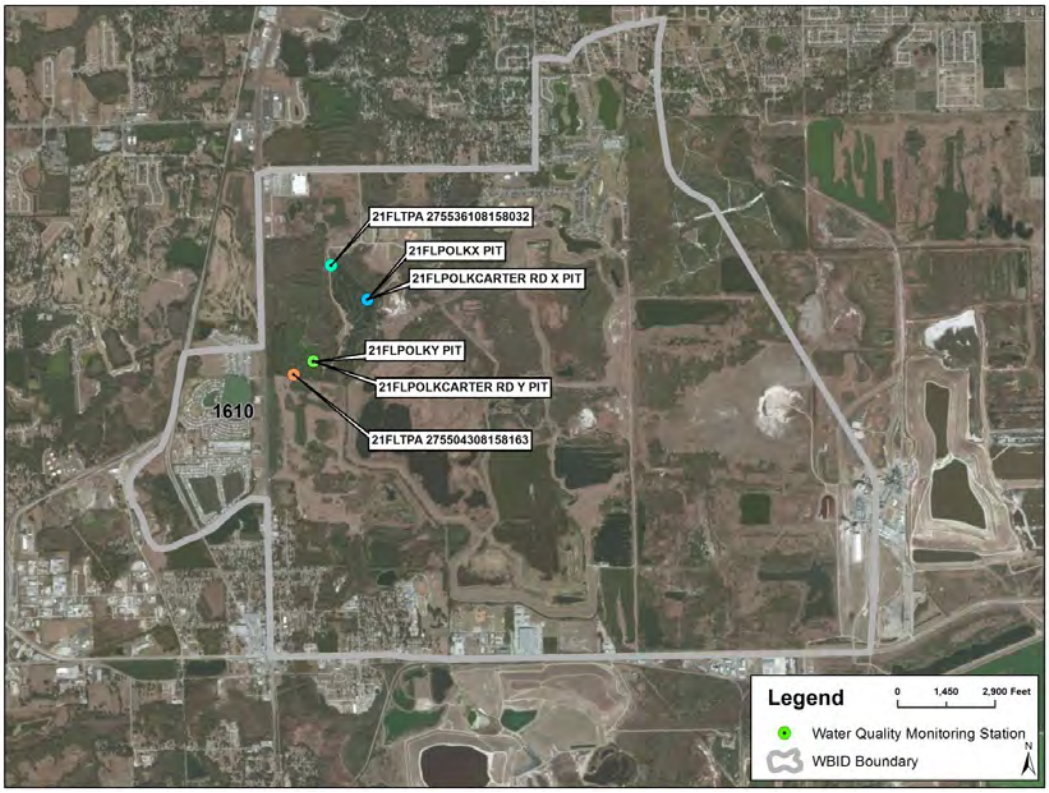


Table 115. Results of NNC evaluation for Carter Road Park Lakes (WBID 1610) over verified period for TSI impairment (January 1, 2001 to June 30, 2008).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1610	CARTER ROAD PARK LAKES	2001	**87.3**	**2.289**	**0.519**
1610	CARTER ROAD PARK LAKES	2002	**79.3**	**1.906**	**0.492**
1610	CARTER ROAD PARK LAKES	2003	**101.9**	**1.663**	**0.552**
1610	CARTER ROAD PARK LAKES	2004	**75.2**	**1.398**	**0.641**
1610	CARTER ROAD PARK LAKES	2005	**48.7**	**1.240**	**0.538**
1610	CARTER ROAD PARK LAKES	2006	**60.8**	**1.359**	**0.505**
1610	CARTER ROAD PARK LAKES	2007	**23.6**	**1.247**	**0.444**
1610	CARTER ROAD PARK LAKES	2008	-	-	**0.328**
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 116. Results of NNC evaluation for Carter Road Park Lakes (WBID 1610) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1610	CARTER ROAD PARK LAKES	2003	**101.9**	**1.663**	**0.552**
1610	CARTER ROAD PARK LAKES	2004	**75.2**	**1.398**	**0.641**
1610	CARTER ROAD PARK LAKES	2005	**48.7**	**1.240**	**0.538**
1610	CARTER ROAD PARK LAKES	2006	**60.8**	**1.359**	**0.505**
1610	CARTER ROAD PARK LAKES	2007	**23.6**	**1.247**	**0.444**
1610	CARTER ROAD PARK LAKES	2008	**34.0**	-	**0.378**
1610	CARTER ROAD PARK LAKES	2009	**52.7**	**1.347**	**0.467**
1610	CARTER ROAD PARK LAKES	2010	**62.2**	**1.429**	**0.431**
1610	CARTER ROAD PARK LAKES	2011	**72.2**	**1.749**	**0.468**
1610	CARTER ROAD PARK LAKES	2012	**71.3**	**1.522**	**0.531**
1610	CARTER ROAD PARK LAKES	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 144. Percent of Carter Road Park Lakes Samples which Exceed Criteria from 2003-2013.

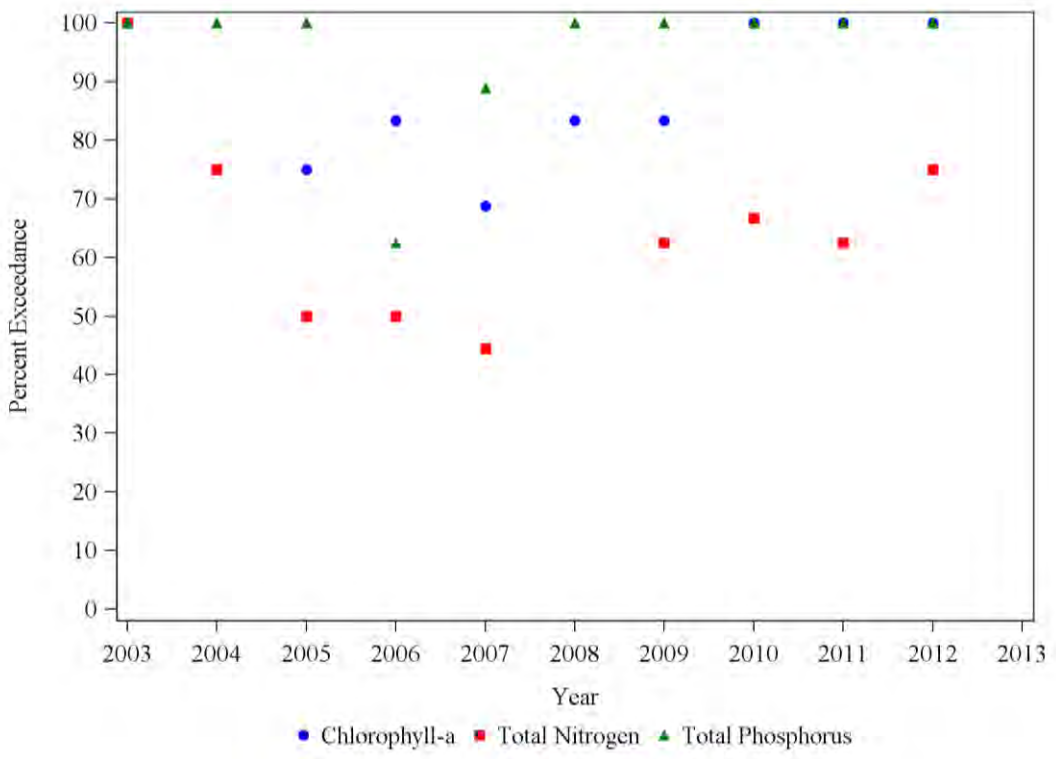
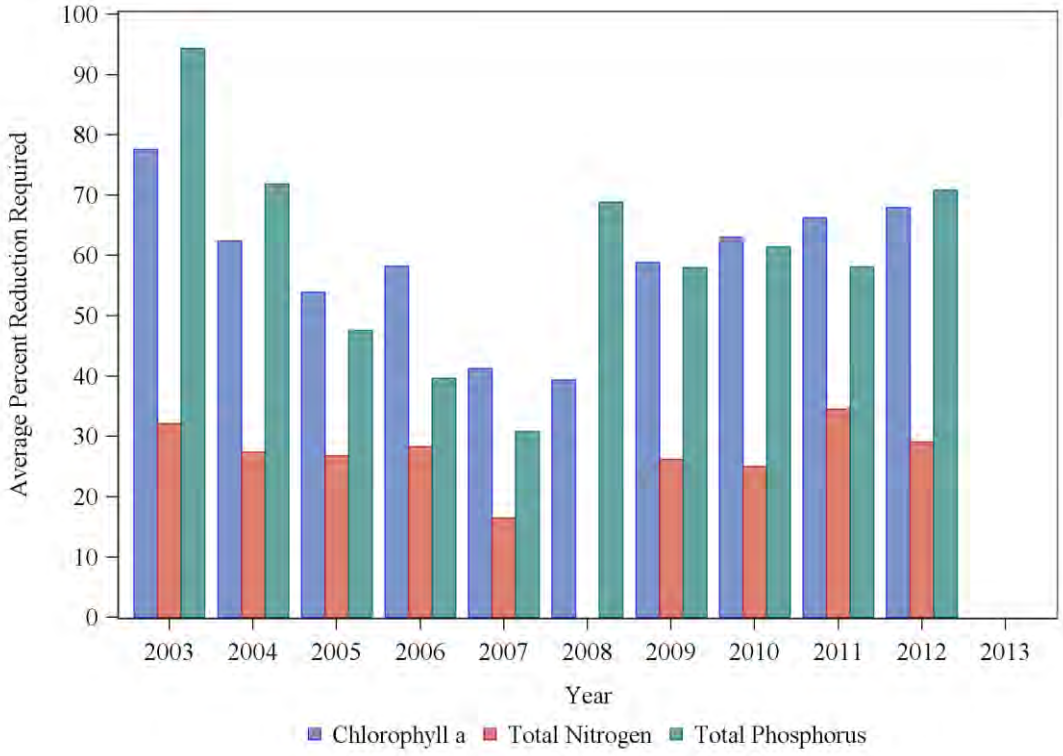


Figure 145. Carter Road Park Lakes average percent concentration reduction required to meet the NNC from 2003-2013.



4.58. Lake Wales (WBID 1619A)

Lake Wales (**Figure 146**) was declared impaired for nutrients due to TSI during the January 1, 2003 to June 30, 2010 verified period as part of the Group 4, Cycle 2 review. The impairment status of Lake Wales was evaluated using NNC over the verified period used for the initial impairment. Lake Wales is considered a clear, alkaline lake based on a long-term geometric mean color of 13 PCU and alkalinity of 30 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L The results of the analysis support the initial impairment determination and indicate that Lake Wales was impaired for elevated chlorophyll-a and TN concentrations during the verified period using the NNC (**Table 117**).

In addition, Lake Wales water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Wales remained characterized as a clear, alkaline lake (color=13 PCU, alkalinity=35 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Wales continues to be impaired for chlorophyll-a and TN with the addition TP (**Table 118**). The annual percent exceedance was calculated for chlorophyll-a and TN with the addition of TP (**Figure 147**). The percent exceedance was variable for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 148**). The calculated required chlorophyll-a percent concentration reductions ranged from 2 to 58 percent, TN concentration reductions ranged from 0 to 35 percent and TP concentration reductions from 0 to 24 percent to obtain compliance with NNC.

Figure 146. Location of water quality sampling sites in Lake Wales (WBID 1619A).

Table 117. Results of NNC evaluation for Lake Wales (WBID 1619A) over verified period for TSI impairment (January 1, 2003 to June 30, 2010).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1619A	LAKE WALES	2003	-	-	-
1619A	LAKE WALES	2004	-	-	-
1619A	LAKE WALES	2005	18.9	0.902	-
1619A	LAKE WALES	2006	12.2	0.727	-
1619A	LAKE WALES	2007	**25.1**	**1.198**	0.028
1619A	LAKE WALES	2008	**21.6**	0.954	0.030
1619A	LAKE WALES	2009	-	**1.182**	**0.033**
1619A	LAKE WALES	2010	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 118. Results of NNC evaluation for Lake Wales (WBID 1619A) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1619A	LAKE WALES	2003	-	-	-
1619A	LAKE WALES	2004	-	-	-
1619A	LAKE WALES	2005	18.9	0.902	-
1619A	LAKE WALES	2006	12.2	0.727	-
1619A	LAKE WALES	2007	**25.1**	**1.198**	0.028
1619A	LAKE WALES	2008	**21.6**	0.954	0.030
1619A	LAKE WALES	2009	-	**1.182**	**0.033**
1619A	LAKE WALES	2010	**35.0**	**1.497**	**0.036**
1619A	LAKE WALES	2011	**48.1**	**1.642**	**0.031**
1619A	LAKE WALES	2012	**42.1**	**1.604**	**0.030**
1619A	LAKE WALES	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 147. Percent of Lake Wales Samples which Exceed Criteria from 2003-2013.

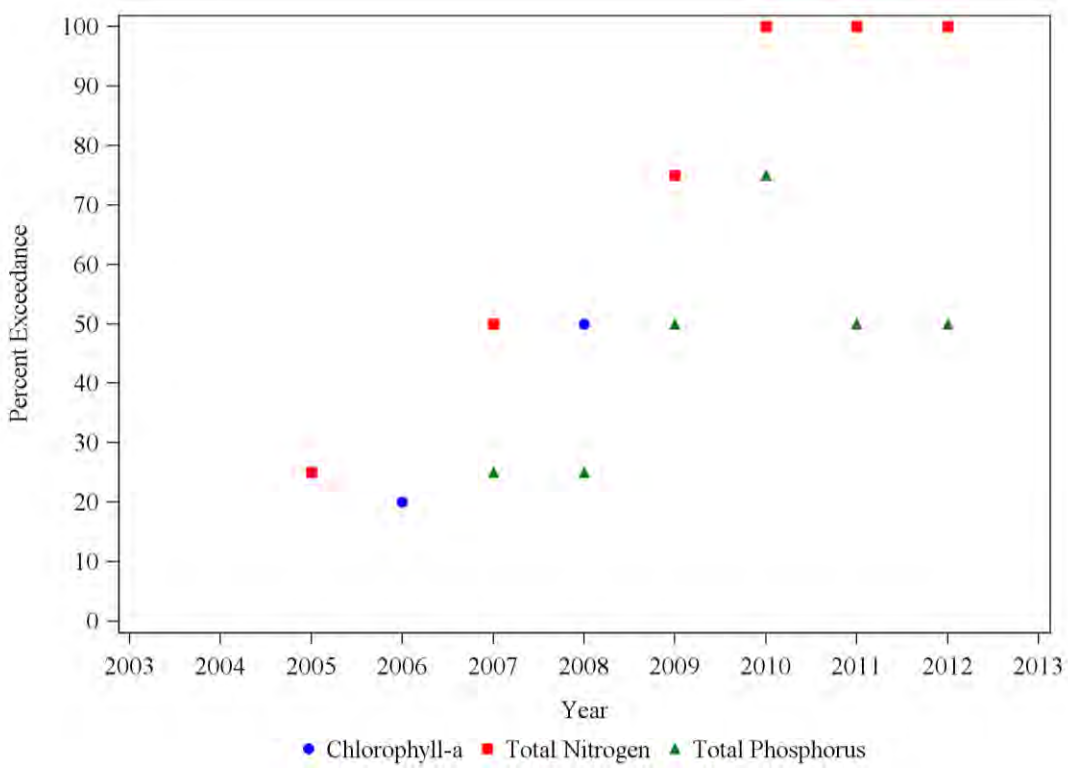
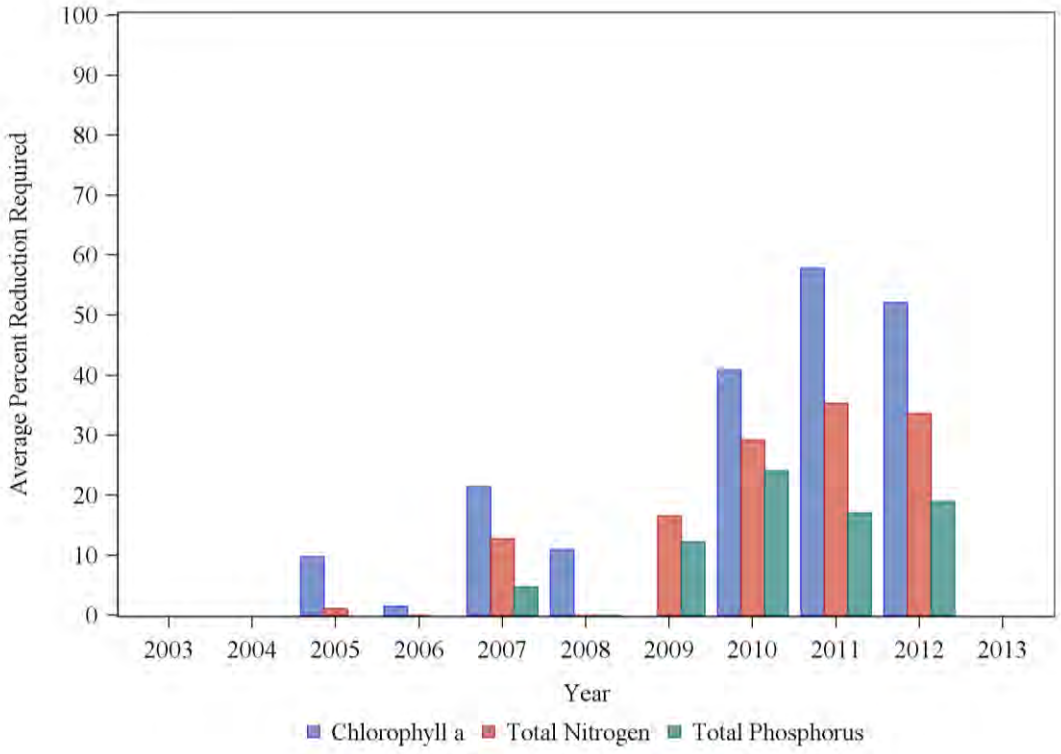


Figure 148. Lake Wales average percent concentration reduction required to meet the NNC from 2003-2013.



4.59. Lake Hancock (WBID 1623L)

Lake Hancock (**Figure 149**) was declared impaired for nutrients due to elevated TSI during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. The impairment status of Lake Hancock was evaluated using NNC over the verified period used for the initial impairment. Lake Hancock is considered a colored lake based on a long-term geometric mean color of 77 PCU. Based on the colored characterization, nutrient criteria were determined based on chlorophyll-a concentration of 20.0 µg/L. Additionally, Lake Hancock is located in the West Central nutrient threshold region. Therefore, if chlorophyll-concentrations remain below 20.0 µg/L, the TP concentration criteria default to 0.49 mg/L. The results of the analysis support the initial impairment determination and indicate that Lake Hancock was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period (**Table 119**).

In addition, Lake Hancock water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Hancock remained classified as a colored lake (color=77 PCU). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Hancock continues to be impaired for all three parameters (**Table 120**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 150**). The percent exceedance was frequently 100 percent for all parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 151**). The calculated required chlorophyll-a percent concentration reductions ranged from 84 to 96 percent, TN concentration reductions ranged from 64 to 89 percent and TP concentration reductions from 77 to 88 percent to obtain compliance with NNC.

Figure 149. Location of water quality sampling sites in Lake Hancock (WBID 1623L).

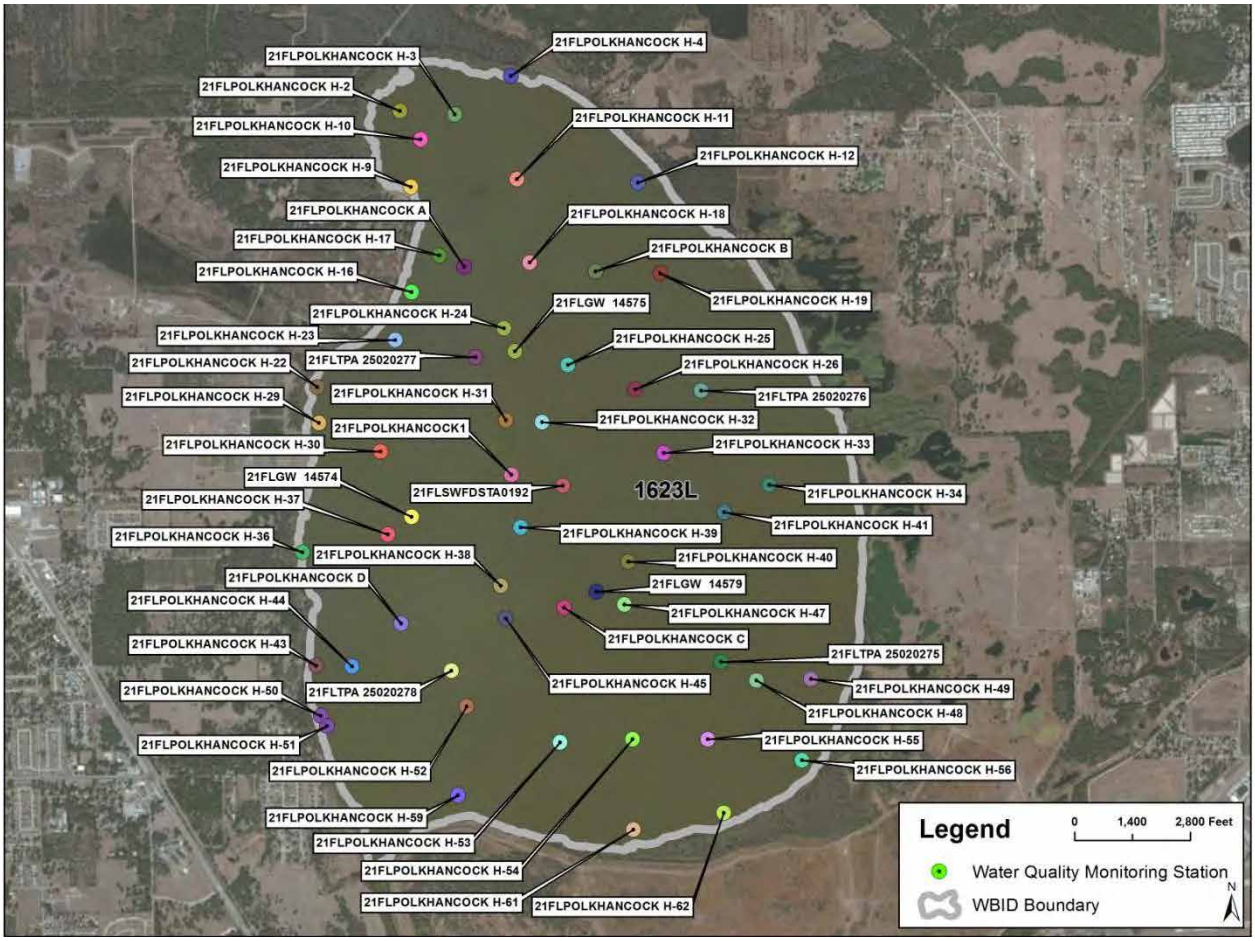


Table 119. Results of NNC evaluation for Lake Hancock (WBID 1623L) over verified period for TSI impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1623L	LAKE HANCOCK	1997	-	-	-
1623L	LAKE HANCOCK	1998		-	-
1623L	LAKE HANCOCK	1999	-	-	-
1623L	LAKE HANCOCK	2000	-	-	-
1623L	LAKE HANCOCK	2001	-	-	-
1623L	LAKE HANCOCK	2002	**103.8**	**3.604**	**0.280**
1623L	LAKE HANCOCK	2003	**151.5**	**4.006**	**0.537**
1623L	LAKE HANCOCK	2004	**202.9**	**5.701**	**0.447**
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 120. Results of NNC evaluation for Lake Hancock (WBID 1623L) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1623L	LAKE HANCOCK	2003	**151.5**	**4.006**	**0.537**
1623L	LAKE HANCOCK	2004	**147.9**	**4.483**	**0.437**
1623L	LAKE HANCOCK	2005	**190.2**	**4.568**	**0.407**
1623L	LAKE HANCOCK	2006	**158.5**	**5.066**	**0.247**
1623L	LAKE HANCOCK	2007	**191.3**	**6.385**	**0.241**
1623L	LAKE HANCOCK	2008	-	-	-
1623L	LAKE HANCOCK	2009	-	**12.152**	**0.289**
1623L	LAKE HANCOCK	2010	-	-	-
1623L	LAKE HANCOCK	2011	**350.8**	**8.047**	**0.218**
1623L	LAKE HANCOCK	2012	**536.5**	**10.427**	**0.323**
1623L	LAKE HANCOCK	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 150. Percent of Lake Hancock Samples which Exceed Criteria from 2003-2013.

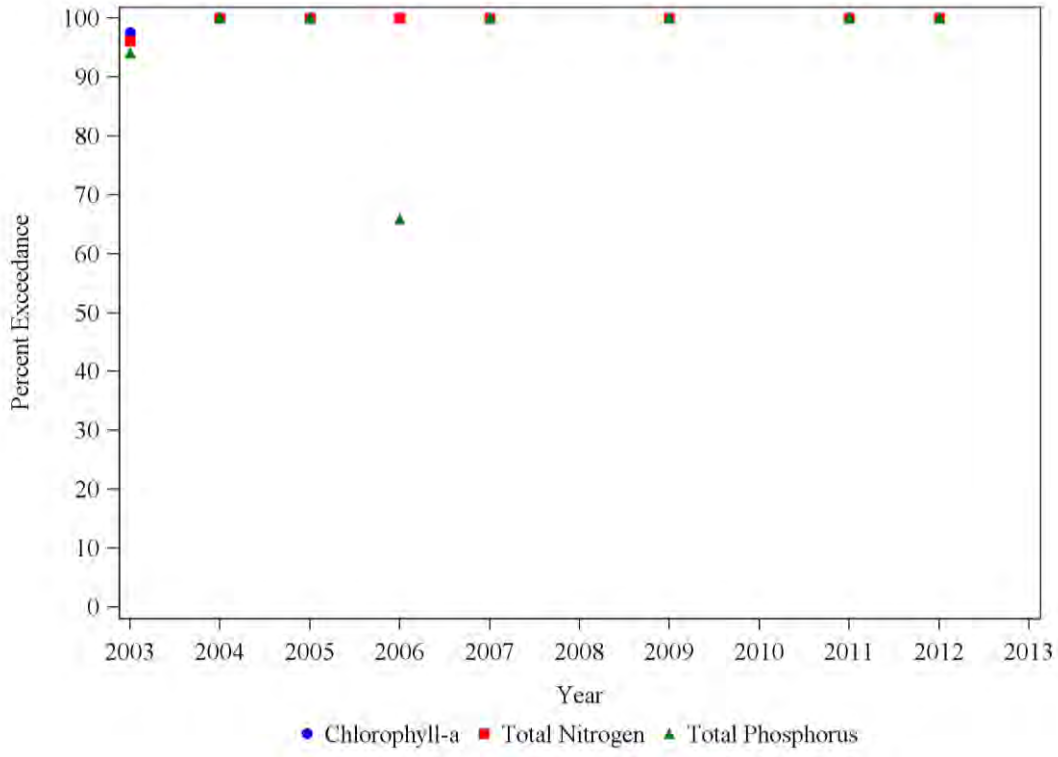
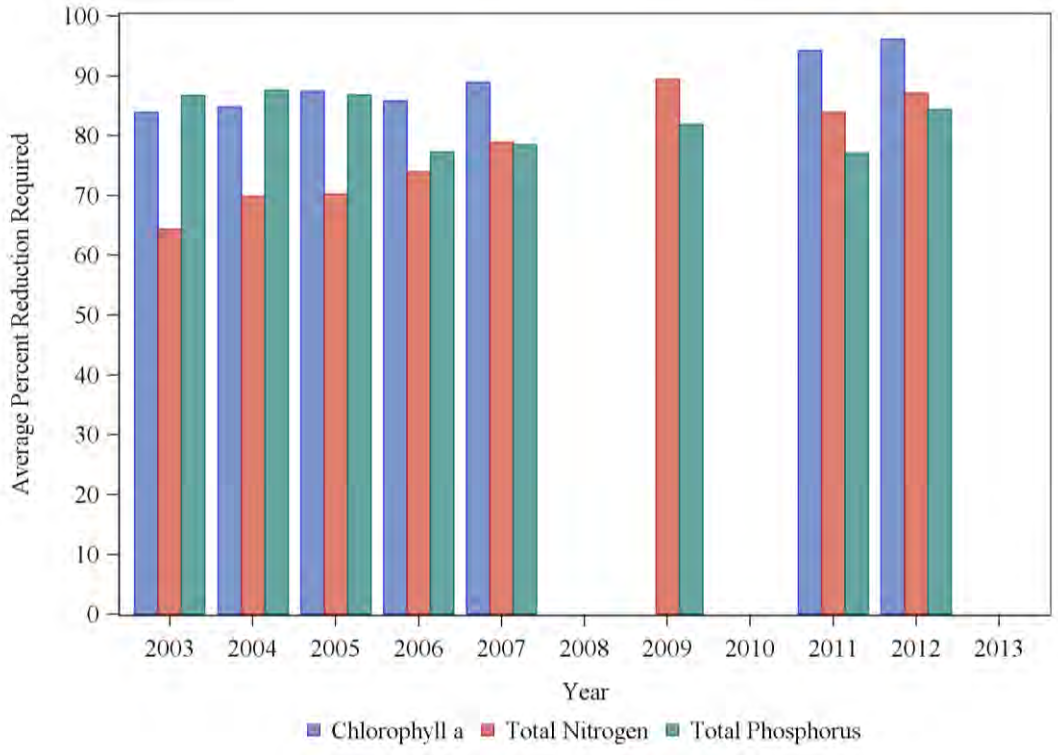


Figure 151. Lake Hancock average percent reduction required to meet the NNC from 2003-2013.



4.60. Eagle Lake (WBID 1623M)

Eagle Lake (**Figure 152**) was declared impaired for nutrients due to TSI during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. The impairment status of Eagle Lake was evaluated using NNC over the verified period used for the initial impairment. Eagle Lake is considered a clear, alkaline lake based on a long-term geometric mean color of 11 PCU and alkalinity of 28 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L The results of the analysis were not consistent with the initial impairment determination and indicate that Eagle Lake was not found to be impaired for chlorophyll-a, TN and TP during the verified period using the NNC (**Table 121**).

In addition, Eagle Lake water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Eagle Lake was reclassified as a clear, acidic lake (color=10 PCU, alkalinity=4 mg/L). Due to the change in characterization, the nutrient criteria were determined based on a chlorophyll-a concentration of 6.0 µg/L. Results of the water quality comparison using current data indicate that Eagle Lake is impaired for chlorophyll-a, TN and TP (**Table 122**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 153**). The percent exceedance was variable for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 154**). The calculated required chlorophyll-a percent concentration reductions ranged from 16 to 56 percent, TN concentration reductions ranged from 2 to 32 percent and TP concentration reductions from 13 to 62 percent to obtain compliance with NNC.

Figure 152. Location of water quality sampling sites in Eagle Lake (WBID 1623M).

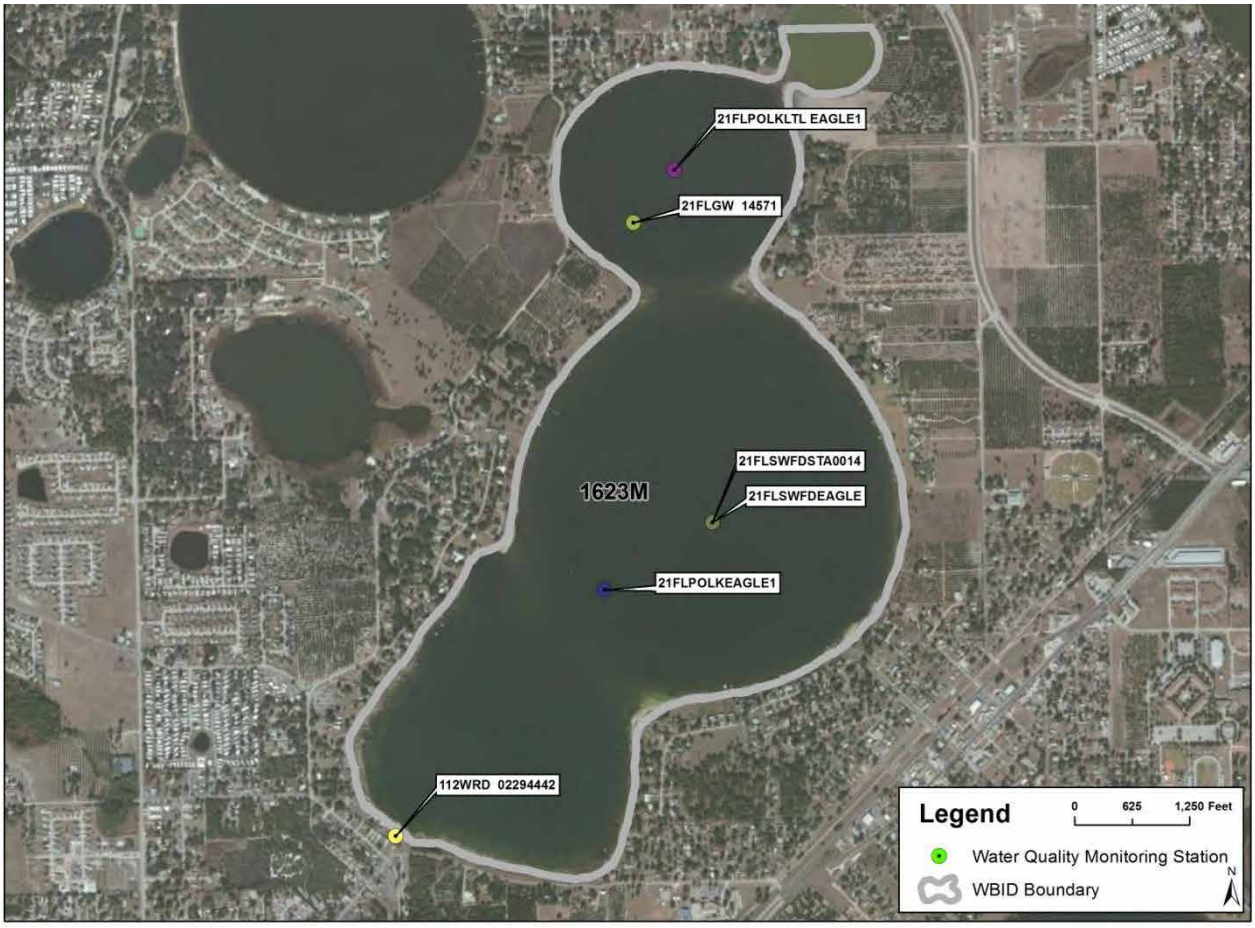


Table 121. Results of NNC evaluation for Eagle Lake (WBID 1623M) over verified period for TSI impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1623M	EAGLE LAKE	1997	-	0.795	**0.050**
1623M	EAGLE LAKE	1998		0.871	0.029
1623M	EAGLE LAKE	1999	7.7	0.636	0.019
1623M	EAGLE LAKE	2000	10.2	0.578	0.016
1623M	EAGLE LAKE	2001	10.6	0.783	0.020
1623M	EAGLE LAKE	2002	-	0.790	-
1623M	EAGLE LAKE	2003	13.2	0.687	0.024
1623M	EAGLE LAKE	2004	-	-	
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 122. Results of NNC evaluation for Eagle Lake (WBID 1623M) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1623M	EAGLE LAKE	2003	**13.2**	**0.687**	**0.024**
1623M	EAGLE LAKE	2004	-	**0.664**	-
1623M	EAGLE LAKE	2005	**14.9**	**0.736**	**0.039**
1623M	EAGLE LAKE	2006	-	**0.602**	**0.029**
1623M	EAGLE LAKE	2007	**16.1**	**0.783**	**0.026**
1623M	EAGLE LAKE	2008	**9.6**	**0.575**	**0.019**
1623M	EAGLE LAKE	2009	-	0.505	**0.020**
1623M	EAGLE LAKE	2010	**6.3**	**0.520**	**0.019**
1623M	EAGLE LAKE	2011	**6.1**	**0.603**	**0.020**
1623M	EAGLE LAKE	2012	**7.7**	**0.650**	**0.024**
1623M	EAGLE LAKE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 153. Percent of Eagle Lake Samples which Exceed Criteria from 2003-2013.

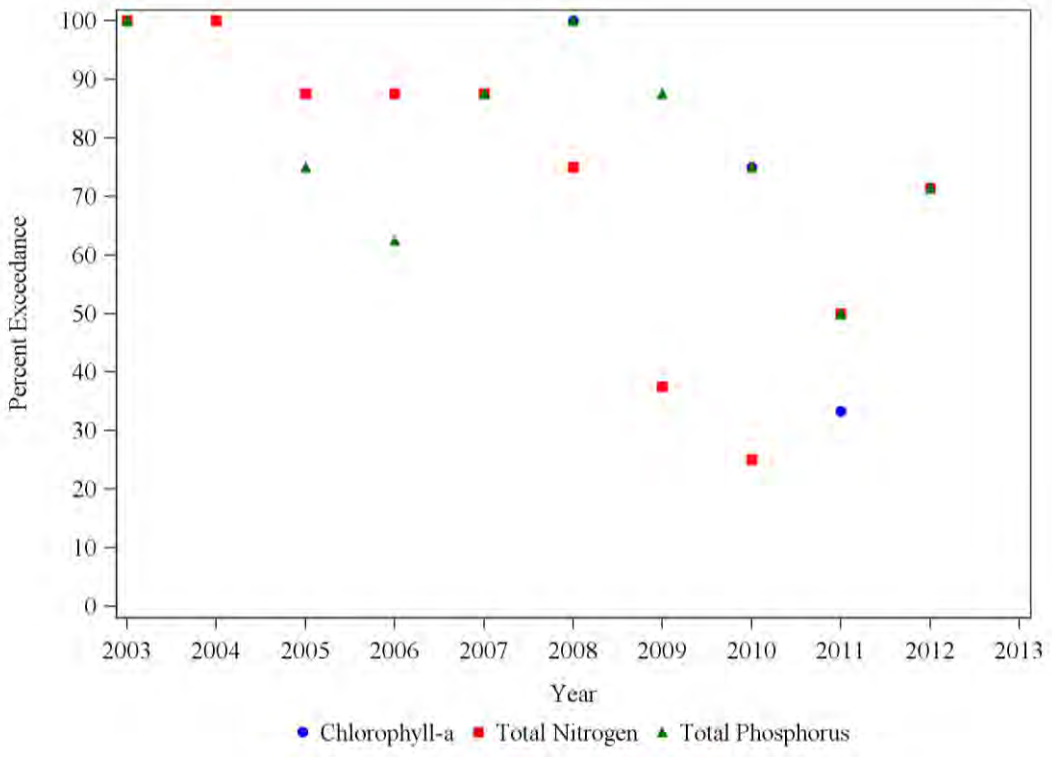
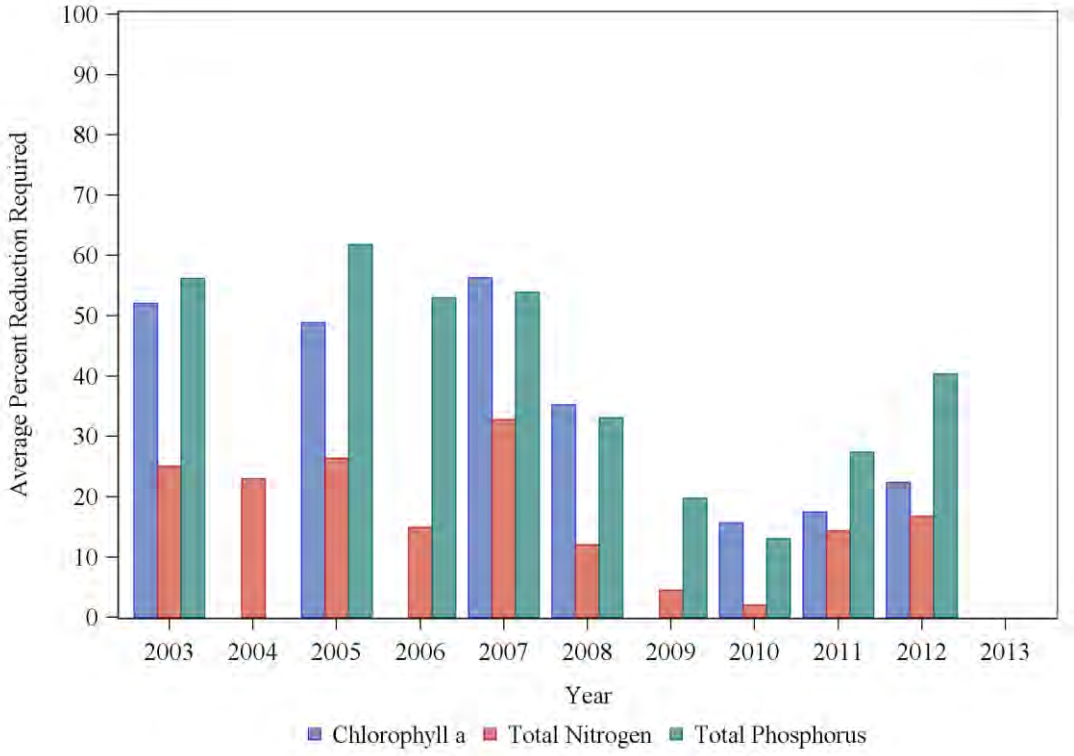


Figure 154. Eagle Lake average percent concentration reduction required to meet the NNC from 2003-2013.



4.61. Grassy Lake (WBID 1623M1)

Grassy Lake (**Figure 155**) was declared impaired for nutrients due to elevated TSI during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Grassy Lake was evaluated using NNC over the verified period used for the initial impairment. Grassy Lake is considered a clear, alkaline lake based on a long-term geometric mean color of 33 PCU and alkalinity of 45 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Grassy Lake was impaired for elevated TN concentrations during the verified period (**Table 123**). There were insufficient chlorophyll-a and TP data to determine impairment status over the initial verified period.

In addition, Grassy Lake water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Grassy Lake remained classified as a clear, alkaline lake (color=32 PCU, alkalinity=39 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Grassy Lake continues to be impaired for elevated TN concentrations (**Table 124**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 156**). Percent exceedance was variable for TN. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 157**). The calculated required TN percent concentration reductions ranged from 0 to 34 percent to obtain compliance with NNC.

Figure 155. Location of water quality sampling sites in Grassy Lake (WBID 1623M1).

Table 123. Results of NNC evaluation for Grassy Lake (WBID 1623M1) over verified period for TSI impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1623M1	GRASSY LAKE	2002	-	-	-
1623M1	GRASSY LAKE	2003	-	-	-
1623M1	GRASSY LAKE	2004	-	-	-
1623M1	GRASSY LAKE	2005	18.0	1.041	-
1623M1	GRASSY LAKE	2006	-	**1.318**	-
1623M1	GRASSY LAKE	2007	-	-	-
1623M1	GRASSY LAKE	2008	-	**1.542**	**0.040**
1623M1	GRASSY LAKE	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 124. Results of NNC evaluation for Grassy Lake (WBID 1623M1) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1623M1	GRASSY LAKE	2003	-	-	-
1623M1	GRASSY LAKE	2004	-	-	-
1623M1	GRASSY LAKE	2005	18.0	1.041	-
1623M1	GRASSY LAKE	2006	-	**1.318**	-
1623M1	GRASSY LAKE	2007	-	-	-
1623M1	GRASSY LAKE	2008	-	**1.542**	**0.040**
1623M1	GRASSY LAKE	2009	-	**1.655**	-
1623M1	GRASSY LAKE	2010	13.7	1.506	0.035
1623M1	GRASSY LAKE	2011	-	**1.407**	**0.032**
1623M1	GRASSY LAKE	2012	9.5	1.065	0.030
1623M1	GRASSY LAKE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 156. Percent of Grassy Lake Samples which Exceed Criteria from 2003-2013.

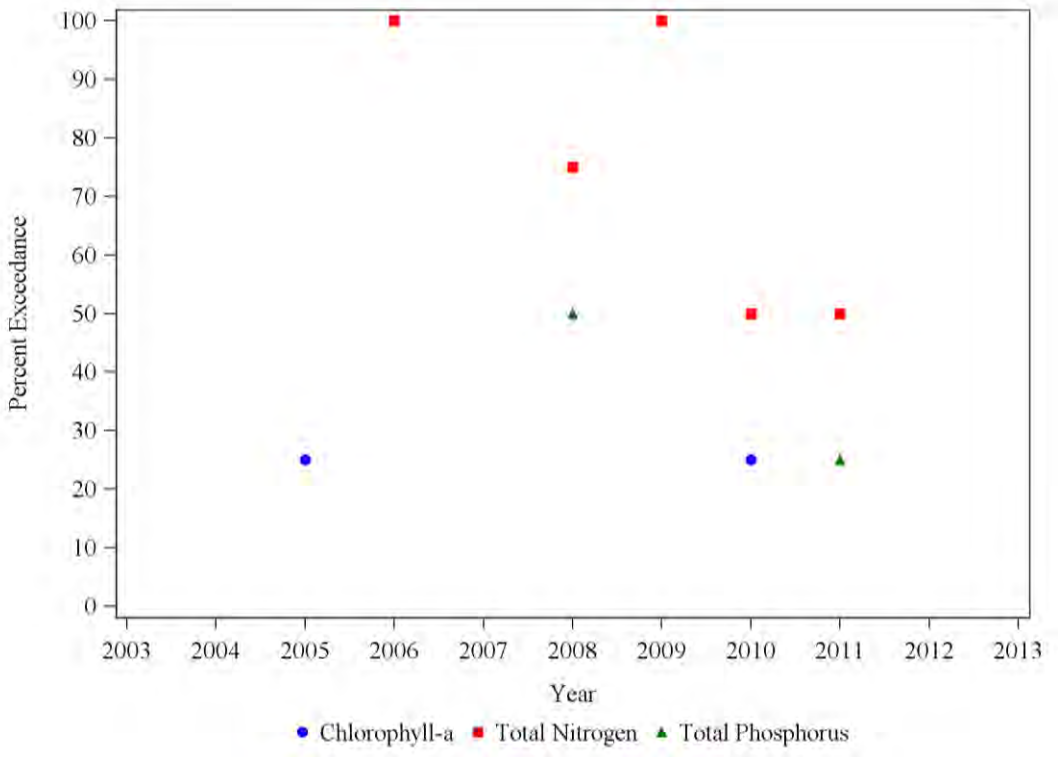
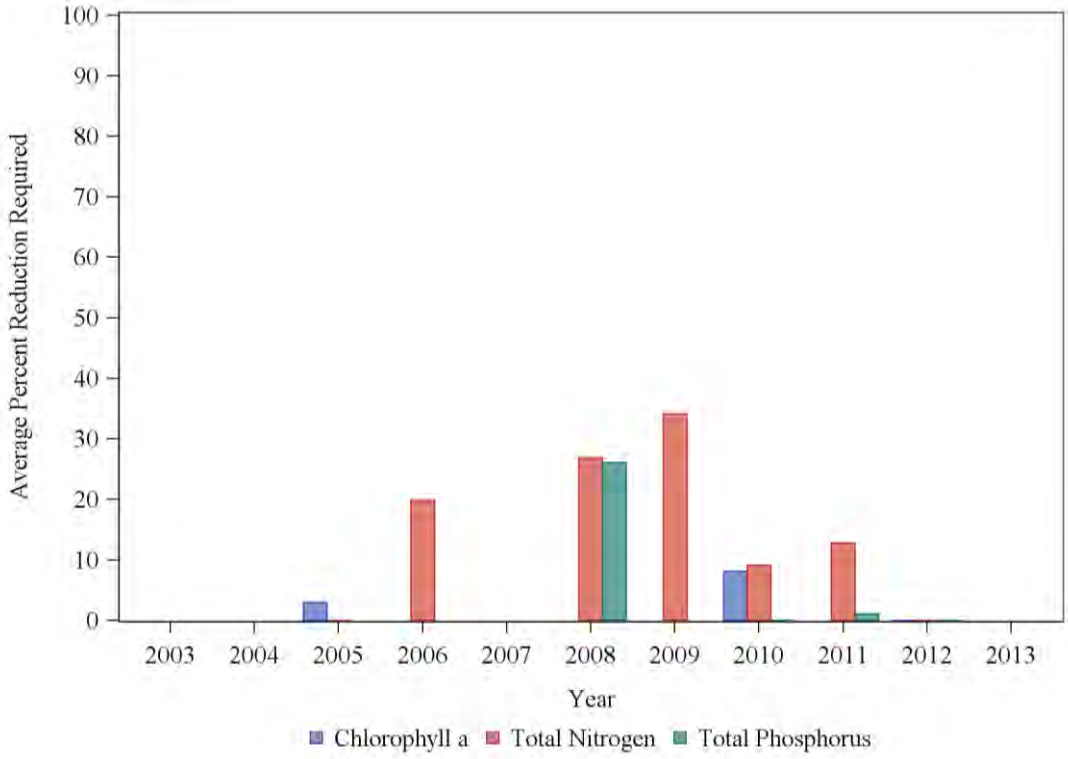


Figure 157. Grassy Lake average percent reduction required to meet the NNC from 2003-2013.



4.62. Reedy Lake (WBID 1685D)

Reedy Lake (**Figure 158**) was declared impaired for nutrients due to TSI during the January 1, 2003 to June 30, 2010 verified period as part of the Group 4, Cycle 2 review. The impairment status of Reedy Lake was evaluated using NNC over the verified period used for the initial impairment. Reedy Lake is considered a clear, alkaline lake based on a long-term geometric mean color of 11 PCU and alkalinity of 48 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Reedy Lake was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period using the NNC (**Table 125**).

In addition, Reedy Lake water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Reedy Lake remained characterized as a clear, alkaline lake (color=11 PCU, alkalinity=45 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Reedy Lake continues to be impaired for chlorophyll-a, TN and TP (**Table 126**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 159**). The percent exceedance was variable for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 160**). The calculated required chlorophyll-a percent concentration reductions ranged from 0 to 25 percent, TN concentration reductions ranged from 1 to 45 percent and TP concentration reductions from 0 to 13 percent to obtain compliance with NNC.

Figure 158. Location of water quality sampling sites in Reedy Lake (WBID 1685D).

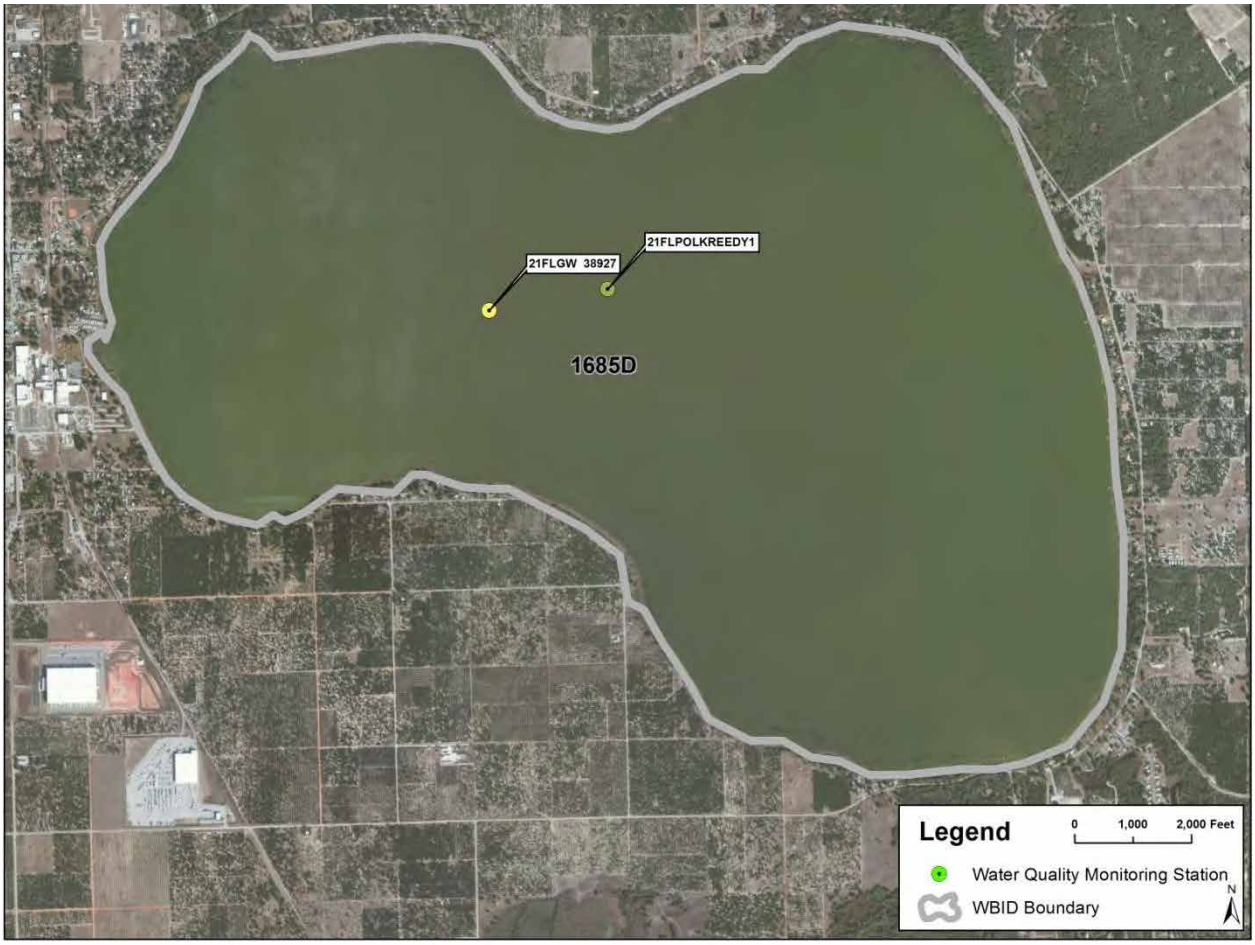


Table 125. Results of NNC evaluation for Reedy Lake (WBID 1685D) over verified period for TSI impairment (January 1, 2003 to June 30, 2010).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1685D	REEDY LAKE	2003	-	-	-
1685D	REEDY LAKE	2004	-	-	-
1685D	REEDY LAKE	2005	**25.5**	**1.465**	-
1685D	REEDY LAKE	2006	-	-	-
1685D	REEDY LAKE	2007	**24.2**	**1.806**	**0.031**
1685D	REEDY LAKE	2008	-	**1.911**	**0.032**
1685D	REEDY LAKE	2009	-	**1.320**	0.027
1685D	REEDY LAKE	2010	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 126. Results of NNC evaluation for Reedy Lake (WBID 1685D) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1685D	REEDY LAKE	2003	-	-	-
1685D	REEDY LAKE	2004	-	-	-
1685D	REEDY LAKE	2005	**25.5**	**1.465**	-
1685D	REEDY LAKE	2006	-	-	-
1685D	REEDY LAKE	2007	**24.2**	**1.806**	**0.031**
1685D	REEDY LAKE	2008	-	**1.911**	**0.032**
1685D	REEDY LAKE	2009	-	**1.320**	0.027
1685D	REEDY LAKE	2010	11.5	1.326	0.021
1685D	REEDY LAKE	2011	16.7	1.472	0.021
1685D	REEDY LAKE	2012	**23.0**	**1.793**	0.025
1685D	REEDY LAKE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 159. Percent of Reedy Lake Samples which Exceed Criteria from 2003-2013.

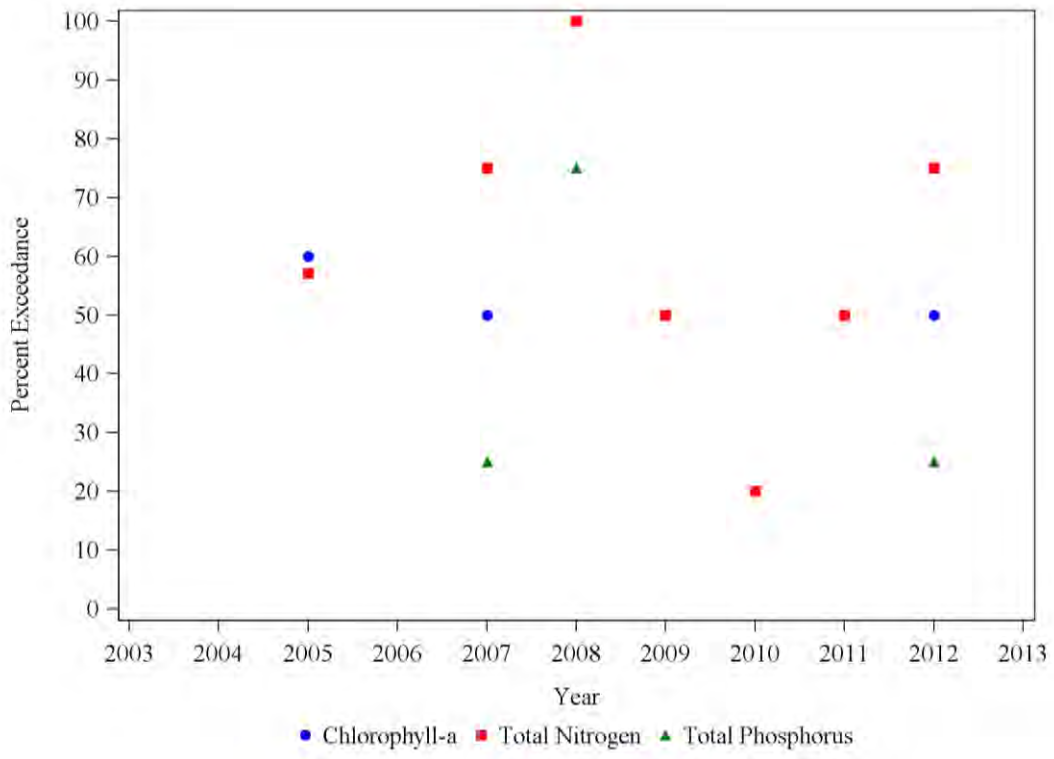
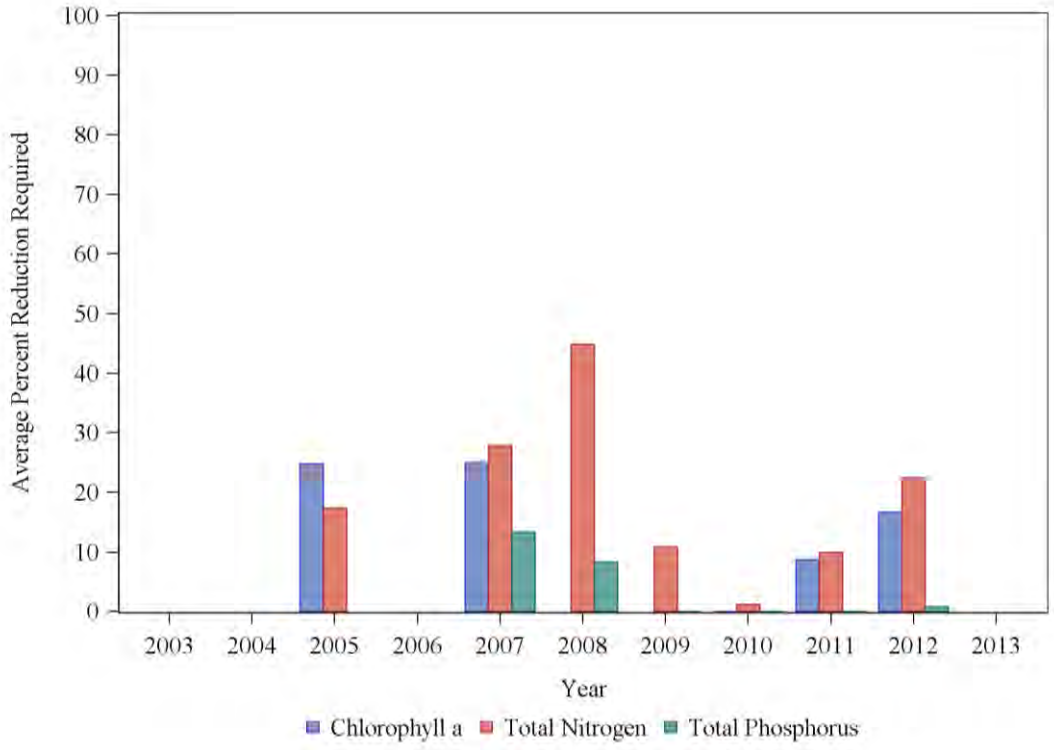


Figure 160. Reedy Lake average percent concentration reduction required to meet the NNC from 2003-2013.



4.63. Lake Clinch (WBID 1706)

Lake Clinch (**Figure 161**) was declared impaired for nutrients due to TSI during the January 1, 2003 to June 30, 2010 verified period as part of the Group 4, Cycle 2 review. The impairment status of Lake Clinch was evaluated using NNC over the verified period used for the initial impairment. Lake Clinch is considered a clear, acidic lake based on a long-term geometric mean color of 14 PCU and alkalinity of 5 mg/L. Based on the clear, acidic characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 6.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Clinch was impaired for elevated chlorophyll-a, TN, and TP concentrations during the verified period using the NNC (**Table 127**).

In addition, Lake Clinch water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Clinch remained characterized as a clear, acidic lake (color=14 PCU, alkalinity=8 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 6.0 µg/L. Results of the water quality comparison using current data indicate that Lake Clinch continues to be impaired for chlorophyll-a, TN and TP (**Table 128**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 162**). The percent exceedance was frequently 100 percent for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 163**). The calculated required chlorophyll-a percent concentration reductions ranged from 37 to 65 percent, TN concentration reductions ranged from 12 to 33 percent and TP concentration reductions from 26 to 51 percent to obtain compliance with NNC.

Figure 161. Location of water quality sampling sites in Lake Clinch (WBID 1706).

Table 127. Results of NNC evaluation for Lake Clinch (WBID 1706) over verified period for TSI impairment (January 1, 2003 to June 30, 2010).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1706	LAKE CLINCH	2003	-	-	-
1706	LAKE CLINCH	2004	-	-	-
1706	LAKE CLINCH	2005	**9.9**	**0.832**	**0.035**
1706	LAKE CLINCH	2006	-	-	-
1706	LAKE CLINCH	2007	**9.8**	**0.629**	**0.020**
1706	LAKE CLINCH	2008	-	**0.638**	**0.020**
1706	LAKE CLINCH	2009	**16.5**	**0.689**	**0.019**
1706	LAKE CLINCH	2010	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 128. Results of NNC evaluation for Lake Clinch (WBID 1706) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1706	LAKE CLINCH	2003	-	-	-
1706	LAKE CLINCH	2004	-	-	-
1706	LAKE CLINCH	2005	**9.9**	**0.832**	**0.035**
1706	LAKE CLINCH	2006	-	-	-
1706	LAKE CLINCH	2007	**9.8**	**0.629**	**0.020**
1706	LAKE CLINCH	2008	-	**0.638**	**0.020**
1706	LAKE CLINCH	2009	**16.5**	**0.689**	**0.019**
1706	LAKE CLINCH	2010	**9.0**	**0.590**	**0.019**
1706	LAKE CLINCH	2011	**18.4**	**0.776**	**0.020**
1706	LAKE CLINCH	2012	**10.5**	**0.651**	**0.020**
1706	LAKE CLINCH	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 162. Percent of Lake Clinch Samples which Exceed Criteria from 2003-2013.

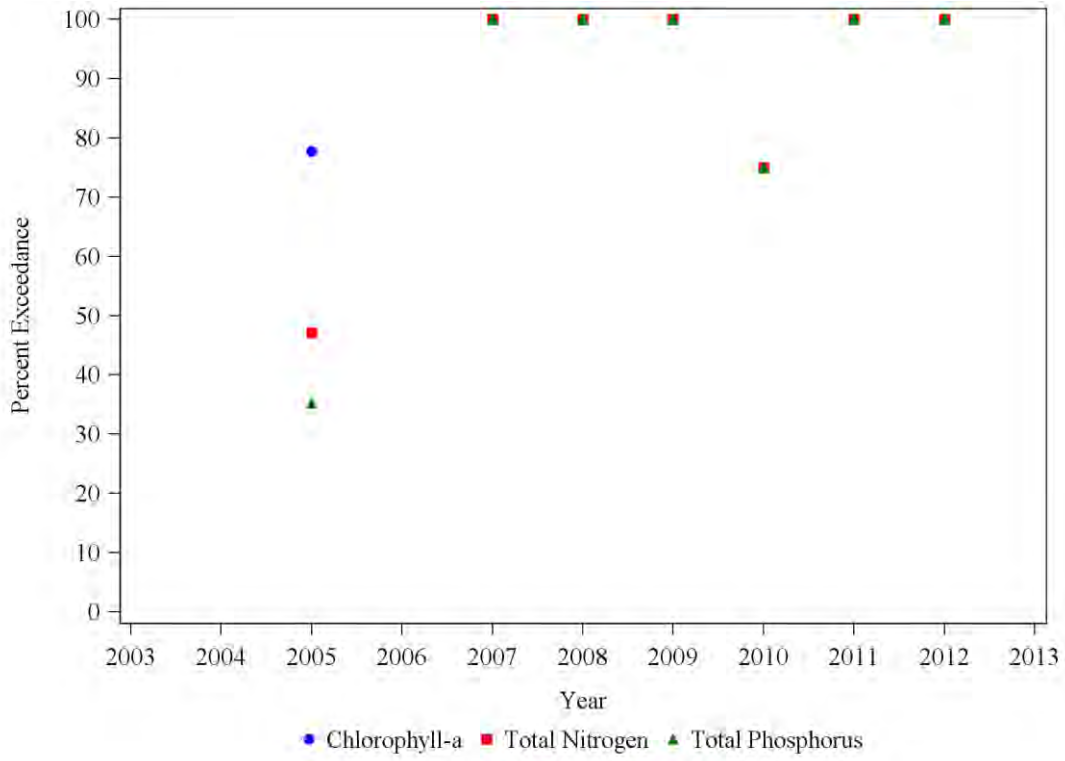
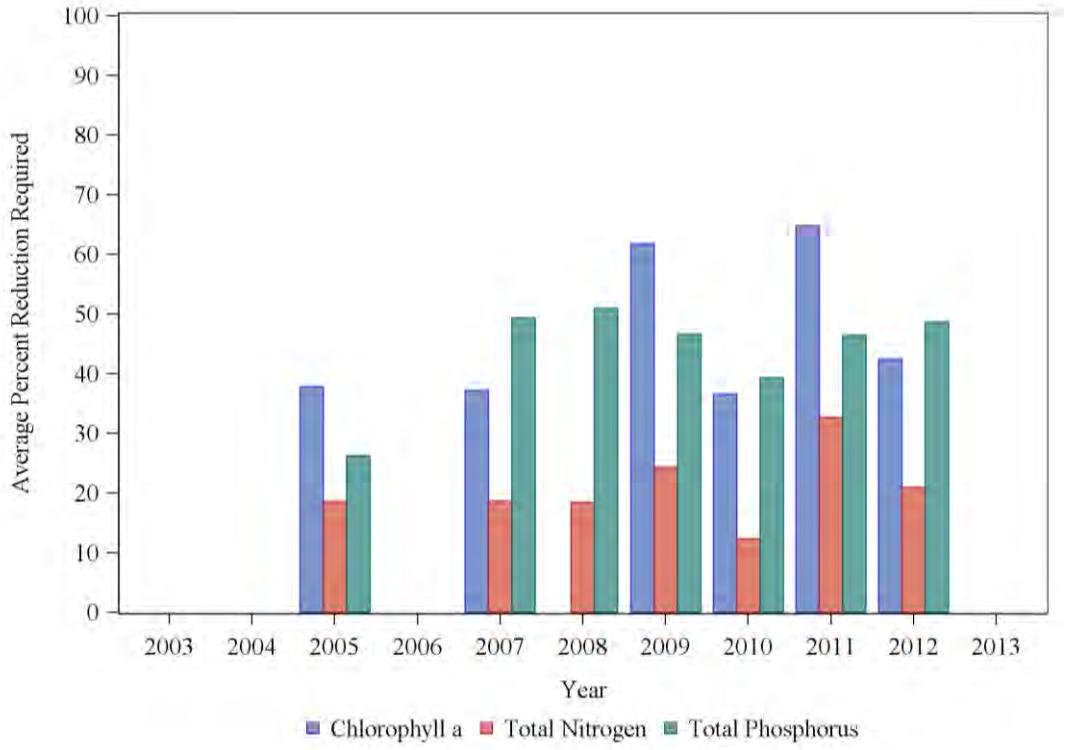


Figure 163. Lake Clinch average percent concentration reduction required to meet the NNC from 2003-2013.



4.64. Hickory Lake (WBID 1730)

Hickory Lake (**Figure 164**) was declared impaired for nutrients due to TSI during the January 1, 2003 to June 30, 2010 verified period as part of the Group 4, Cycle 2 review. The impairment status of Hickory Lake was evaluated using NNC over the verified period used for the initial impairment. Hickory Lake is considered a clear, alkaline lake based on a long-term geometric mean color of 11 PCU and alkalinity of 47 mg/L. Based on the clear, alkaline characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Hickory Lake was impaired for elevated TN and TP concentrations during the verified period using the NNC (**Table 129**). There were insufficient chlorophyll-a data to determine impairment status over the initial verified period.

In addition, Hickory Lake water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Hickory Lake remained classified as a clear, alkaline lake (color=12 PCU, alkalinity=46 mg/L). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Hickory Lake continues to be impaired for TN and TP with the addition of chlorophyll-a (**Table 130**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 165**). The percent exceedance was frequently 100 percent for all three parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 166**). The calculated required chlorophyll-a percent concentration reductions ranged from 50 to 69 percent, TN concentration reductions ranged from 45 to 61 percent and TP concentration reductions from 9 to 13 percent to obtain compliance with NNC.

Figure 164. Location of water quality sampling sites in Hickory Lake (WBID 1730).

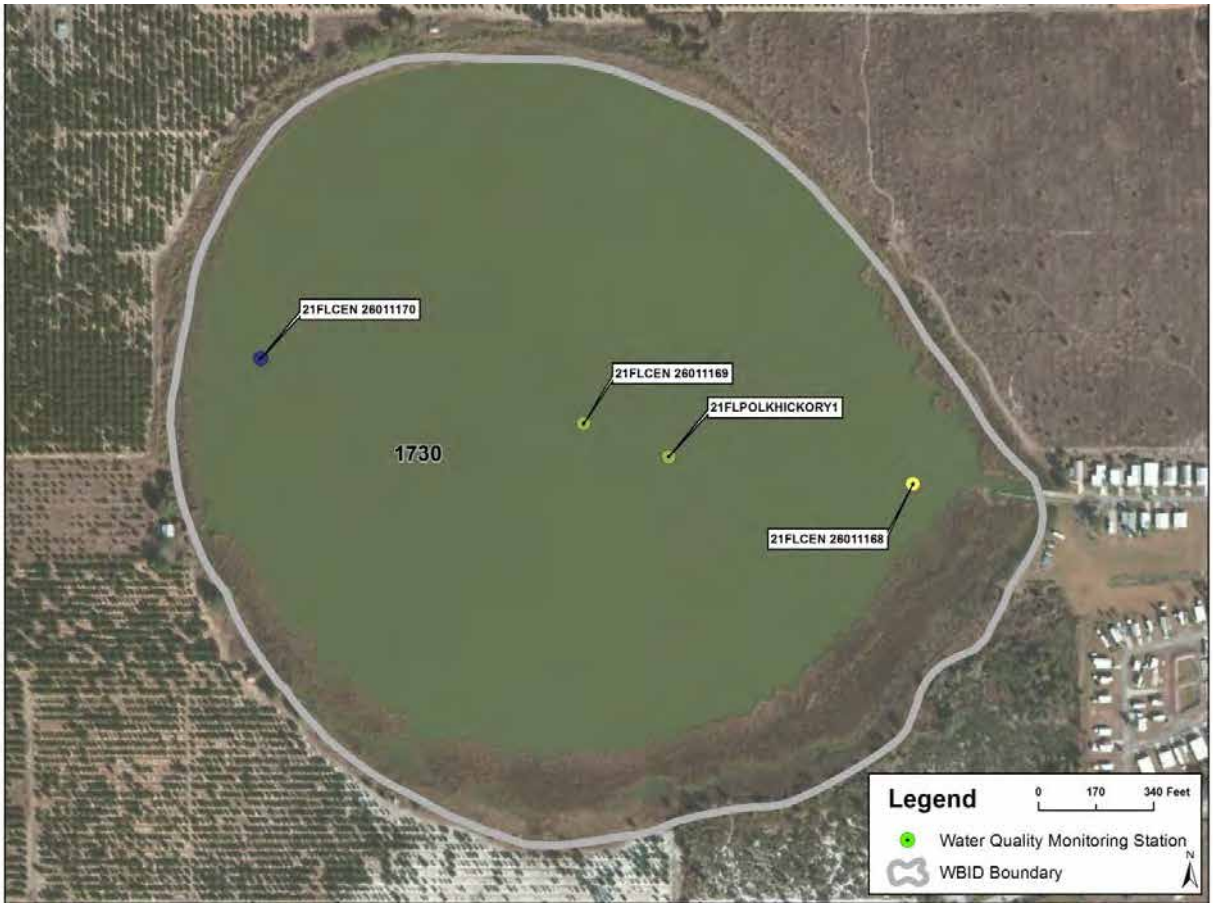


Table 129. Results of NNC evaluation for Hickory Lake (WBID 1730) over verified period for TSI impairment (January 1, 2003 to June 30, 2010).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1730	HICKORY LAKE	2003	-	-	-
1730	HICKORY LAKE	2004	-	-	-
1730	HICKORY LAKE	2005	**42.4**	**2.466**	-
1730	HICKORY LAKE	2006	-	-	-
1730	HICKORY LAKE	2007	-	**2.098**	**0.032**
1730	HICKORY LAKE	2008	-	**2.718**	**0.034**
1730	HICKORY LAKE	2009	**66.1**	**2.620**	**0.033**
1730	HICKORY LAKE	2010	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 130. Results of NNC evaluation for Hickory Lake (WBID 1730) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1730	HICKORY LAKE	2003	-	-	-
1730	HICKORY LAKE	2004	-	-	-
1730	HICKORY LAKE	2005	**42.4**	**2.466**	-
1730	HICKORY LAKE	2006	-	-	-
1730	HICKORY LAKE	2007	-	**2.098**	**0.032**
1730	HICKORY LAKE	2008	-	**2.718**	**0.034**
1730	HICKORY LAKE	2009	**66.1**	**2.620**	**0.033**
1730	HICKORY LAKE	2010	**41.4**	**1.909**	**0.030**
1730	HICKORY LAKE	2011	-	-	-
1730	HICKORY LAKE	2012	-	-	-
1730	HICKORY LAKE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 165. Percent of Hickory Lake Samples which Exceed Criteria from 2003-2013.

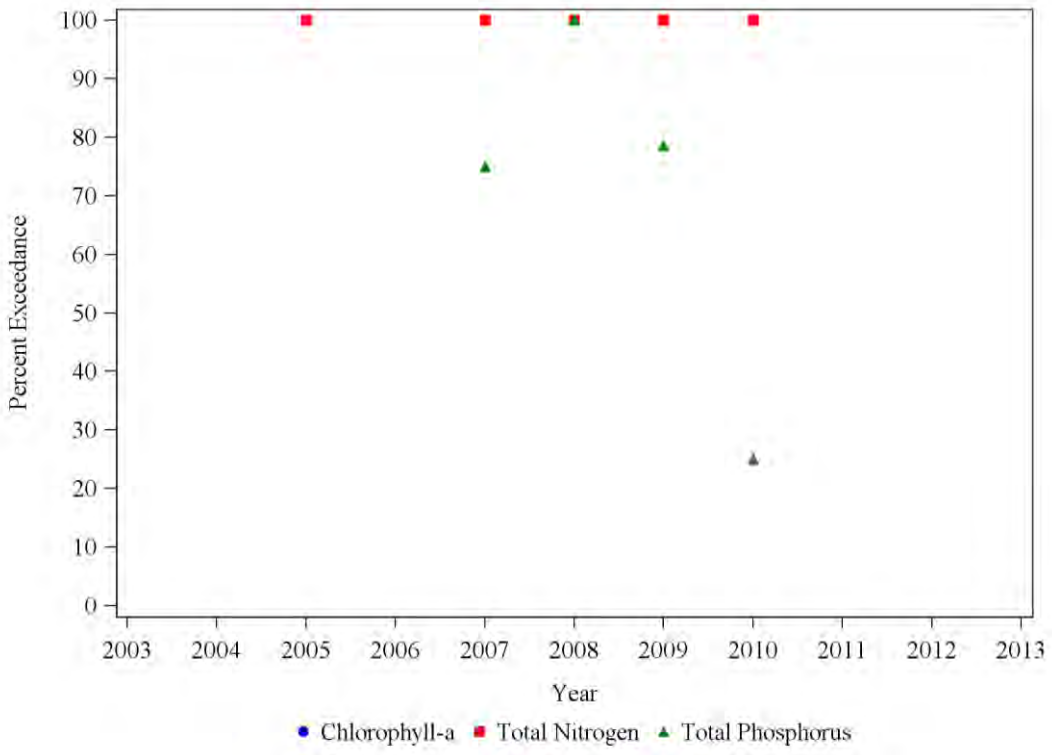
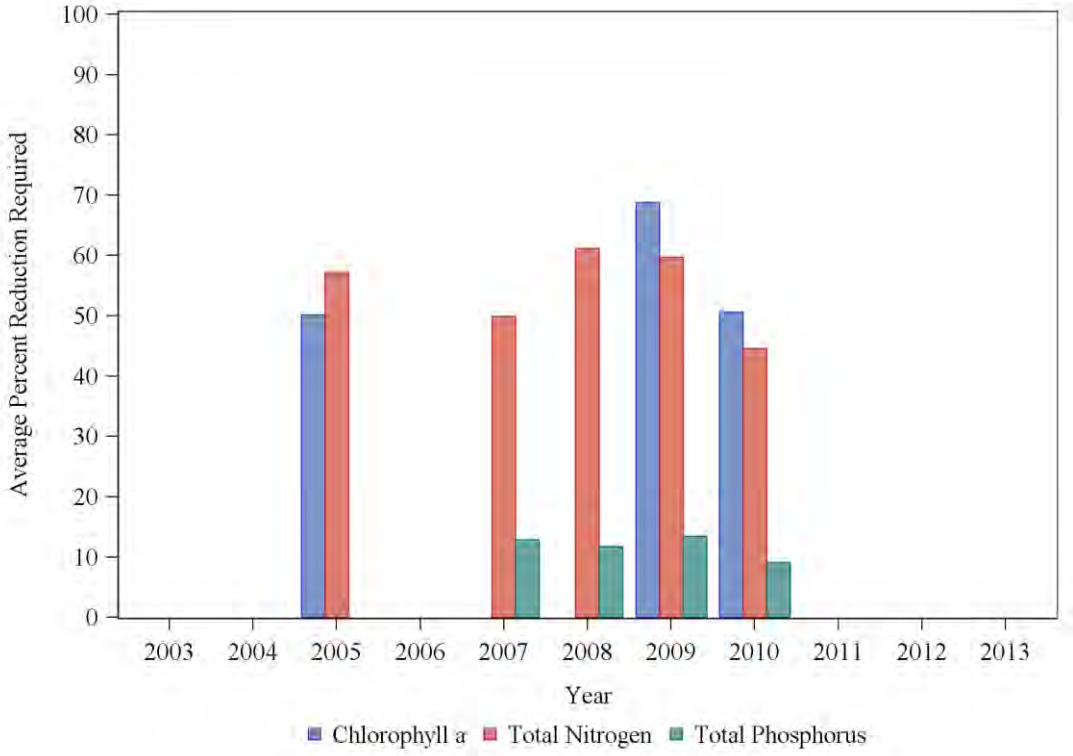


Figure 166. Hickory Lake average percent concentration reduction required to meet the NNC from 2003-2013.



4.65. Lake Lowery (WBID 2890A)

Lake Lowery (**Figure 167**) was declared impaired for nutrients due to elevated TSI during the January 1, 2005 to June 30, 2012 verified period as part of the Group 1, Cycle 3 review. The impairment status of Lake Lowery was evaluated using NNC over the verified period used for the initial impairment. Lake Lowery is considered a colored lake based on a long-term geometric mean color of 46 PCU. Based on the colored characterization, nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. The results of the analysis were not consistent with the initial impairment determination and indicate that Lake Lowery was not found to be impaired for TN and TP during the verified period using the NNC (**Table 131**). There were insufficient chlorophyll-a data to determine impairment status over the initial verified period.

In addition, Lake Lowery water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Lowery remained classified as a colored lake (color=46 PCU). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Lowery continues to be unimpaired for TN and TP using the NNC (**Table 132**). There were insufficient chlorophyll-a data to determine impairment status over the 2003 to 2013 period.

Figure 167. Location of water quality sampling sites in Lake Lowery (WBID 2890A).

Table 131. Results of NNC evaluation for Lake Lowery (WBID 2890A) over verified period for TSI impairment (January 1, 2003 to June 30, 2012).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
2890A	LAKE LOWERY	2005	-	1.114	-
2890A	LAKE LOWERY	2006	-	1.120	-
2890A	LAKE LOWERY	2007	8.9	1.187	0.024
2890A	LAKE LOWERY	2008	-	-	0.022
2890A	LAKE LOWERY	2009	-	1.240	0.021
2890A	LAKE LOWERY	2010	-	-	-
2890A	LAKE LOWERY	2011	-	-	-
2890A	LAKE LOWERY	2012	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 132. Results of NNC evaluation for Lake Lowery (WBID 2890A) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
2890A	LAKE LOWERY	2003	-	-	-
2890A	LAKE LOWERY	2004	-	-	-
2890A	LAKE LOWERY	2005	-	1.114	-
2890A	LAKE LOWERY	2006	-	1.120	-
2890A	LAKE LOWERY	2007	8.9	1.187	0.024
2890A	LAKE LOWERY	2008	-	-	0.022
2890A	LAKE LOWERY	2009	-	1.240	0.021
2890A	LAKE LOWERY	2010	-	-	-
2890A	LAKE LOWERY	2011	-	-	-
2890A	LAKE LOWERY	2012	-	-	-
2890A	LAKE LOWERY	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

4.66. Lake Cypress (WBID 3180A)

Lake Cypress (**Figure 168**) was declared impaired for nutrients due to elevated TSI during the January 1, 1998 to June 30, 2005 verified period as part of the Group 4, Cycle 1 review. The impairment status of Lake Cypress was evaluated using NNC over the verified period used for the initial impairment. Lake Cypress is considered a colored lake based on a long-term geometric mean color of 86 PCU. Based on the colored characterization, nutrient criteria were determined based on chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Cypress was impaired for elevated chlorophyll-a, TN and TP concentrations during the verified period (**Table 133**).

In addition, Lake Cypress water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Cypress remained classified as a colored lake (color=86 PCU). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Cypress continues to be impaired for all three parameters (**Table 134**). The annual percent exceedance was calculated for chlorophyll-a, TN and TP (**Figure 169**). The percent exceedance was variable for all parameters. The average annual percent reduction required to meet the respective NNC criteria for each parameter was calculated (**Figure 170**). The calculated required chlorophyll-a percent concentration reductions ranged from 22 to 53 percent, TN concentration reductions ranged from 6 to 25 percent and TP concentration reductions from 13 to 27 percent to obtain compliance with NNC.

Figure 168. Location of water quality sampling sites in Lake Cypress (WBID 3180A).

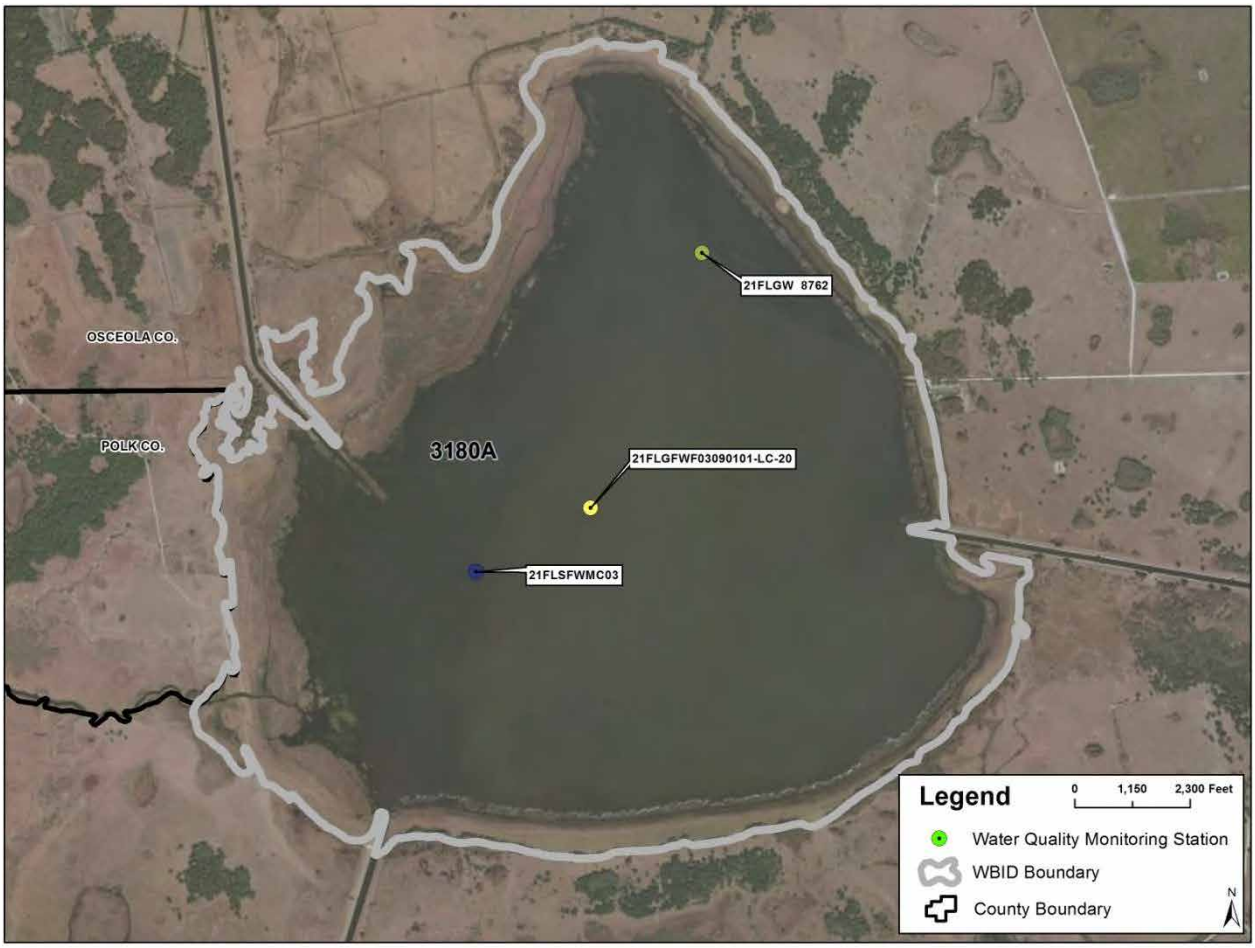


Table 133. Results of NNC evaluation for Lake Cypress (WBID 3180A) over verified period for TSI impairment (January 1, 1998 to June 30, 2005).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
3180A	LAKE CYPRESS	1998	**30.6**	**1.428**	**0.085**
3180A	LAKE CYPRESS	1999	**26.6**	**1.388**	**0.072**
3180A	LAKE CYPRESS	2000	19.0	1.420	0.068
3180A	LAKE CYPRESS	2001	**29.3**	**1.626**	**0.067**
3180A	LAKE CYPRESS	2002	**26.5**	**1.506**	**0.054**
3180A	LAKE CYPRESS	2003	17.5	1.361	0.058
3180A	LAKE CYPRESS	2004	**25.7**	1.206	**0.083**
3180A	LAKE CYPRESS	2005	**32.8**	**1.307**	**0.107**
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 134. Results of NNC evaluation for Lake Cypress (WBID 3180A) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
3180A	LAKE CYPRESS	2003	17.5	1.361	0.058
3180A	LAKE CYPRESS	2004	**25.7**	1.206	**0.083**
3180A	LAKE CYPRESS	2005	**27.4**	1.260	**0.096**
3180A	LAKE CYPRESS	2006	**30.6**	**1.706**	**0.101**
3180A	LAKE CYPRESS	2007	**33.8**	**1.694**	**0.058**
3180A	LAKE CYPRESS	2008	**35.3**	**1.564**	**0.067**
3180A	LAKE CYPRESS	2009	**43.5**	**1.611**	**0.067**
3180A	LAKE CYPRESS	2010	**21.2**	1.215	**0.052**
3180A	LAKE CYPRESS	2011	-	**1.345**	**0.052**
3180A	LAKE CYPRESS	2012	-	-	-
3180A	LAKE CYPRESS	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Figure 169. Percent of Lake Cypress Samples which Exceed Criteria from 2003-2013.

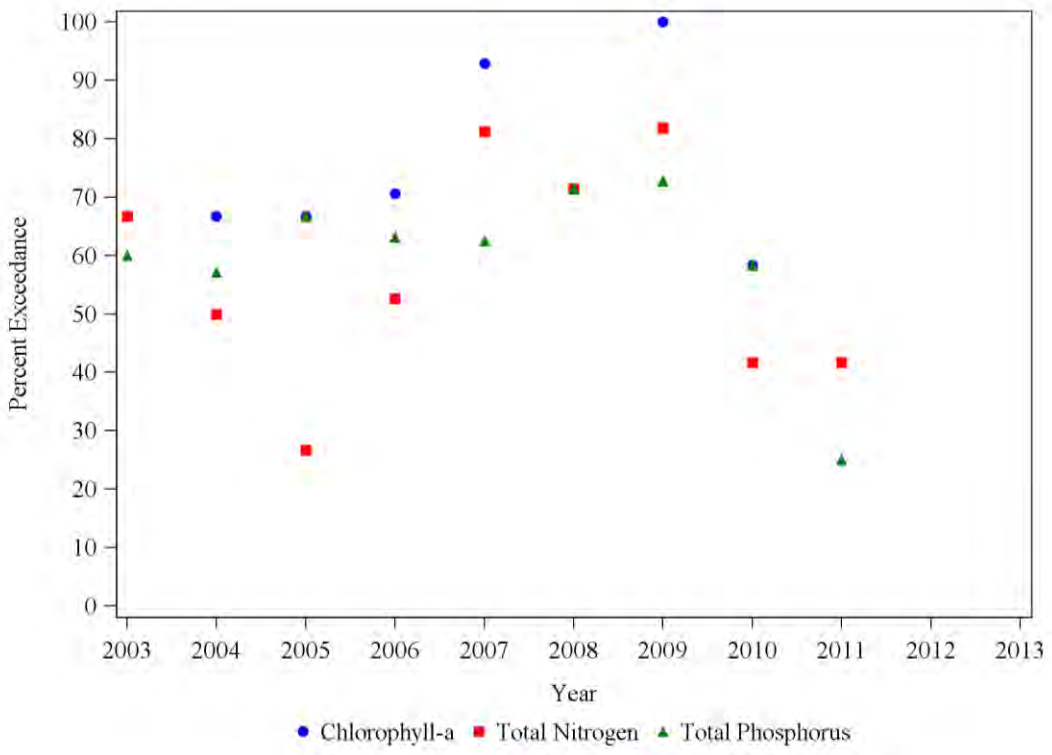
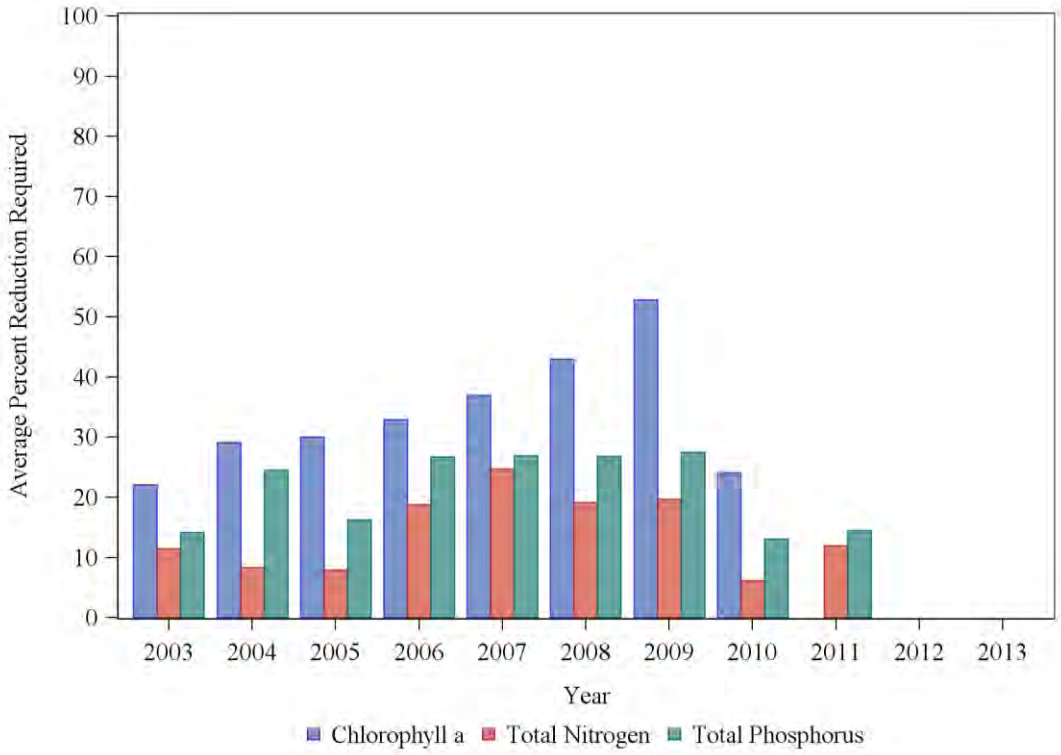


Figure 170. Lake Cypress average percent reduction required to meet the NNC from 2003-2013.



4.67. Lake Kissimmee (WBID 3183B)

Lake Kissimmee (**Figure 171**) was declared impaired for nutrients due to elevated TSI during the January 1, 1998 to June 30, 2005 verified period as part of the Group 4, Cycle 1 review. The impairment status of Lake Kissimmee was evaluated using NNC over the verified period used for the initial impairment. Lake Kissimmee is considered a colored lake based on a long-term geometric mean color of 69 PCU. Based on the colored characterization, nutrient criteria were determined based on chlorophyll-a concentration of 20.0 µg/L. The results of the analysis support the initial impairment determination and indicate that Lake Kissimmee was impaired for elevated chlorophyll-a and TP concentrations during the verified period (**Table 135**).

In addition, Lake Kissimmee water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Based on the recalculation of the long-term geometric mean for color and alkalinity, Lake Kissimmee remained classified as a colored lake (color=69 PCU). Therefore, the nutrient criteria were determined based on a chlorophyll-a concentration of 20.0 µg/L. Results of the water quality comparison using current data indicate that Lake Kissimmee was unimpaired for all three parameters using the NNC (**Table 136**).

Figure 171. Location of water quality sampling sites in Lake Kissimmee (WBID 3183B).

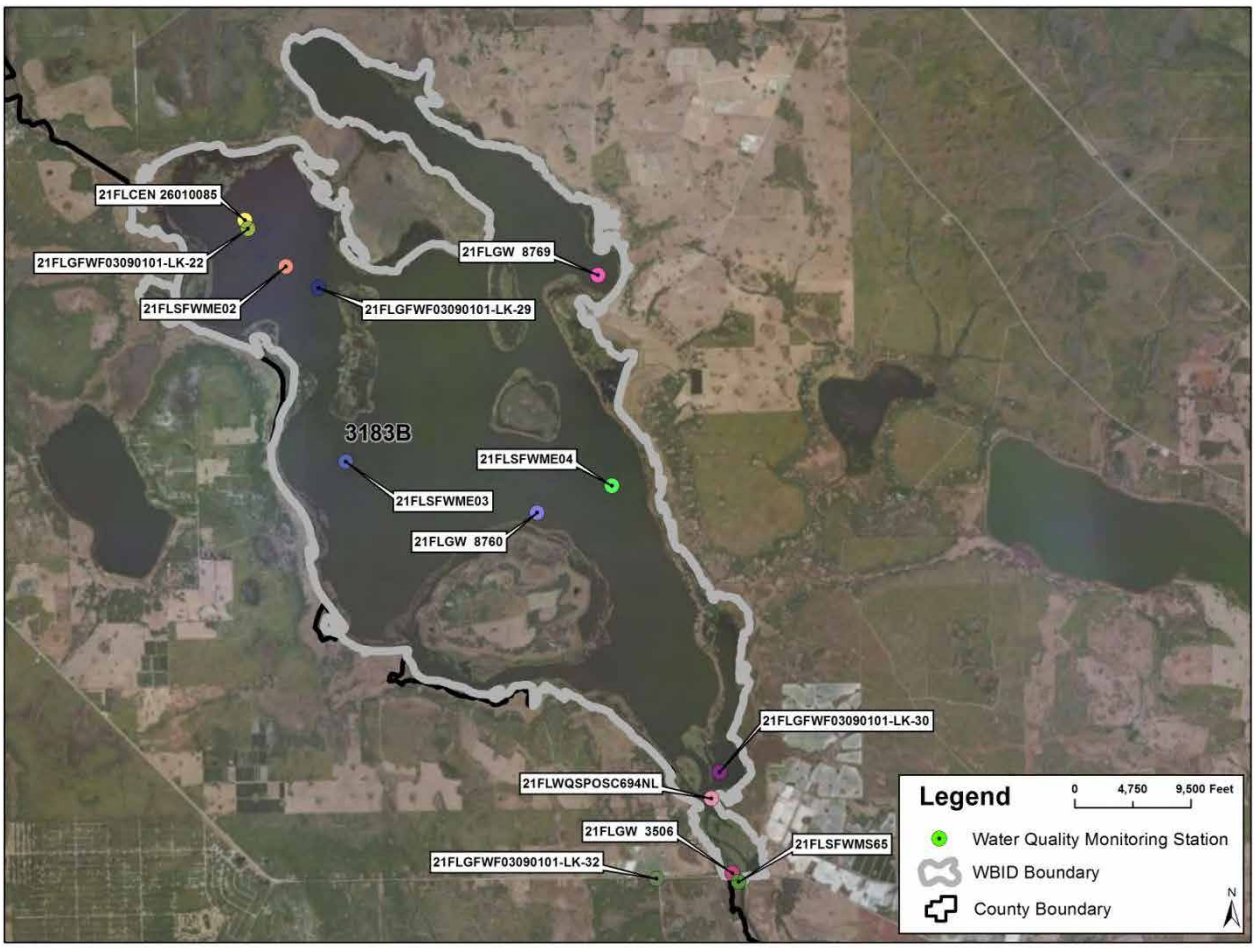


Table 135. Results of NNC evaluation for Lake Kissimmee (WBID 3183B) over verified period for TSI impairment (January 1, 1998 to June 30, 2005).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
3183B	LAKE KISSIMMEE	1998	**26.0**	**1.297**	**0.078**
3183B	LAKE KISSIMMEE	1999	**23.5**	1.247	**0.077**
3183B	LAKE KISSIMMEE	2000	16.3	1.220	0.052
3183B	LAKE KISSIMMEE	2001	18.9	1.545	0.054
3183B	LAKE KISSIMMEE	2002	18.2	1.311	0.044
3183B	LAKE KISSIMMEE	2003	13.6	1.222	0.057
3183B	LAKE KISSIMMEE	2004	14.5	1.230	0.066
3183B	LAKE KISSIMMEE	2005	13.6	1.280	0.076
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 136. Results of NNC evaluation for Lake Kissimmee (WBID 3183B) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
3183B	LAKE KISSIMMEE	2003	13.6	1.222	0.057
3183B	LAKE KISSIMMEE	2004	14.5	1.230	0.066
3183B	LAKE KISSIMMEE	2005	17.1	1.012	0.078
3183B	LAKE KISSIMMEE	2006	18.2	1.227	0.075
3183B	LAKE KISSIMMEE	2007	18.2	1.287	0.053
3183B	LAKE KISSIMMEE	2008	**29.0**	**1.484**	**0.058**
3183B	LAKE KISSIMMEE	2009	19.9	1.302	0.049
3183B	LAKE KISSIMMEE	2010	15.1	1.137	0.044
3183B	LAKE KISSIMMEE	2011	16.4	1.177	0.050
3183B	LAKE KISSIMMEE	2012	16.5	1.174	0.045
3183B	LAKE KISSIMMEE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

5. Polk County Lake Impairment Summary

5.1. Verified Period

Sixty-seven lakes identified as verified impaired by FDEP for elevated TSI where evaluated using the NNC. Of the 67 lakes, 10 were found unimpaired for the three parameters: chlorophyll-a, TN or TP (**Table 137**). Thirteen lakes had insufficient data to evaluate at least one of the parameters for to determine an impairment designation. For those 13 lakes, parameters with sufficient data for analysis were found to not be impaired. At least one parameter was found to be impaired in the remaining 44 lakes (**Table 138**).

5.2. Recent Analysis (2003-2013)

The 67 impaired lakes were analyzed using a more recent data set (2003-2013) to determine if there was evidence of a changed in impairment status. Thirteen lakes were found unimpaired for the three parameters: chlorophyll-a, TN or TP (**Table 139**). Four lakes had insufficient data to evaluate at least one of the parameters for to determine an impairment designation. For those 4 lakes, parameters with sufficient data for analysis were found to not be impaired. At least one parameter was found to be impaired in the remaining 50 lakes (**Table 140**).

Based on an update to the dataset used for analysis, four lakes had a change in lake characterization. Lake Deeson was initially characterized as a clear, acidic lake and reclassified as a clear, alkaline lake resulting in more lenient water quality criteria. Lake Gibson changed from a high color to a clear, alkaline lake. While Sears and Eagle Lake had lake classification changes from clear, alkaline to clear, acidic. The changes in lake characterization resulted in a shift to a more stringent water quality criteria. Both Sears and Eagle Lakes switched from unimpaired to impaired due to the reclassification.

Water quality in Lake Weohyakapka was initially classified as unimpaired during the verified but impaired over the 2003 to 2013 time period due to elevated chlorophyll-a concentrations in 2011 and 2012, annual geometric chlorophyll-a concentrations of 20.3 and 20.5 µg/L respectively. However, water quality in Lakes Kissimmee and Elbert appear to be improving, transitioning from an impaired to unimpaired WBID.

Table 137. List of Polk County Lakes found unimpaired or insufficient data when evaluated using the NNC over verified period.

Type	Group	Cycle	Verified Period		WBID	Waterbody Name	Impairment Status		
			Start Date	End Date			Chlorophyll-a	Total Nitrogen	Total Phosphorus
303(d) list	3	2	1/1/2002	6/30/2009	1488V	LAKE SWOOPE	No	No	No
303(d) list	3	1	1/1/1997	6/30/2004	1488Y	LAKE PANSY	No	No	No
303(d) list	3	2	1/1/2002	6/30/2009	1488Z	LAKE ECHO	No	No	No
303(d) list	3	2	1/1/2002	6/30/2009	14921	LAKE TRACY	No	No	No
303(d) list	3	2	1/1/2002	6/30/2009	1501W	SEARS LAKE	No	No	No
303(d) list	4	2	1/1/2003	6/30/2010	1532B	LAKE MARIE	No	No	No
303(d) list	3	2	1/1/2002	6/30/2009	1539Q	LAKE NED	No	No	No
303(d) list	3	2	1/1/2002	6/30/2009	1539Z	LAKE MENZIE	No	No	No
303(d) list	4	2	1/1/2003	6/30/2010	1573E	LAKE WEOHYAKAPKA	No	No	No
303(d) list	3	1	1/1/1997	6/30/2004	1623M	EAGLE LAKE	No	No	No
303(d) list	3	2	1/1/2002	6/30/2009	1488G	LAKE SILVER	ID	No	No
303(d) list	3	2	1/1/2002	6/30/2009	1488P	LAKE MARTHA	No	No	ID
303(d) list	3	2	1/1/2002	6/30/2009	1488Q	LAKE MAUDE	No	No	ID
303(d) list	3	2	1/1/2002	6/30/2009	1488S	LAKE BUCKEYE	ID	No	No
303(d) list	3	2	1/1/2002	6/30/2009	1497C	LAKE TENOROC	ID	ID	ID
303(d) list	3	1	1/1/1997	6/30/2004	1497D	LAKE GIBSON	ID	ID	ID
303(d) list	3	1	1/1/1997	6/30/2004	1497E	LAKE BONNY	ID	ID	ID
303(d) list	3	2	1/1/2002	6/30/2009	15003	LAKE CONFUSION	ID	No	No
303(d) list	3	1	1/1/1997	6/30/2004	1501	LAKE LENA	ID	ID	ID
303(d) list	2	2	1/1/2001	6/30/2008	1537	LAKE WIRE	ID	ID	ID
303(d) list	3	2	1/1/2002	6/30/2009	1539C	LAKE ANNIE	No	No	ID
303(d) list	3	1	1/1/1997	6/30/2004	1549X	LAKE HOLLINGSWORTH	ID	ID	ID
303(d) list	1	3	1/1/2005	6/30/2012	2890A	LAKE LOWERY	ID	No	No
ID=Insufficient Data									

Table 138. List of Polk County Lakes found to be impaired when evaluated using the NNC over verified period.

TYPE	Group	Cycle	Verified Period		WBID	Waterbody Name	Impairment Status		
			Start Date	End Date			Chlorophyll-a	Total Nitrogen	Total Phosphorus
303(d) list	4	2	1/1/2003	6/30/2010	1449A	LAKE DEESON	Yes	Yes	ID
303(d) list	4	1	1/1/1998	6/30/2005	1467	MUD LAKE	Yes	No	Yes
303(d) list	4	2	1/1/2003	6/30/2010	1472B	LAKE HATCHINEHA	Yes	Yes	Yes
303(d) list	4	2	1/1/2003	6/30/2010	1480	LAKE MARION	Yes	Yes	Yes
303(d) list	4	2	1/1/2003	6/30/2010	1484A	LAKE TENNESSEE	Yes	Yes	Yes
303(d) list	4	2	1/1/2003	6/30/2010	1484B	LAKE JULIANA	Yes	No	No
303(d) list	3	1	1/1/1997	6/30/2004	1488A	LAKE SMART	Yes	Yes	Yes
303(d) list	3	1	1/1/1997	6/30/2004	1488B	LAKE ROCHELLE	Yes	Yes	Yes
303(d) list	3	1	1/1/1997	6/30/2004	1488C	LAKE HAINES	Yes	Yes	Yes
303(d) list	3	2	1/1/2002	6/30/2009	1488D	LAKE ALFRED	ID	Yes	Yes
303(d) list	3	1	1/1/1997	6/30/2004	1488U	LAKE CONINE	Yes	Yes	Yes
303(d) list	3	2	1/1/2002	6/30/2009	1497A	CRYSTAL LAKE	Yes	Yes	No
303(d) list	3	1	1/1/1997	6/30/2004	1497B	LAKE PARKER	Yes	Yes	Yes
303(d) list	3	2	1/1/2002	6/30/2009	15001	LITTLE LAKE HAMILTON	No	No	Yes
303(d) list	3	2	1/1/2002	6/30/2009	1501B	LAKE ARIANA	Yes	No	No
303(d) list	3	2	1/1/2002	6/30/2009	15101	LAKE EVA	Yes	Yes	Yes
TMDL	3	2	1/1/2002	6/30/2009	1521	LAKE LULU	Yes	Yes	ID
303(d) list	3	2	1/1/2002	6/30/2009	1521B	LAKE ELOISE	Yes	Yes	ID
TMDL	3	2	1/1/2002	6/30/2009	1521D	LAKE SHIPP	Yes	Yes	Yes
TMDL	3	2	1/1/2002	6/30/2009	1521E	LAKE MAY	Yes	Yes	ID
TMDL	3	2	1/1/2002	6/30/2009	1521F	LAKE HOWARD	ID	Yes	ID
TMDL	3	2	1/1/2002	6/30/2009	1521G	LAKE MIRROR	ID	Yes	ID
TMDL	3	2	1/1/2002	6/30/2009	1521H	LAKE CANNON	Yes	Yes	Yes
TMDL	3	2	1/1/2002	6/30/2009	1521J	LAKE IDYLWILD	Yes	No	Yes
TMDL	3	2	1/1/2002	6/30/2009	1521K	LAKE JESSIE	Yes	No	Yes

TYPE	Group	Cycle	Verified Period		WBID	Waterbody Name	Impairment Status		
			Start Date	End Date			Chlorophyll-a	Total Nitrogen	Total Phosphorus
303(d) list	3	2	1/1/2002	6/30/2009	1521L	LAKE MARIANNA	Yes	Yes	Yes
303(d) list	3	2	1/1/2002	6/30/2009	1521P	DEER LAKE	Yes	Yes	ID
303(d) list	3	2	1/1/2002	6/30/2009	1521Q	LAKE BLUE	Yes	Yes	Yes
303(d) list	4	2	1/1/2003	6/30/2010	1532A	LAKE PIERCE	Yes	Yes	Yes
303(d) list	3	1	1/1/1997	6/30/2004	1539R	LAKE DAISY	Yes	No	Yes
TMDL	2	2	1/1/2001	6/30/2008	1543	LAKE HUNTER	Yes	Yes	Yes
303(d) list	3	1	1/1/1997	6/30/2004	1548	LAKE ELBERT	No	No	Yes
303(d) list	3	1	1/1/1997	6/30/2004	1549B	BANANA LAKE	Yes	Yes	Yes
303(d) list	3	2	1/1/2002	6/30/2009	1549B1	LAKE STAHL	Yes	Yes	Yes
303(d) list	3	2	1/1/2002	6/30/2009	1588A	LAKE MCLEOD	Yes	Yes	Yes
303(d) list	2	2	1/1/2001	6/30/2008	1610	CARTER ROAD PARK LAKES	Yes	Yes	Yes
303(d) list	4	2	1/1/2003	6/30/2010	1619A	LAKE WALES	Yes	Yes	No
303(d) list	3	1	1/1/1997	6/30/2004	1623L	LAKE HANCOCK	Yes	Yes	Yes
303(d) list	3	2	1/1/2002	6/30/2009	1623M1	GRASSY LAKE	ID	Yes	ID
303(d) list	4	2	1/1/2003	6/30/2010	1685D	REEDY LAKE	Yes	Yes	Yes
303(d) list	4	2	1/1/2003	6/30/2010	1706	LAKE CLINCH	Yes	Yes	Yes
303(d) list	4	2	1/1/2003	6/30/2010	1730	HICKORY LAKE	ID	Yes	Yes
303(d) list	4	1	1/1/1998	6/30/2005	3180A	LAKE CYPRESS	Yes	Yes	Yes
303(d) list	4	1	1/1/1998	6/30/2005	3183B	LAKE KISSIMMEE	Yes	No	Yes

ID=Insufficient Data

Table 139. List of Polk County Lakes found unimpaired or insufficient data when evaluated using the NNC over 2003-2013 period.

Type	WBID	Waterbody Name	Impairment Status		
			Chlorophyll-a	Total Nitrogen	Total Phosphorus
303(d) list	1488G	LAKE SILVER	No	No	No
303(d) list	1488P	LAKE MARTHA	No	No	No
303(d) list	1488S	LAKE BUCKEYE	No	No	No
303(d) list	1488V	LAKE SWOOPE	No	No	No
303(d) list	1488Y	LAKE PANSY	No	No	No
303(d) list	1488Z	LAKE ECHO	No	No	No
303(d) list	14921	LAKE TRACY	No	No	No
303(d) list	1532B	LAKE MARIE	No	No	No
303(d) list	1539C	LAKE ANNIE	No	No	No
303(d) list	1539Q	LAKE NED	No	No	No
303(d) list	1539Z	LAKE MENZIE	No	No	No
303(d) list	1548	LAKE ELBERT	No	No	No
303(d) list	3183B	LAKE KISSIMMEE	No	No	No
303(d) list	1497C	LAKE TENOROC	ID	ID	ID
303(d) list	15003	LAKE CONFUSION	ID	No	No
303(d) list	1537	LAKE WIRE	ID	ID	ID
303(d) list	2890A	LAKE LOWERY	ID	No	No

Table 140. List of Polk County Lakes found to be impaired when evaluated using the NNC over 2003-2013 period.

Type	WBID	Waterbody Name	Impairment Status		
			Chlorophyll-a	Total Nitrogen	Total Phosphorus
303(d) list	1449A	LAKE DEESON	Yes	Yes	Yes
303(d) list	1467	MUD LAKE	Yes	Yes	Yes
303(d) list	1472B	LAKE HATCHINEHA	Yes	Yes	Yes
303(d) list	1480	LAKE MARION	Yes	Yes	Yes
303(d) list	1484A	LAKE TENNESSEE	Yes	Yes	Yes
303(d) list	1484B	LAKE JULIANA	Yes	Yes	Yes
TMDL	1488A	LAKE SMART	ID	Yes	ID
303(d) list	1488B	LAKE ROCHELLE	Yes	Yes	Yes
TMDL	1488C	LAKE HAINES	Yes	Yes	No
303(d) list	1488D	LAKE ALFRED	ID	Yes	Yes
303(d) list	1488Q	LAKE MAUDE	No	No	Yes
303(d) list	1488U	LAKE CONINE	Yes	Yes	Yes
303(d) list	1497A	CRYSTAL LAKE	Yes	Yes	Yes
303(d) list	1497B	LAKE PARKER	Yes	Yes	Yes
303(d) list	1497D	LAKE GIBSON	No	No	Yes
303(d) list	1497E	LAKE BONNY	Yes	Yes	Yes
303(d) list	15001	LITTLE LAKE HAMILTON	No	Yes	Yes
303(d) list	1501	LAKE LENA	Yes	Yes	Yes
303(d) list	1501B	LAKE ARIANA	Yes	Yes	No
303(d) list	1501W	SEARS LAKE	Yes	Yes	Yes
303(d) list	15101	LAKE EVA	Yes	Yes	Yes
TMDL	1521	LAKE LULU	Yes	Yes	Yes
303(d) list	1521B	LAKE ELOISE	Yes	Yes	Yes
TMDL	1521D	LAKE SHIPP	Yes	Yes	Yes
TMDL	1521E	LAKE MAY	Yes	Yes	Yes

Type	WBID	Waterbody Name	Impairment Status		
			Chlorophyll-a	Total Nitrogen	Total Phosphorus
TMDL	1521F	LAKE HOWARD	Yes	Yes	Yes
TMDL	1521G	LAKE MIRROR	ID	Yes	No
TMDL	1521H	LAKE CANNON	Yes	Yes	Yes
TMDL	1521J	LAKE IDYLWILD	Yes	Yes	Yes
TMDL	1521K	LAKE JESSIE	Yes	Yes	Yes
303(d) list	1521L	LAKE MARIANNA	Yes	Yes	Yes
303(d) list	1521P	DEER LAKE	Yes	Yes	Yes
303(d) list	1521Q	LAKE BLUE	Yes	Yes	Yes
303(d) list	1532A	LAKE PIERCE	Yes	Yes	Yes
303(d) list	1539R	LAKE DAISY	ID	Yes	Yes
TMDL	1543	LAKE HUNTER	Yes	Yes	Yes
303(d) list	1549B	BANANA LAKE	Yes	Yes	Yes
303(d) list	1549B1	LAKE STAHL	Yes	Yes	Yes
303(d) list	1549X	LAKE HOLLINGSWORTH	ID	Yes	Yes
303(d) list	1573E	LAKE WEOHYAKAPKA	Yes	No	No
303(d) list	1588A	LAKE MCLEOD	Yes	Yes	Yes
303(d) list	1610	CARTER ROAD PARK LAKES	Yes	Yes	Yes
303(d) list	1619A	LAKE WALES	Yes	Yes	Yes
303(d) list	1623L	LAKE HANCOCK	Yes	Yes	Yes
303(d) list	1623M	EAGLE LAKE	Yes	Yes	Yes
303(d) list	1623M1	GRASSY LAKE	No	Yes	No
303(d) list	1685D	REEDY LAKE	Yes	Yes	Yes
303(d) list	1706	LAKE CLINCH	Yes	Yes	Yes
303(d) list	1730	HICKORY LAKE	Yes	Yes	Yes
303(d) list	3180A	LAKE CYPRESS	Yes	Yes	Yes
ID=Insufficient Data					

6. Impairment Determinations using Stream NNC

Stream-based NNC are divided into floral or nutrient thresholds and stream condition index (SCI). In order to classify a waterbody as unimpaired, the floral metric and either SCI or nutrient thresholds must meet standard. In contrast, a waterbody can be designated as impaired if the floral metric or the nutrient threshold and SCI exceed standards. A more robust stream evaluation is required to deem a waterbody as unimpaired (**Figure 172**). Stream impairment can occur regardless of nutrient concentrations in the water.

Figure 172. Decision matrix for stream impairment status (FDEP 2013). Blue cell=indicates conditions in which a WBID is unimpaired; Yellow and orange cells indicate WBIDs with insufficient data to determine status; and Red cells indicate conditions in which a WBID is impaired.

	Attains Nutrient Thresholds for Both TN and TP (3 Years of Data)			Nutrient Threshold Attainment Inconclusive for Either TN or TP (< 3 Years of Data)			At Least One Nutrient Threshold Not Attained (3 Years of Data)		
	SCI Attains (2 Samples)	SCI Inconclusive (<2 Samples)	SCI Not Attained (1 or 2 Samples)	SCI Attains	SCI Inconclusive	SCI Not Attained	SCI Attains	SCI Inconclusive	SCI Not Attained
Attains Floral Measures (2 Sampling Events)	Attains .531(2)(c) Cat. 2	Attains .531(2)(c) Cat. 2	Attains .531(2)(c) Cat. 2	Attains .531(2)(c) Cat. 2	Cannot Conclude .531(2)(c) Assessment Cat. 3b	Cannot Conclude .531(2)(c) Assessment Cat. 3b	Attains .531(2)(c) Cat. 2	Cannot Conclude .531(2)(c) Assessment Cat. 4d (Study & 303(d) List)	.531(2)(c) Not Attained Cat. 5 (Verified & 303(d) List)
Floral Measures Inconclusive (<2 Sampling Events)	Cannot Conclude .531(2)(c) Assessment Cat. 3b or 3c(Planning List)	Cannot Conclude .531(2)(c) Assessment Cat. 3b or 3c(Planning List)	Cannot Conclude .531(2)(c) Assessment Cat. 3b or 3c(Planning List)	Cannot Conclude .53 1(2)(c) Assessment Cat. 3b or 3c(Planning List)	Cannot Conclude .531(2)(c) Assessment Cat. 3b or 3c(Planning List)	Cannot Conclude .531(2)(c) Assessment Cat. 4d (Study & 303(d) List)	Cannot Conclude-.531(2)(c) Assessment Cat. 4d (Study & 303(d) List)	Cannot Conclude .531(2)(c) Assessment Cat. 4d (Study & 303(d) List)	.531(2)(c) Not Attained Cat. 5 (Verified & 303(d) List)
Any One Floral Measure Not Attained (2 Sampling Events)	.531(2)(c) Not Attained Cat. 5 (Verified & 303(d) List)	.531(2)(c) Not Attained Cat. 5 (Verified & 303(d) List)	.531(2)(c) Not Attained Cat 5 (Verified & 303(d) List)	.531(2)(c) Not Attained Cat. 5 (Verified & 303(d) List)	.531(2)(c) Not Attained Cat/ 5 (Verified & 303(d) List)	.531(2)(c) Not Attained Cat. 5 (Verified & 303(d) List)	.531(2)(c) Not Attained Cat. 5 (Verified & 303(d) List)	.531(2)(c) Not Attained Cat. 5 (Verified & 303(d) List)	.531(2)(c) Not Attained Cat. 5 (Verified & 303(d) List)

6.1. Floral Metrics

A violation of the floral metrics alone is sufficient to consider a stream impaired. The chlorophyll-a annual geometric mean greater than 20 µg/L more than once in a consecutive three year period indicates impairment. In addition, a weight of evidence approach whereby the review of a rapid periphyton survey, change in species composition, linear vegetation survey and chlorophyll-a concentrations can indicate impairment.

6.2. Nutrient Thresholds and Stream Condition Index

A combination of a violation of a nutrient threshold and faunal evaluation (SCI) is sufficient to classify a stream as impaired. Nutrient thresholds for TN and TP are designated based on the nutrient watershed regions identified by FDEP (**Figure 173**). Two nutrient regions are present in Polk County, Peninsula and West Central (**Table 141**). A nutrient threshold has been exceeded if the annual geometric mean exceeds the threshold more than once in a consecutive three year period. In addition, at least two independent (3 months apart) SCI surveys must be completed. If the average of the two SCI cores is below 40 or any score is below 35, the WBID fails the faunal survey. A combination of a nutrient exceedance and SCI failure can result in an impaired stream designation.

Figure 173. Nutrient Watershed Regions (FDEP 2011).

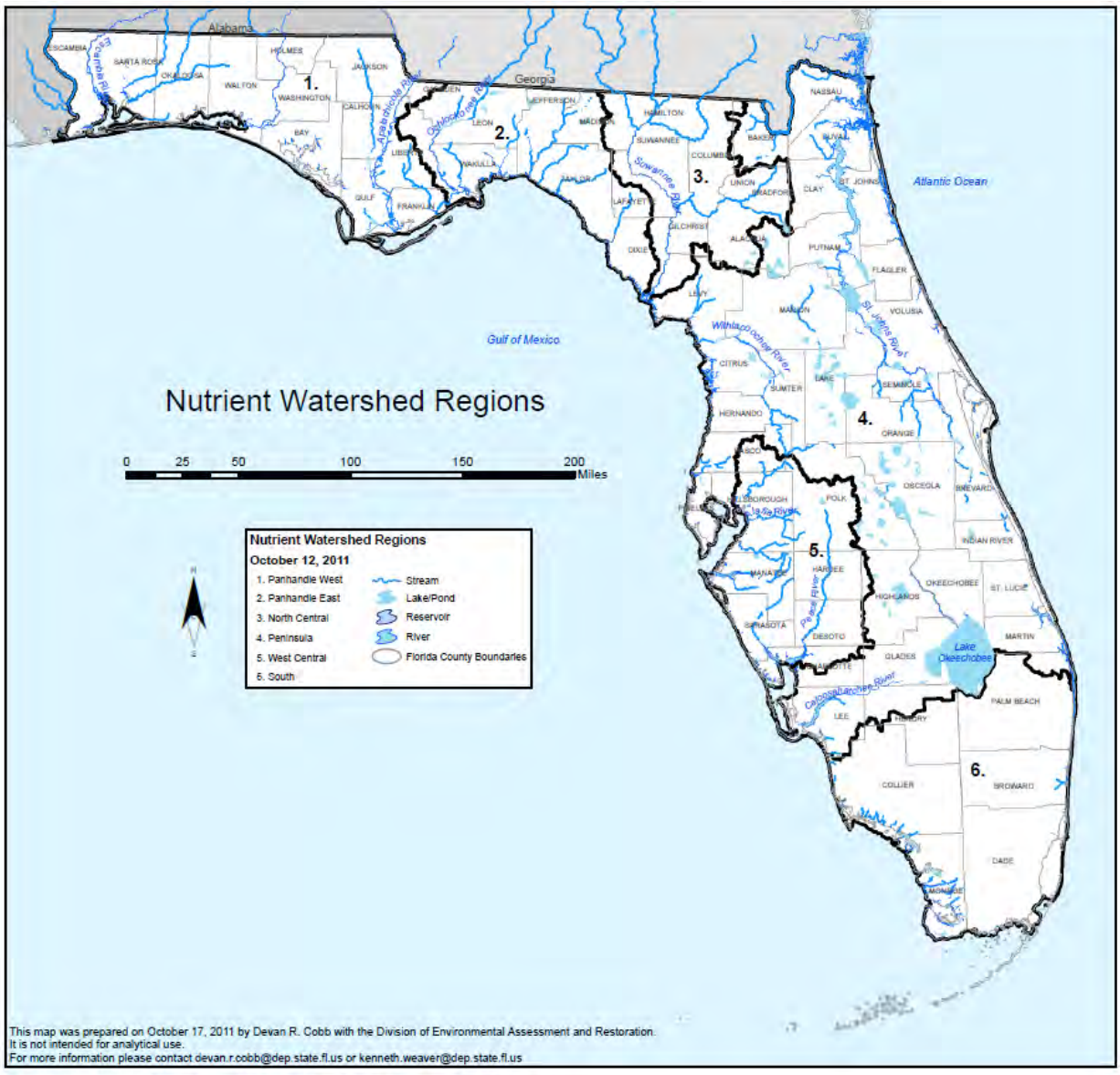


Table 141. Polk County specific nutrient watershed and associated nutrient thresholds.

Nutrient Region	Total Phosphorus Threshold	Total Nitrogen Threshold
Peninsula	0.12 mg/L	1.54 mg/L
West Central	0.49 mg/L	1.65 mg/L

7. Polk County Impaired Stream Review

Using methodology laid out in the State of Florida"s Surface Water Quality Standards (FAC 62-302) and the Impaired Waters Rule (62-303), water quality impairment determinations (for FDEP-determined "impaired" water bodies) were compared using the newly adopted numeric nutrient criteria for streams. Using the guidance provided in the State of Florida"s NNC derivation process, those streams with sufficient water quality were evaluated to ascertain the impairment status. In addition, using the most recent and complete data set from IWR (and supplemented with additional data sets seen as appropriate by Polk County) ambient water quality values for chlorophyll-a, TN and TP were compared to target values for chlorophyll-a, TN and TP within FDEP"s 62-302 guidance. As available, stream condition index (SCI) was reviewed for compliance with the stream guidelines.

Annual geometric means for corrected, chlorophyll-a, TN and TP, where calculated consistent with the F.A.C 62-303. A minimum of 4 sampling events per year with at least one occurring during the wet (May to September) and dry (October to April) seasons are required to calculate an annual geometric mean. The TN and TP criteria were designated based upon the nutrient threshold regions in which an individual WBID was located.

For each stream, a map of sampling station locations is provided where sampling locations with the same color-coding indicate data that were combined. Data are reported with one significant digit greater than the respective parameter criteria in order to accurately denote exceedance. For example, the TP concentration criteria for a stream in the West Central nutrient region is 0.49 mg/L. In order to ascertain the difference between an annual geometric TP concentration of 0.485 and 0.50 mg/L, data are reported to an additional decimal place beyond the standard itself.

7.1. Hillsborough River (WBID 1443A)

Hillsborough River (**Figure 174**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 2001 to June 30, 2008 verified period as part of the Group 2, Cycle 2 review. The impairment status of Hillsborough River was evaluated using NNC over the verified period used for the initial impairment. Hillsborough River is located within the West Central nutrient threshold region, therefore; the TP and TN thresholds are 0.49 and 1.65 mg/L, respectively. The results of the analysis were not consistent with the initial impairment determination and indicate that there are insufficient data to determine if the Hillsborough River was impaired for nutrients (**Table 142**). There were insufficient chlorophyll-a or SCI data to determine impairment status over the initial verified period.

In addition, Hillsborough River water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that there were insufficient data for Hillsborough River to determine if the WBID is impaired for nutrients (**Table 143**). There were insufficient chlorophyll-a or SCI data to determine impairment status over the 2003 to 2013 time period. However based upon the available data, water quality conditions appear below the criteria. There was one SCI reported from March 2012 indicating a healthy stream (SCI=74) and nutrient values have remained below the thresholds for both nitrogen and phosphorus. Additionally, the 2005 annual geometric mean for chlorophyll-a was 1.1 µg/L which is well below the 20.0 µg/L standard.

Figure 174. Location of water quality sampling sites in Hillsborough River (WBID 1443A).

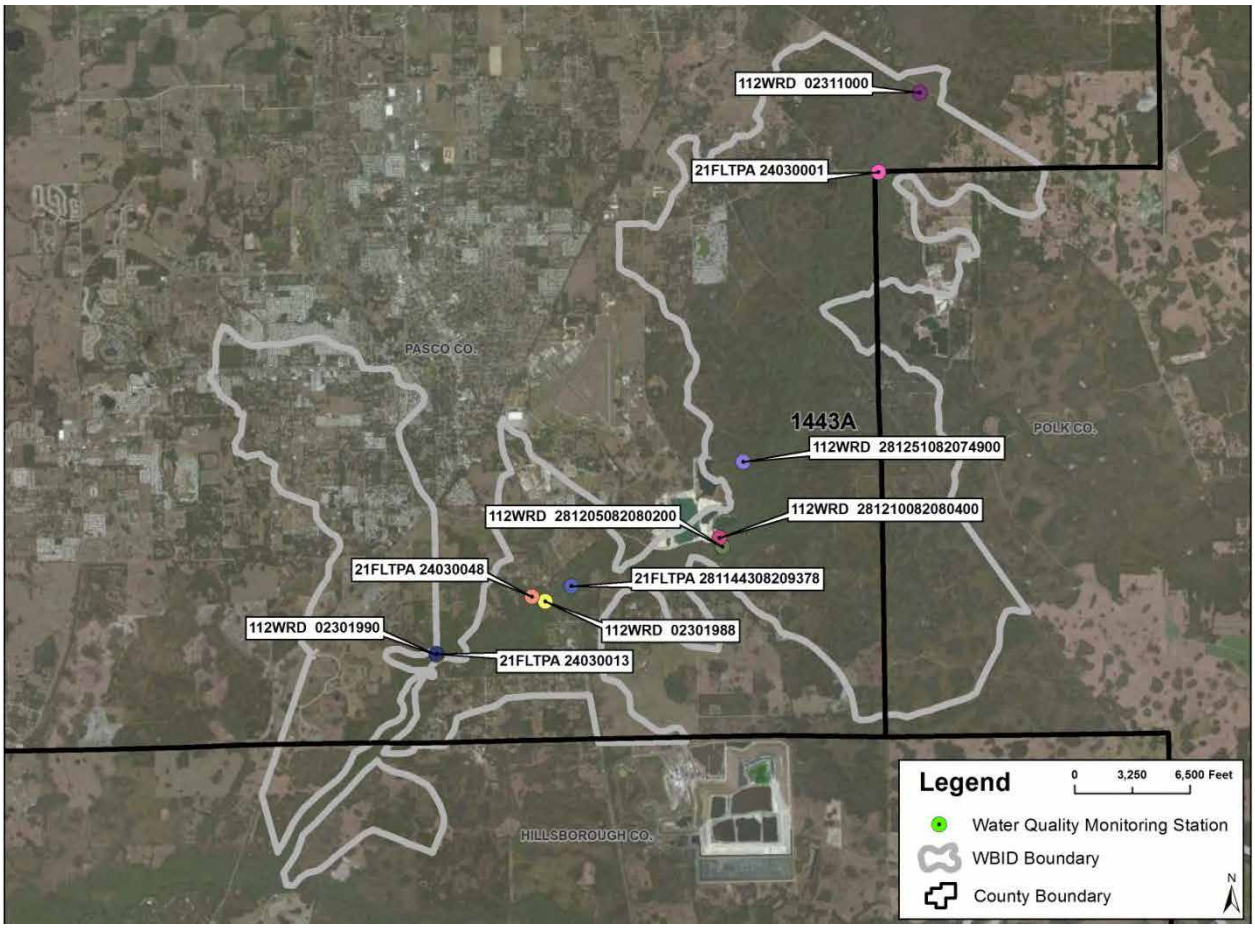


Table 142. Results of NNC evaluation for Hillsborough River (WBID 1443A) over verified period for nutrient impairment (January 1, 2001 to June 30, 2008).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1443A	HILLSBOROUGH RIVER	2001	-	1.265	0.115
1443A	HILLSBOROUGH RIVER	2002	-	1.215	0.141
1443A	HILLSBOROUGH RIVER	2003	-	1.217	0.172
1443A	HILLSBOROUGH RIVER	2004	-	1.289	0.114
1443A	HILLSBOROUGH RIVER	2005	1.1	0.856	0.112
1443A	HILLSBOROUGH RIVER	2006	-	0.945	0.057
1443A	HILLSBOROUGH RIVER	2007	-	1.216	0.065
1443A	HILLSBOROUGH RIVER	2008	-	1.300	0.153
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 143. Results of NNC evaluation for Hillsborough River (WBID 1443A) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1443A	HILLSBOROUGH RIVER	2003	-	1.217	0.172
1443A	HILLSBOROUGH RIVER	2004	-	1.289	0.114
1443A	HILLSBOROUGH RIVER	2005	1.1	0.856	0.112
1443A	HILLSBOROUGH RIVER	2006	-	0.945	0.057
1443A	HILLSBOROUGH RIVER	2007	-	1.216	0.065
1443A	HILLSBOROUGH RIVER	2008	-	1.415	0.141
1443A	HILLSBOROUGH RIVER	2009	-	1.381	0.137
1443A	HILLSBOROUGH RIVER	2010	-	1.339	0.158
1443A	HILLSBOROUGH RIVER	2011	-	-	-
1443A	HILLSBOROUGH RIVER	2012	-	-	-
1443A	HILLSBOROUGH RIVER	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.2. Lake Marion Creek (WBID 1472A1)

Lake Marion Creek (**Figure 175**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 2003 to June 30, 2010 verified period as part of the Group 4, Cycle 2 review. The impairment status of Lake Marion Creek was evaluated using NNC over the verified period used for the initial impairment. Lake Marion Creek is located within the Peninsula nutrient threshold region, therefore; the TP and TN thresholds are 0.12 and 1.54 mg/L, respectively. The results of the analysis support the initial impairment determination and indicate that Lake Marion Creek was impaired for elevated chlorophyll-a concentrations over the verified period (**Table 144**).

In addition, Lake Marion Creek water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that Lake Marion Creek continues to be impaired for elevated chlorophyll-a concentrations (**Table 145**).

Figure 175. Location of water quality sampling sites in Lake Marion Creek (WBID 1472A1).

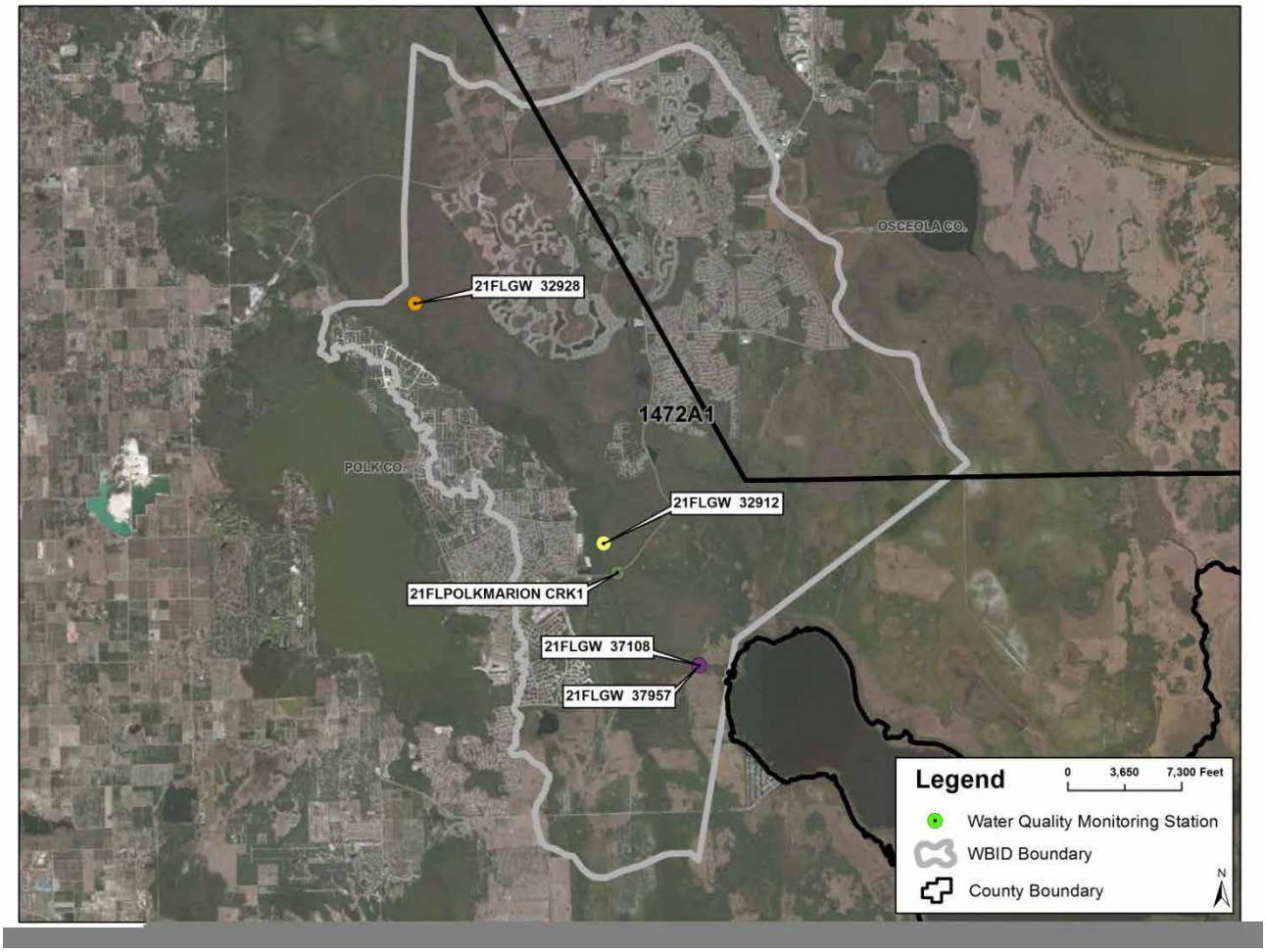


Table 144. Results of NNC evaluation for Lake Marion Creek (WBID 1472A1) over verified period for nutrient impairment (January 1, 2003 to June 30, 2010).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1472A1	LAKE MARION CREEK	2003	-	-	-
1472A1	LAKE MARION CREEK	2004	-	-	-
1472A1	LAKE MARION CREEK	2005	4.4	1.167	-
1472A1	LAKE MARION CREEK	2006	**27.7**	**2.053**	-
1472A1	LAKE MARION CREEK	2007	**26.5**	**2.182**	0.079
1472A1	LAKE MARION CREEK	2008	-	**2.167**	0.071
1472A1	LAKE MARION CREEK	2009	-	**2.232**	0.084
1472A1	LAKE MARION CREEK	2010	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 145. Results of NNC evaluation for Lake Marion Creek (WBID 1472A1) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1472A1	LAKE MARION CREEK	2003	-	-	-
1472A1	LAKE MARION CREEK	2004	-	-	-
1472A1	LAKE MARION CREEK	2005	4.4	1.167	-
1472A1	LAKE MARION CREEK	2006	**27.7**	**2.053**	-
1472A1	LAKE MARION CREEK	2007	**26.5**	**2.182**	0.079
1472A1	LAKE MARION CREEK	2008	-	**2.167**	0.071
1472A1	LAKE MARION CREEK	2009	-	**2.232**	0.084
1472A1	LAKE MARION CREEK	2010	-	**1.675**	-
1472A1	LAKE MARION CREEK	2011	15.3	**1.987**	0.059
1472A1	LAKE MARION CREEK	2012	-	-	-
1472A1	LAKE MARION CREEK	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.3. Bald Eagle Creek (WBID 1483)

Bald Eagle Creek (**Figure 176**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 2001 to June 30, 2008 verified period as part of the Group 2, Cycle 2 review. The impairment status of Bald Eagle Creek was evaluated using NNC over the verified period used for the initial impairment. Bald Eagle Creek is located within the West Central nutrient threshold region, therefore; the TP and TN thresholds are 0.49 and 1.65 mg/L, respectively. The results of the analysis were not consistent with the initial impairment determination and indicate that there are insufficient data to determine if the Bald Eagle Creek was impaired for nutrients (**Table 146**). There were insufficient chlorophyll-a or nutrient and SCI data to determine impairment status over the initial verified period.

In addition, Bald Eagle Creek water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that there were insufficient data for Bald Eagle Creek to determine if the WBID is impaired for nutrients (**Table 147**). There were insufficient chlorophyll-a or nutrient and SCI data to determine impairment status over the 2003 to 2013 time period. Based upon the limited data available from 2005, chlorophyll-a concentrations (16.28 µg/L) are within the range requiring additional data and nutrient concentrations are elevated above the threshold for both nitrogen and phosphorus.

Figure 176. Location of water quality sampling sites in Bald Eagle Creek (WBID 1483).

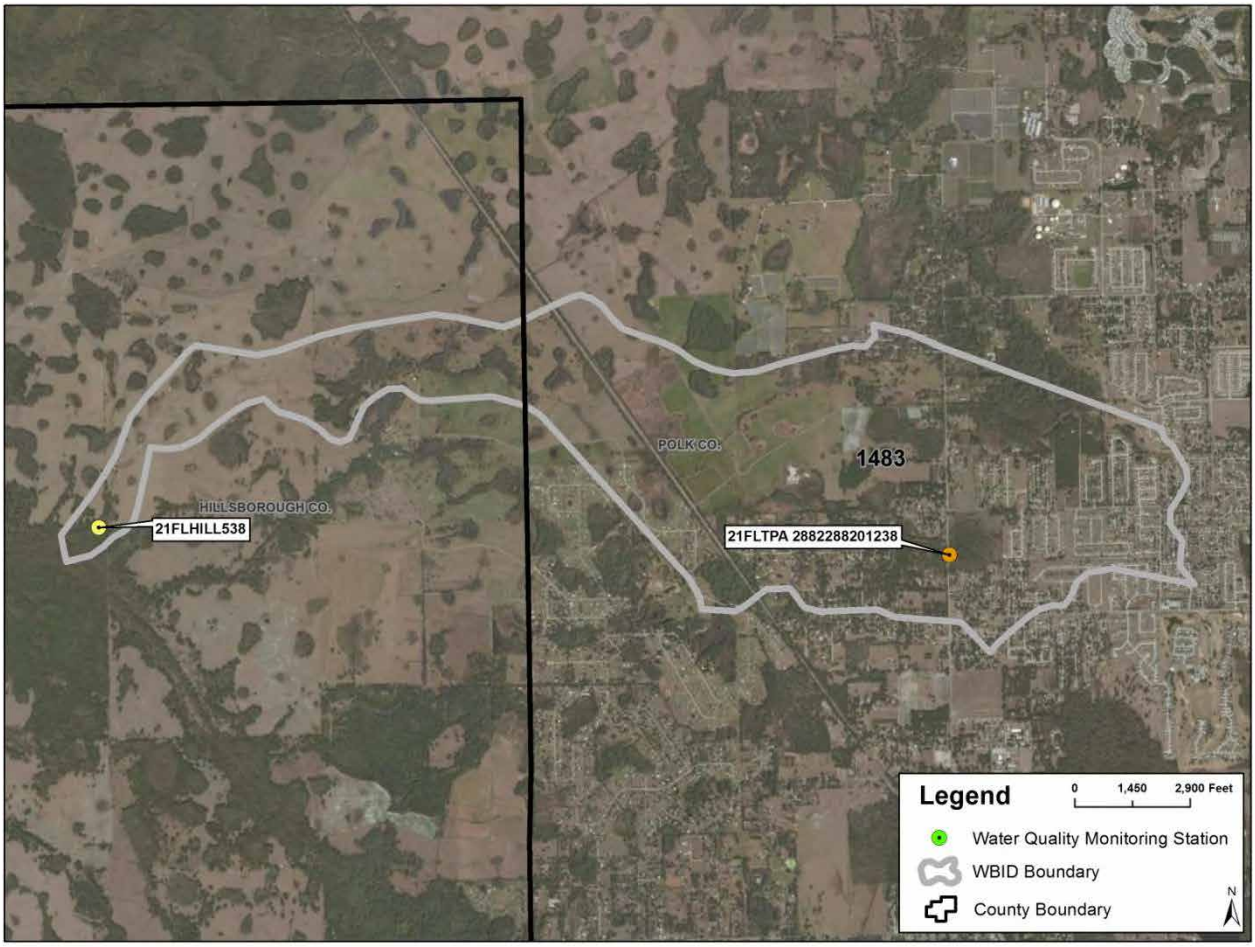


Table 146. Results of NNC evaluation for Bald Eagle Creek (WBID 1483) over verified period for nutrient impairment (January 1, 2001 to June 30, 2008).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1483	BALD EAGLE CREEK	2001	-	-	-
1483	BALD EAGLE CREEK	2002	-	-	-
1483	BALD EAGLE CREEK	2003	-	-	-
1483	BALD EAGLE CREEK	2004	-	-	-
1483	BALD EAGLE CREEK	2005	16.3	**2.512**	**1.128**
1483	BALD EAGLE CREEK	2006	-	-	-
1483	BALD EAGLE CREEK	2007	-	-	-
1483	BALD EAGLE CREEK	2008	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 147. Results of NNC evaluation for Bald Eagle Creek (WBID 1483) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1483	BALD EAGLE CREEK	2003	-	-	-
1483	BALD EAGLE CREEK	2004	-	-	-
1483	BALD EAGLE CREEK	2005	16.3	**2.512**	**1.128**
1483	BALD EAGLE CREEK	2006	-	-	-
1483	BALD EAGLE CREEK	2007	-	-	-
1483	BALD EAGLE CREEK	2008	-	-	-
1483	BALD EAGLE CREEK	2009	-	-	-
1483	BALD EAGLE CREEK	2010	-	-	-
1483	BALD EAGLE CREEK	2011	-	-	-
1483	BALD EAGLE CREEK	2012	-	-	-
1483	BALD EAGLE CREEK	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.4. Itchepackesassa Creek (WBID 1495B)

Itchepackesassa Creek (**Figure 177**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 2001 to June 30, 2008 verified period as part of the Group 2, Cycle 2 review. The impairment status of Itchepackesassa Creek was evaluated using NNC over the verified period used for the initial impairment. Itchepackesassa Creek is located within the West Central nutrient threshold region, therefore; the TP and TN thresholds are 0.49 and 1.65 mg/L, respectively. The results of the analysis were not consistent with the initial impairment determination and indicate that there are insufficient data to determine if the Itchepackesassa Creek was impaired for nutrients (**Table 148**). There were insufficient SCI data to determine impairment status over the initial verified period.

In addition, Itchepackesassa Creek water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that Itchepackesassa Creek is not impaired for nutrients over the 2003 to 2013 time period (**Table 149**). While the TN and TP exceeded the nutrient threshold criteria in more than one year within a three year consecutive time period, results from two independently performed SCI surveys averaged 84 passing the faunal metric review.

Figure 177. Location of water quality sampling sites in Itchepackesassa Creek (WBID 1495B).

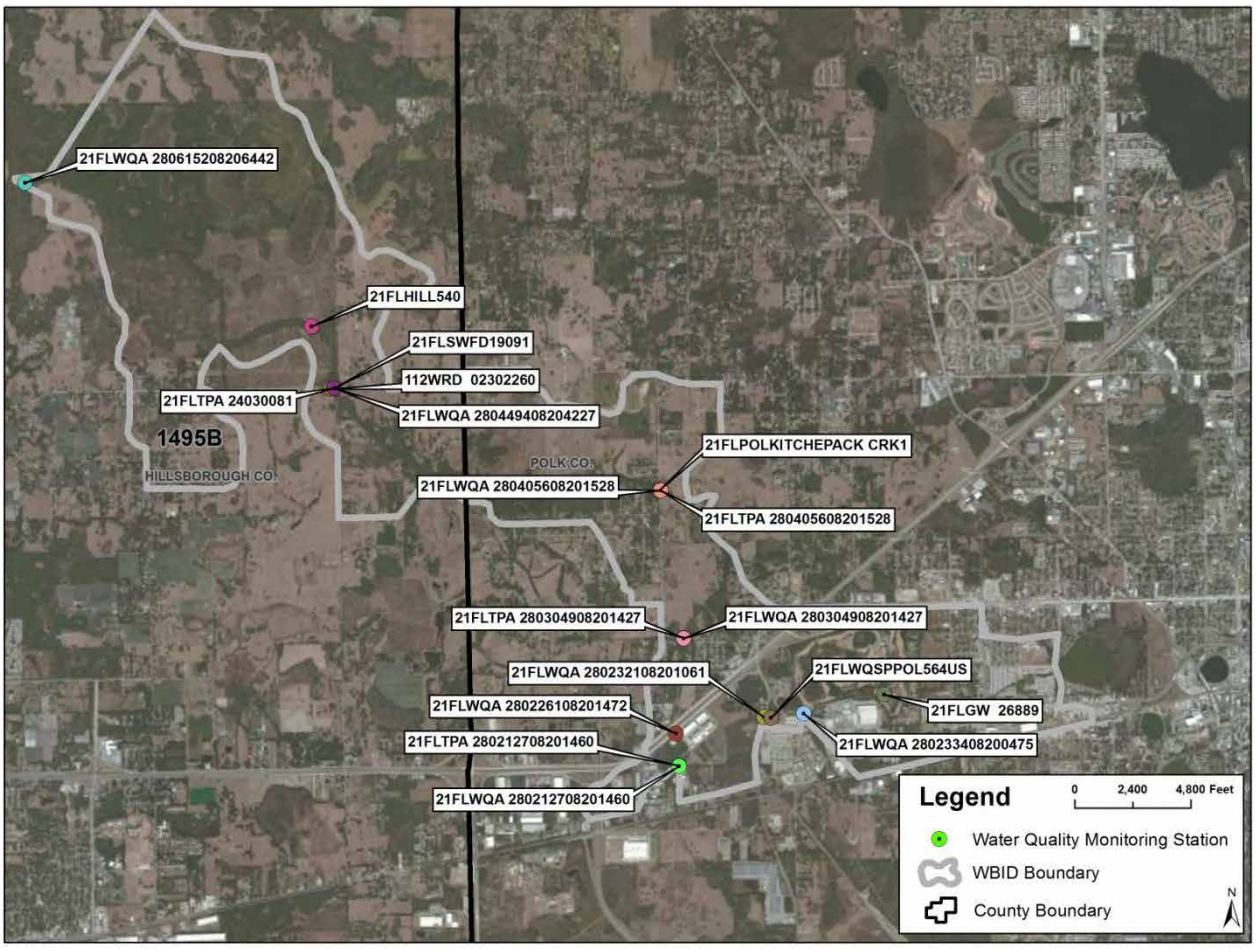


Table 148. Results of NNC evaluation for Itchepackesassa Creek (WBID 1495B) over verified period for nutrient impairment (January 1, 2001 to June 30, 2008).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1495B	ITCHEPACKESASSA CREEK	2001	-	**1.761**	**0.527**
1495B	ITCHEPACKESASSA CREEK	2002	2.8	**1.695**	**0.607**
1495B	ITCHEPACKESASSA CREEK	2003	7.2	**1.676**	**0.573**
1495B	ITCHEPACKESASSA CREEK	2004	7.3	**1.727**	**0.602**
1495B	ITCHEPACKESASSA CREEK	2005	8.8	1.631	**0.528**
1495B	ITCHEPACKESASSA CREEK	2006	2.5	1.267	**0.517**
1495B	ITCHEPACKESASSA CREEK	2007	2.6	1.224	**0.589**
1495B	ITCHEPACKESASSA CREEK	2008	2.6	1.165	**0.580**
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 149. Results of NNC evaluation for Itchepackesassa Creek (WBID 1495B) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1495B	ITCHEPACKESASSA CREEK	2003	7.2	**1.676**	**0.573**
1495B	ITCHEPACKESASSA CREEK	2004	7.3	**1.727**	**0.602**
1495B	ITCHEPACKESASSA CREEK	2005	8.8	1.631	**0.528**
1495B	ITCHEPACKESASSA CREEK	2006	2.5	1.267	**0.517**
1495B	ITCHEPACKESASSA CREEK	2007	2.6	1.224	**0.589**
1495B	ITCHEPACKESASSA CREEK	2008	3.1	1.142	**0.552**
1495B	ITCHEPACKESASSA CREEK	2009	3.9	1.293	**0.515**
1495B	ITCHEPACKESASSA CREEK	2010	2.7	1.100	0.471
1495B	ITCHEPACKESASSA CREEK	2011	3.2	1.145	0.472
1495B	ITCHEPACKESASSA CREEK	2012	-	-	-
1495B	ITCHEPACKESASSA CREEK	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.5. Saddle Creek (WBID 1497)

Saddle Creek (**Figure 178**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Saddle Creek was evaluated using NNC over the verified period used for the initial impairment. Saddle Creek is located within the West Central nutrient threshold region, therefore; the TP and TN thresholds are 0.49 and 1.65 mg/L, respectively. The results of the analysis were not consistent with the initial impairment determination and indicate that there are insufficient data to determine if the Saddle Creek was impaired for nutrients (**Table 150**). There were insufficient SCI data to determine impairment status over the initial verified period.

In addition, Saddle Creek water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that there were insufficient data for Saddle Creek to determine if the WBID is impaired for nutrients (**Table 151**). There were insufficient SCI data to determine impairment status over the 2003 to 2013 time period. While two independent SCI scores were available (17 and 59), the difference was greater than 20 points therefore, a third evaluation is required to determine the impairment status coupled with exceeding the nutrient thresholds.

Figure 178. Location of water quality sampling sites in Saddle Creek (WBID 1497).

Table 150. Results of NNC evaluation for Saddle Creek (WBID 1497) over verified period for nutrient impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1497	SADDLE CREEK	2002			
1497	SADDLE CREEK	2003	4.3	1.387	**0.547**
1497	SADDLE CREEK	2004	-	-	-
1497	SADDLE CREEK	2005	6.3	1.278	**0.555**
1497	SADDLE CREEK	2006	-	-	-
1497	SADDLE CREEK	2007	-	-	-
1497	SADDLE CREEK	2008	-	-	-
1497	SADDLE CREEK	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 151. Results of NNC evaluation for Saddle Creek (WBID 1497) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1497	SADDLE CREEK	2003	4.3	1.387	**0.547**
1497	SADDLE CREEK	2004	-	-	-
1497	SADDLE CREEK	2005	6.3	1.278	**0.555**
1497	SADDLE CREEK	2006	-	-	-
1497	SADDLE CREEK	2007	-	-	-
1497	SADDLE CREEK	2008	-	-	-
1497	SADDLE CREEK	2009	-	-	-
1497	SADDLE CREEK	2010	-	-	-
1497	SADDLE CREEK	2011	-	-	-
1497	SADDLE CREEK	2012	-	-	-
1497	SADDLE CREEK	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.6. Lake Lena Run (WBID 1501A)

Lake Lena Run (**Figure 179**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. In Lake Lena Run, sampling station 21FLTPA 28030168148592 appears to be located outside of the WBID boundary but the station descriptor and WBID designation indicate it is within Lake Lena Run. The station was not removed from analysis. It is recommended that the station coordinates and description be further validated by the respective sampling entity in order to confirm the station location.

An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Lake Lena Run. The impairment status of Lake Lena Run was evaluated using NNC over the verified period used for the initial impairment. Lake Lena Run is located within the West Central nutrient threshold region, therefore; the TP and TN thresholds are 0.49 and 1.65 mg/L, respectively. The results of the analysis were not consistent with the initial impairment determination and indicate that there are insufficient data to determine if the Lake Lena Run was impaired for nutrients (**Table 152**). There were insufficient SCI data to determine impairment status over the initial verified period.

In addition, Lake Lena Run water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that there were insufficient data for Lake Lena Run to determine if the WBID is impaired for nutrients (**Table 153**). There were insufficient SCI data to determine impairment status over the 2003 to 2013 time period. However based upon the available data, water quality conditions appear below the criteria. Overall, nutrient values have remained below the thresholds for both nitrogen and phosphorus. Additionally, chlorophyll-a concentrations have been consistently below the 20.0 µg/L standard. There were not SCI data available for review.

Figure 179. Location of water quality sampling sites in Lake Lena Run (WBID 1501A).

Table 152. Results of NNC evaluation for Lake Lena Run (WBID 1501A) over verified period for nutrient impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1501A	LAKE LENA RUN	1997	-	1.452	0.287
1501A	LAKE LENA RUN	1998	-	1.529	0.216
1501A	LAKE LENA RUN	1999	3.5	1.148	0.237
1501A	LAKE LENA RUN	2000	4.3	**1.906**	0.226
1501A	LAKE LENA RUN	2001	2.9	**1.719**	0.160
1501A	LAKE LENA RUN	2002	-	**1.663**	0.472
1501A	LAKE LENA RUN	2003	2.0	1.626	**1.067**
1501A	LAKE LENA RUN	2004	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 153. Results of NNC evaluation for Lake Lena Run (WBID 1501A) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1501A	LAKE LENA RUN	2003	2.0	1.626	**1.067**
1501A	LAKE LENA RUN	2004	-	-	-
1501A	LAKE LENA RUN	2005	2.6	**1.726**	0.350
1501A	LAKE LENA RUN	2006	6.2	1.285	-
1501A	LAKE LENA RUN	2007	4.9	1.158	0.181
1501A	LAKE LENA RUN	2008	4.6	1.366	0.224
1501A	LAKE LENA RUN	2009	-	-	-
1501A	LAKE LENA RUN	2010	-	-	-
1501A	LAKE LENA RUN	2011	-	-	-
1501A	LAKE LENA RUN	2012	-	-	-
1501A	LAKE LENA RUN	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.7. Lake Lulu Run (WBID 1521C)

Lake Lulu Run (**Figure 180**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. In Lake Lulu Run, sampling station 21POLKLULURUN appears to be located in Lake Lulu but the station descriptor and WBID designation indicate it is within Lake Lulu Run. The station was not removed from analysis. It is recommended that the station coordinates and description be further validated by the respective sampling entity in order to confirm the station location.

The impairment status of Lake Lulu Run was evaluated using NNC over the verified period used for the initial impairment. Lake Lulu Run is located within the West Central nutrient threshold region, therefore; the TP and TN thresholds are 0.49 and 1.65 mg/L, respectively. The results of the analysis were not consistent with the initial impairment determination and indicate that there are insufficient data to determine if the Lake Lulu Run was impaired for nutrients (**Table 154**). There were insufficient chlorophyll-a or SCI and nutrient data to determine impairment status over the initial verified period.

In addition, Lake Lulu Run water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that there were insufficient data for Lake Lulu Run to determine if the WBID is impaired for nutrients (**Table 155**). There were insufficient chlorophyll-a or nutrient and SCI data to determine impairment status over the 2003 to 2013 time period. However based upon the available data, the most recent data (2008) are elevated for both chlorophyll-a and TN concentrations. There were no SCI data available for review.

Figure 180. Location of water quality sampling sites in Lake Lulu Run (WBID 1521C).

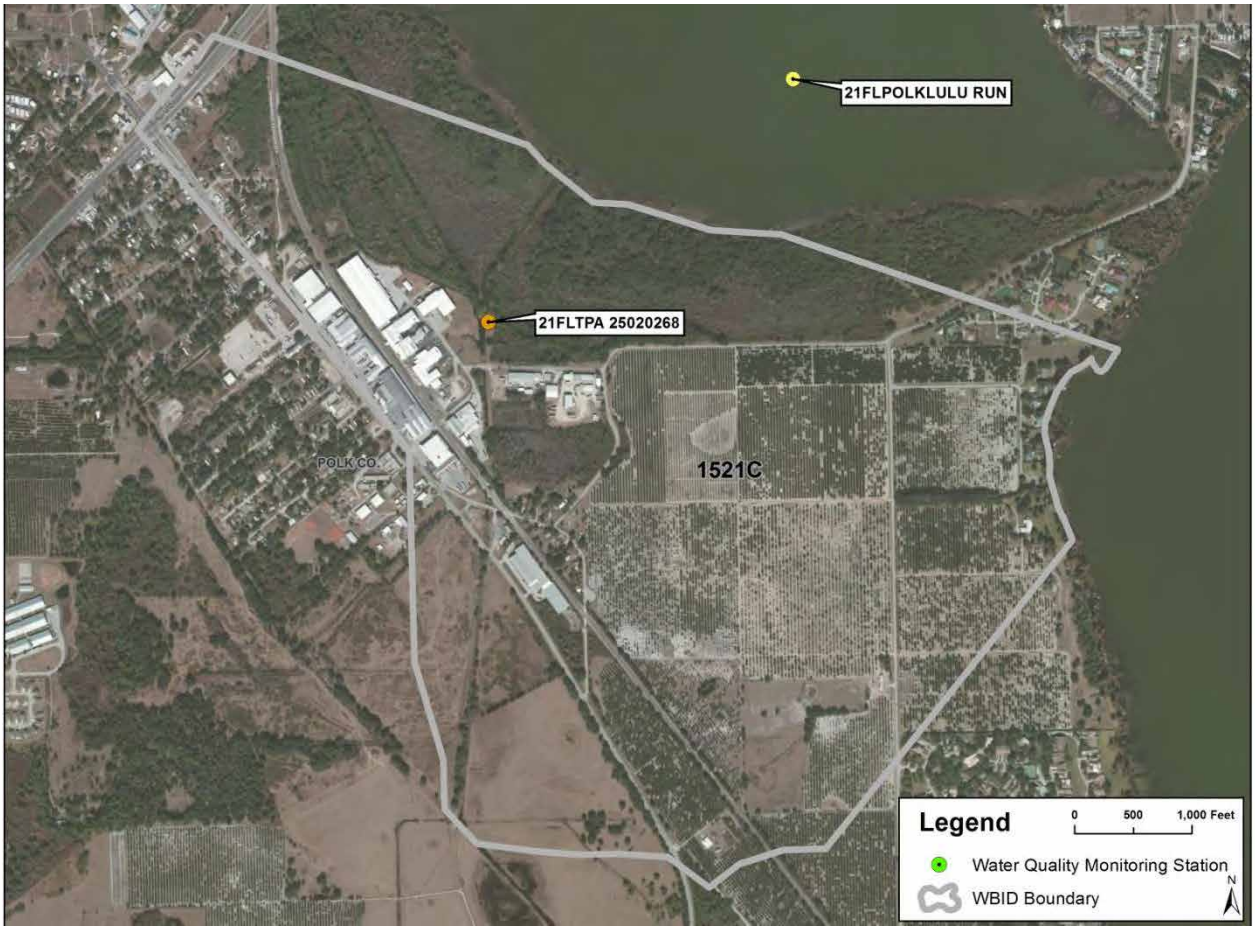


Table 154. Results of NNC evaluation for Lake Lulu Run (WBID 1521C) over verified period for nutrient impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521C	LAKE LULU RUN	2002	-	-	-
1521C	LAKE LULU RUN	2003	-	1.608	0.102
1521C	LAKE LULU RUN	2004	-	-	-
1521C	LAKE LULU RUN	2005	15.7	1.340	-
1521C	LAKE LULU RUN	2006	-	-	-
1521C	LAKE LULU RUN	2007	-	-	-
1521C	LAKE LULU RUN	2008	**23.1**	**1.807**	0.193
1521C	LAKE LULU RUN	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 155. Results of NNC evaluation for Lake Lulu Run (WBID 1521C) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1521C	LAKE LULU RUN	2003	-	1.608	0.102
1521C	LAKE LULU RUN	2004	-	-	-
1521C	LAKE LULU RUN	2005	15.7	1.340	-
1521C	LAKE LULU RUN	2006	-	-	-
1521C	LAKE LULU RUN	2007	-	-	-
1521C	LAKE LULU RUN	2008	**23.1**	**1.807**	0.193
1521C	LAKE LULU RUN	2009	-	-	-
1521C	LAKE LULU RUN	2010	-	-	-
1521C	LAKE LULU RUN	2011	-	-	-
1521C	LAKE LULU RUN	2012	-	-	-
1521C	LAKE LULU RUN	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.8. Peace Creek Drainage Canal (WBID 1539)

Peace Creek Drainage Canal (**Figure 181**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. The impairment status of Peace Creek Drainage Canal was evaluated using NNC over the verified period used for the initial impairment. Peace Creek Drainage Canal is located within the West Central nutrient threshold region, therefore; the TP and TN thresholds are 0.49 and 1.65 mg/L, respectively. The results of the analysis were not consistent with the initial impairment determination and indicate that there are insufficient data to determine if the Peace Creek Drainage Canal was impaired for nutrients (**Table 156**). There were insufficient SCI data to determine impairment status over the initial verified period.

In addition, Peace Creek Drainage Canal water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that there were insufficient data for Peace Creek Drainage Canal to determine if the WBID is impaired for nutrients (**Table 157**). There were insufficient SCI data to determine impairment status over the 2003 to 2013 time period. Two SCI surveys were completed; however, they are not temporally independent both occurring in November 2009 (28 and 34, respectively). However, both surveys failed the faunal evaluation. Chlorophyll-a concentrations have been consistently below the 20.0 µg/L standard.

Figure 181. Location of water quality sampling sites in Peace Creek Drainage Canal (WBID 1539).

Table 156. Results of NNC evaluation for Peace Creek Drainage Canal (WBID 1539) over verified period for nutrient impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1539	PEACE CREEK DRAINAGE CANAL	2002	6.9	**1.966**	0.351
1539	PEACE CREEK DRAINAGE CANAL	2003	2.6	**1.792**	0.177
1539	PEACE CREEK DRAINAGE CANAL	2004	4.7	**1.990**	0.337
1539	PEACE CREEK DRAINAGE CANAL	2005	8.1	**1.894**	0.198
1539	PEACE CREEK DRAINAGE CANAL	2006	3.9	**1.763**	**0.617**
1539	PEACE CREEK DRAINAGE CANAL	2007	4.4	1.577	**0.718**
1539	PEACE CREEK DRAINAGE CANAL	2008	5.4	**1.774**	0.387
1539	PEACE CREEK DRAINAGE CANAL	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 157. Results of NNC evaluation for Peace Creek Drainage Canal (WBID 1539) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1539	PEACE CREEK DRAINAGE CANAL	2003	2.6	**1.792**	0.177
1539	PEACE CREEK DRAINAGE CANAL	2004	4.7	**1.990**	0.337
1539	PEACE CREEK DRAINAGE CANAL	2005	8.1	**1.894**	0.198
1539	PEACE CREEK DRAINAGE CANAL	2006	3.9	**1.763**	**0.617**
1539	PEACE CREEK DRAINAGE CANAL	2007	4.4	1.577	**0.718**
1539	PEACE CREEK DRAINAGE CANAL	2008	5.4	**1.774**	0.387
1539	PEACE CREEK DRAINAGE CANAL	2009	-	**2.158**	0.242
1539	PEACE CREEK DRAINAGE CANAL	2010	3.4	1.514	0.181
1539	PEACE CREEK DRAINAGE CANAL	2011	4.5	1.577	0.162
1539	PEACE CREEK DRAINAGE CANAL	2012	2.8	1.411	0.127
1539	PEACE CREEK DRAINAGE CANAL	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.9. Lake Hunter Outlet (WBID 1543A)

Lake Hunter Outlet (**Figure 182**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 2001 to June 30, 2008 verified period as part of the Group 2, Cycle 2 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Lake Hunter Outlet. The impairment status of Lake Hunter Outlet was evaluated using NNC over the verified period used for the initial impairment. Lake Hunter Outlet is located within the West Central nutrient threshold region, therefore; the TP and TN thresholds are 0.49 and 1.65 mg/L, respectively. The results of the analysis were not consistent with the initial impairment determination and indicate that there are insufficient data to determine if the Lake Hunter Outlet was impaired for nutrients (**Table 158**). There were insufficient chlorophyll-a or nutrient and SCI data to determine impairment status over the initial verified period.

In addition, Lake Hunter Outlet water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that there were insufficient data for Lake Hunter Outlet to determine if the WBID is impaired for nutrients (**Table 159**). There were insufficient chlorophyll-a or nutrient and SCI data to determine impairment status over the 2003 to 2013 time period.

Figure 182. Location of water quality sampling sites in Lake Hunter Outlet (WBID 1543A).

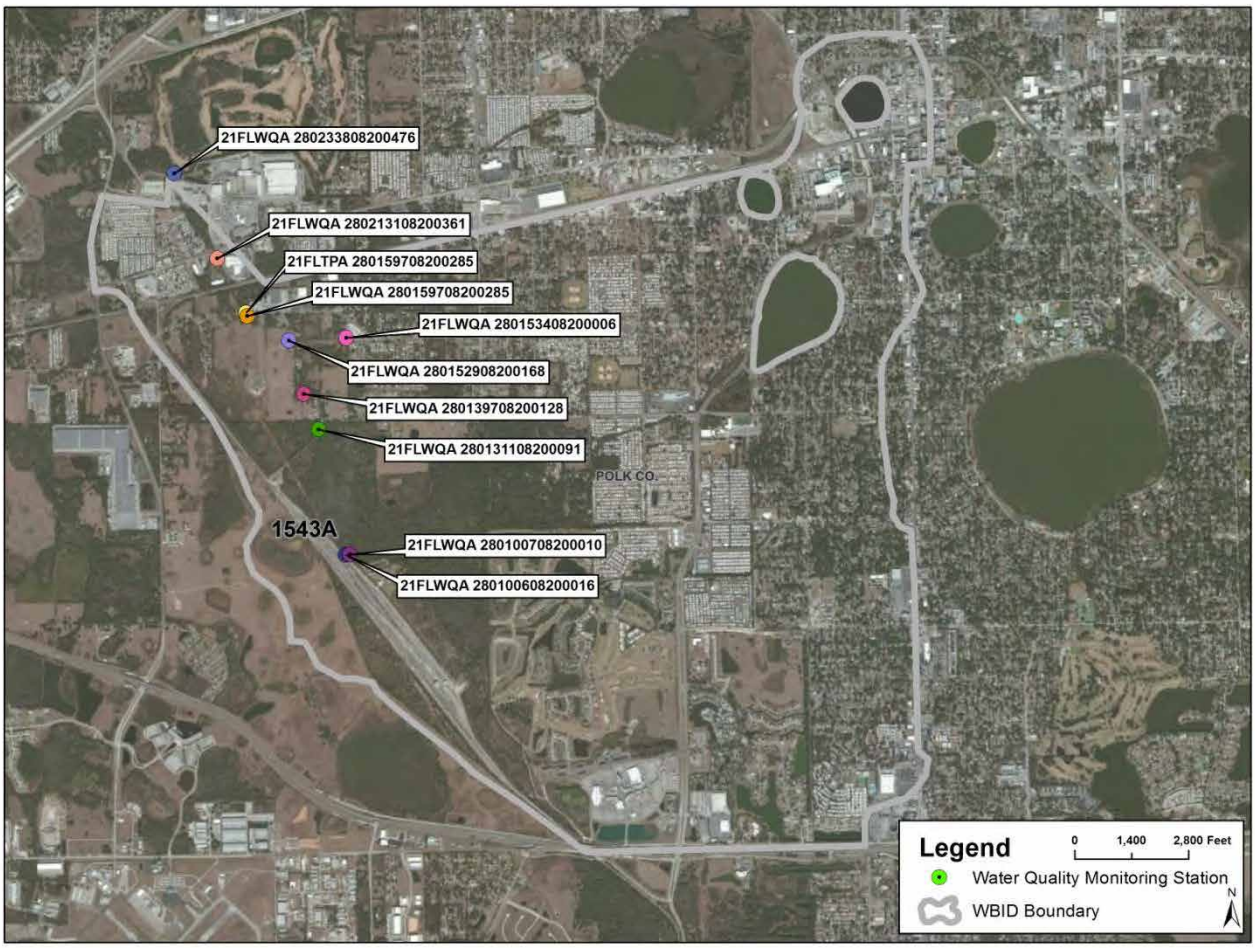


Table 158. Results of NNC evaluation for Lake Hunter Outlet (WBID 1543A) over verified period for nutrient impairment (January 1, 2001 to June 30, 2008).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1543A	LAKE HUNTER OUTLET	2001	-	-	-
1543A	LAKE HUNTER OUTLET	2002	-	-	-
1543A	LAKE HUNTER OUTLET	2003	-	-	-
1543A	LAKE HUNTER OUTLET	2004	-	-	-
1543A	LAKE HUNTER OUTLET	2005	-	-	-
1543A	LAKE HUNTER OUTLET	2006	-	-	-
1543A	LAKE HUNTER OUTLET	2007	-	-	-
1543A	LAKE HUNTER OUTLET	2008	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 159. Results of NNC evaluation for Lake Hunter Outlet (WBID 1543A) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1543A	LAKE HUNTER OUTLET	2003	-	-	-
1543A	LAKE HUNTER OUTLET	2004	-	-	-
1543A	LAKE HUNTER OUTLET	2005	-	-	-
1543A	LAKE HUNTER OUTLET	2006	-	-	-
1543A	LAKE HUNTER OUTLET	2007	-	-	-
1543A	LAKE HUNTER OUTLET	2008	-	-	-
1543A	LAKE HUNTER OUTLET	2009	-	-	-
1543A	LAKE HUNTER OUTLET	2010	-	-	-
1543A	LAKE HUNTER OUTLET	2011	-	-	-
1543A	LAKE HUNTER OUTLET	2012	-	-	-
1543A	LAKE HUNTER OUTLET	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.10. Banana Lake Canal (WBID 1549A)

Banana Lake Canal (**Figure 183**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. Banana Lake Canal was also deemed impaired for Historic chlorophyll-a over the period of January 1, 2002 to June 30, 2009. The impairment status of Banana Lake Canal was evaluated using NNC over the verified period used for the initial impairment. Banana Lake Canal is located within the West Central nutrient threshold region, therefore; the TP and TN thresholds are 0.49 and 1.65 mg/L, respectively. The results of the analysis support the initial impairment determination and indicate that Banana Lake Canal was impaired for elevated chlorophyll-a concentrations over the verified period (**Table 160**).

In addition, Banana Lake Canal water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that Banana Lake Canal continues to be impaired for elevated chlorophyll-a concentrations (**Table 161**). Only one SCI survey was performed (November 2007) at which time Banana Lake Canal failed the faunal evaluation (score=23).

Figure 183. Location of water quality sampling sites in Banana Lake Canal (WBID 1549A).

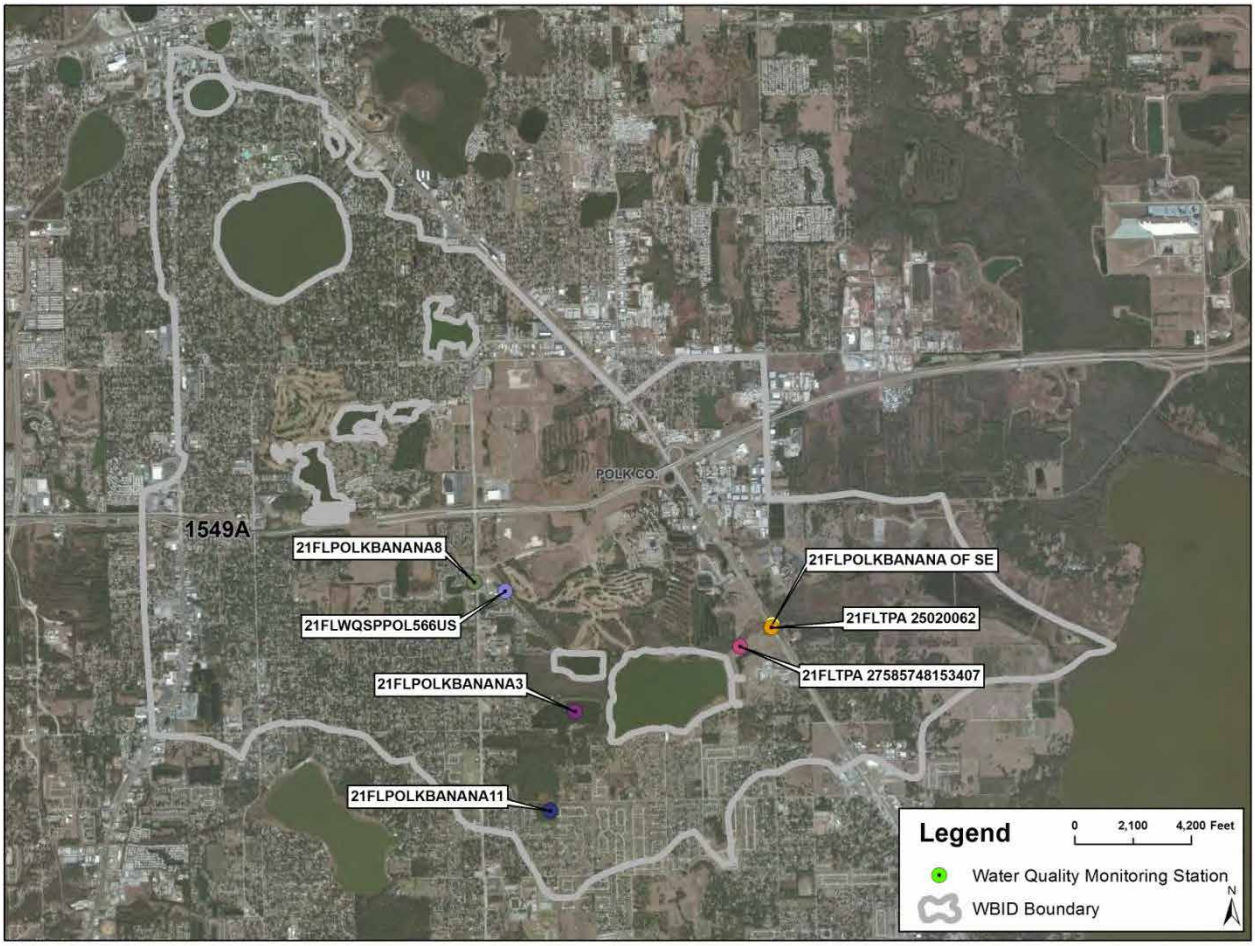


Table 160. Results of NNC evaluation for Banana Lake Canal (WBID 1549A) over verified period for nutrient impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1549A	BANANA LAKE CANAL	1997	-	**1.811**	0.391
1549A	BANANA LAKE CANAL	1998	-	**1.734**	0.409
1549A	BANANA LAKE CANAL	1999	**34.1**	**1.721**	0.164
1549A	BANANA LAKE CANAL	2000	-	-	-
1549A	BANANA LAKE CANAL	2001	-	-	-
1549A	BANANA LAKE CANAL	2002	-	-	-
1549A	BANANA LAKE CANAL	2003	**70.8**	**2.258**	**0.601**
1549A	BANANA LAKE CANAL	2004	**103.2**	**2.103**	0.432
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 161. Results of NNC evaluation for Banana Lake Canal (WBID 1549A) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1549A	BANANA LAKE CANAL	2003	**70.8**	**2.258**	**0.601**
1549A	BANANA LAKE CANAL	2004	**103.2**	**2.103**	0.432
1549A	BANANA LAKE CANAL	2005	**35.2**	**1.718**	0.396
1549A	BANANA LAKE CANAL	2006	-	**2.611**	0.410
1549A	BANANA LAKE CANAL	2007	**30.6**	1.315	0.212
1549A	BANANA LAKE CANAL	2008	**46.7**	-	0.329
1549A	BANANA LAKE CANAL	2009	**57.6**	**2.379**	0.185
1549A	BANANA LAKE CANAL	2010	-	-	-
1549A	BANANA LAKE CANAL	2011	**37.1**	**1.738**	0.079
1549A	BANANA LAKE CANAL	2012	-	-	-
1549A	BANANA LAKE CANAL	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.11. Wahneta Farms Drainage Canal (WBID 1580)

Wahneta Farms Drainage Canal (**Figure 184**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 2002 to June 30, 2009 verified period as part of the Group 3, Cycle 2 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Wahneta Farms Drainage Canal. The impairment status of Wahneta Farms Drainage Canal was evaluated using NNC over the verified period used for the initial impairment. Wahneta Farms Drainage Canal is located within the West Central nutrient threshold region, therefore; the TP and TN thresholds are 0.49 and 1.65 mg/L, respectively. The results of the analysis were not consistent with the initial impairment determination and indicate that there are insufficient data to determine if the Wahneta Farms Drainage Canal was impaired for nutrients (**Table 162**). There were insufficient SCI data to determine impairment status over the initial verified period. However, neither chlorophyll-a nor nutrient concentrations exceeded the criteria for impairment.

In addition, Wahneta Farms Drainage Canal water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that there were insufficient data for Wahneta Farms Drainage Canal to determine if the WBID is impaired for nutrients (**Table 163**). There were insufficient SCI data to determine impairment status over the 2003 to 2013 time period. However based upon the available data, water quality conditions appear below the criteria. Nutrient values have remained below the thresholds for both nitrogen and phosphorus. Additionally, the annual geometric mean for chlorophyll-a has remained below the 20.0 µg/L standard. There was one SCI reported from January 2008 indicating a poor stream (SCI=33).

Figure 184. Location of water quality sampling sites in Wahneta Farms Drainage Canal (WBID 1580).

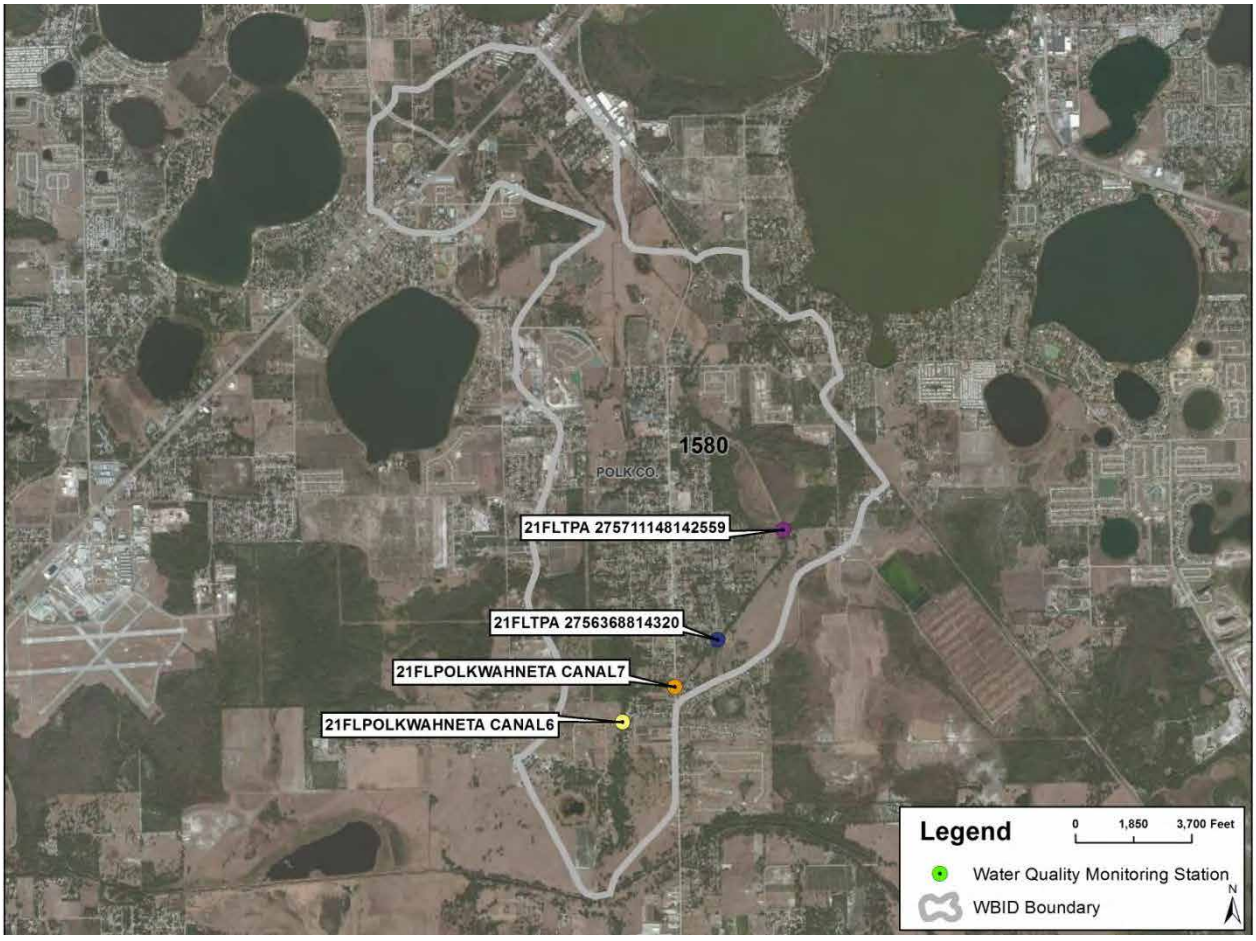


Table 162. Results of NNC evaluation for Wahneta Farms Drainage Canal (WBID 1580) over verified period for nutrient impairment (January 1, 2002 to June 30, 2009).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1580	WAHNETA FARMS DRAINAGE CANAL	2002	2.6	1.308	0.122
1580	WAHNETA FARMS DRAINAGE CANAL	2003	6.3	1.631	0.089
1580	WAHNETA FARMS DRAINAGE CANAL	2004	4.9	1.320	0.096
1580	WAHNETA FARMS DRAINAGE CANAL	2005	2.9	1.391	0.097
1580	WAHNETA FARMS DRAINAGE CANAL	2006	5.2	1.096	0.117
1580	WAHNETA FARMS DRAINAGE CANAL	2007	3.9	0.853	0.067
1580	WAHNETA FARMS DRAINAGE CANAL	2008	3.4	1.011	0.074
1580	WAHNETA FARMS DRAINAGE CANAL	2009	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 163. Results of NNC evaluation for Wahneta Farms Drainage Canal (WBID 1580) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1580	WAHNETA FARMS DRAINAGE CANAL	2003	6.3	1.631	0.089
1580	WAHNETA FARMS DRAINAGE CANAL	2004	4.9	1.320	0.096
1580	WAHNETA FARMS DRAINAGE CANAL	2005	2.9	1.391	0.097
1580	WAHNETA FARMS DRAINAGE CANAL	2006	5.2	1.096	0.117
1580	WAHNETA FARMS DRAINAGE CANAL	2007	3.9	0.853	0.067
1580	WAHNETA FARMS DRAINAGE CANAL	2008	3.4	1.011	0.074
1580	WAHNETA FARMS DRAINAGE CANAL	2009	3.0	1.075	0.065
1580	WAHNETA FARMS DRAINAGE CANAL	2010	-	-	-
1580	WAHNETA FARMS DRAINAGE CANAL	2011	3.5	1.247	0.101
1580	WAHNETA FARMS DRAINAGE CANAL	2012	-	-	-
1580	WAHNETA FARMS DRAINAGE CANAL	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.12. Peace Creek Tributary Canal (WBID 1613)

Peace Creek Tributary Canal (**Figure 185**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Peace Creek Tributary Canal. The impairment status of Peace Creek Tributary Canal was evaluated using NNC over the verified period used for the initial impairment. Peace Creek Tributary Canal is located within the West Central nutrient threshold region, therefore; the TP and TN thresholds are 0.49 and 1.65 mg/L, respectively. The results of the analysis were not consistent with the initial impairment determination and indicate that there are insufficient data to determine if the Peace Creek Tributary Canal was impaired for nutrients (**Table 164**). There were insufficient SCI data to determine impairment status over the initial verified period.

In addition, Peace Creek Tributary Canal water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that there were insufficient data for Peace Creek Tributary Canal to determine if the WBID is impaired for nutrients (**Table 165**). There were insufficient chlorophyll-a or nutrient and SCI data to determine impairment status over the 2003 to 2013 time period. However based upon the available data, chlorophyll-a and TP concentrations appear below the criteria. There was one SCI reported from January 2008 indicating an unhealthy stream (SCI=33).

Figure 185. Location of water quality sampling sites in Peace Creek Tributary Canal (WBID 1613).

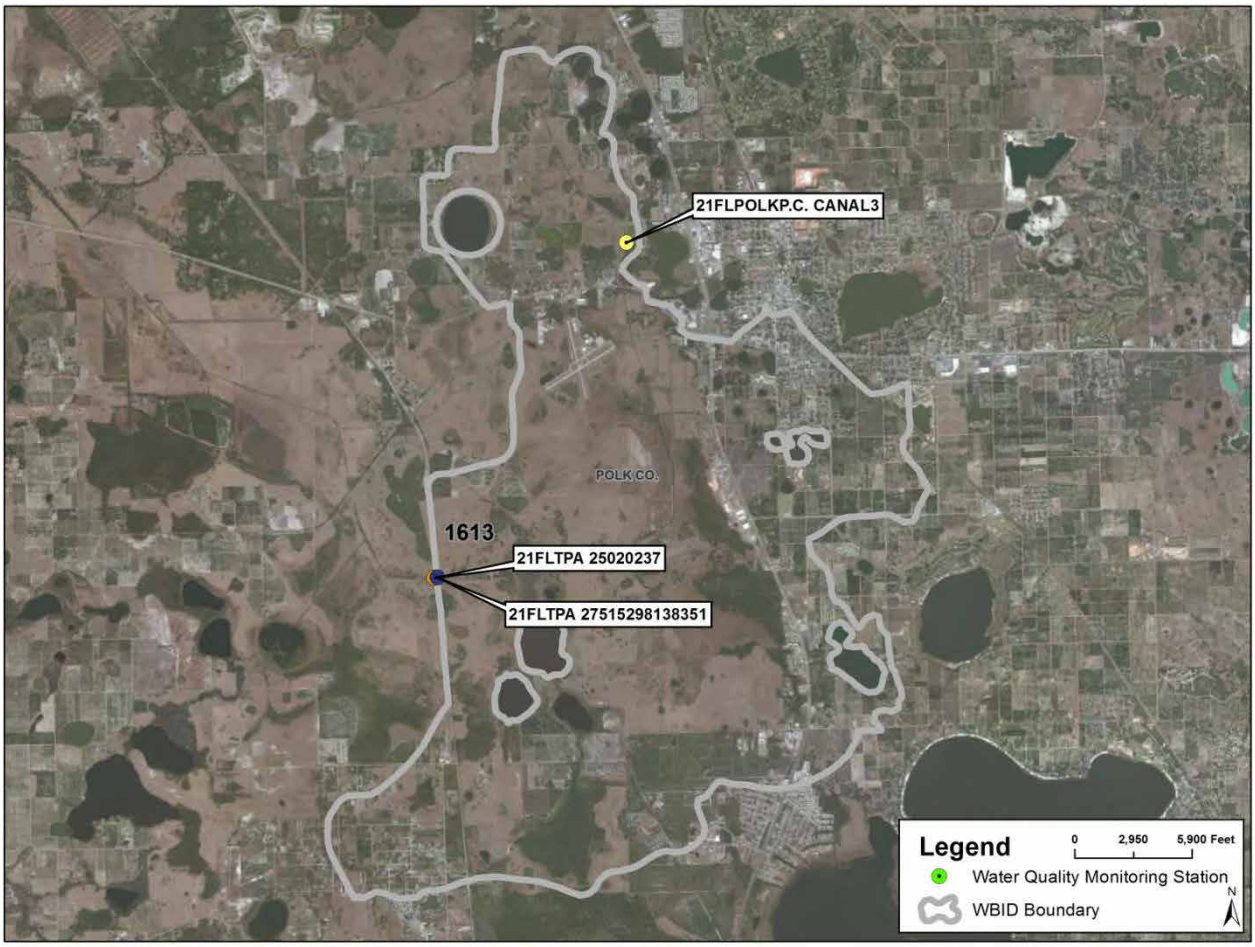


Table 164. Results of NNC evaluation for Peace Creek Tributary Canal (WBID 1613) over verified period for nutrient impairment (January 1, 19997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1613	PEACE CREEK TRIBUTARY CANAL	1997	-	**3.656**	0.261
1613	PEACE CREEK TRIBUTARY CANAL	1998	-	**5.380**	0.426
1613	PEACE CREEK TRIBUTARY CANAL	1999	4.1	**4.656**	0.345
1613	PEACE CREEK TRIBUTARY CANAL	2000	4.8	**3.904**	0.254
1613	PEACE CREEK TRIBUTARY CANAL	2001	-	-	-
1613	PEACE CREEK TRIBUTARY CANAL	2002	-	-	-
1613	PEACE CREEK TRIBUTARY CANAL	2003	-	-	-
1613	PEACE CREEK TRIBUTARY CANAL	2004	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

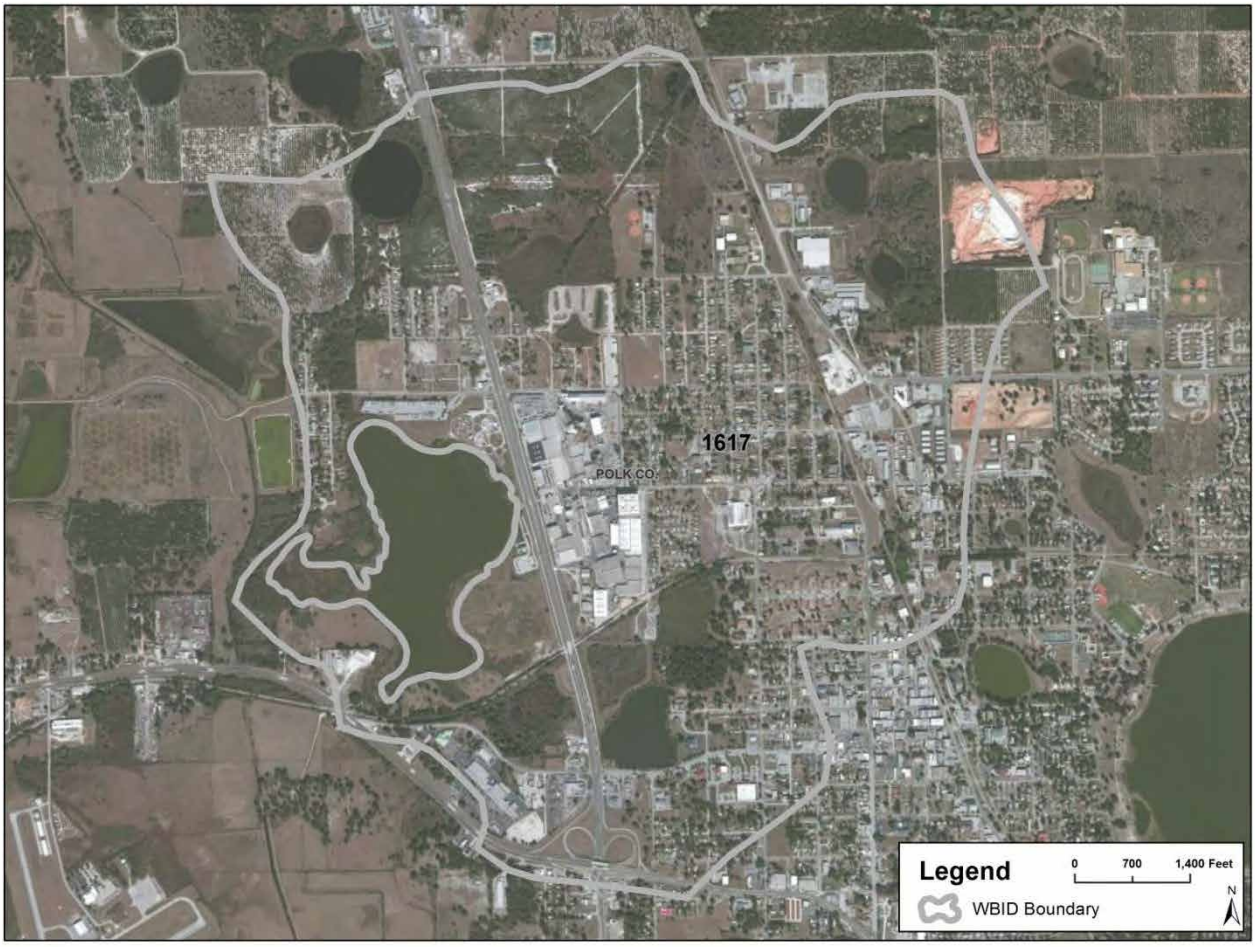
Table 165. Results of NNC evaluation for Peace Creek Tributary Canal (WBID 1613) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1613	PEACE CREEK TRIBUTARY CANAL	2003	-	-	-
1613	PEACE CREEK TRIBUTARY CANAL	2004	-	-	-
1613	PEACE CREEK TRIBUTARY CANAL	2005	1.7	**2.263**	0.100
1613	PEACE CREEK TRIBUTARY CANAL	2006	-	-	-
1613	PEACE CREEK TRIBUTARY CANAL	2007	-	-	-
1613	PEACE CREEK TRIBUTARY CANAL	2008	-	-	-
1613	PEACE CREEK TRIBUTARY CANAL	2009	-	-	-
1613	PEACE CREEK TRIBUTARY CANAL	2010	-	-	-
1613	PEACE CREEK TRIBUTARY CANAL	2011	-	-	-
1613	PEACE CREEK TRIBUTARY CANAL	2012	-	-	-
1613	PEACE CREEK TRIBUTARY CANAL	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.13. Lake Effie Outlet (WBID 1617)

Lake Effie Outlet (**Figure 186**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Lake Effie Outlet. The impairment status of Lake Effie Outlet was evaluated using NNC over the verified period used for the initial impairment. Lake Effie Outlet is located within the West Central nutrient threshold region, therefore; the TP and TN thresholds are 0.49 and 1.65 mg/L, respectively. No data were available for Lake Effie Outlet.

Figure 186. Lake Effie Outlet (WBID 1617).



7.14. Saddle Creek Below Lake Hancock (WBID 1623K)

Saddle Creek Below Lake Hancock (**Figure 187**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Saddle Creek Below Lake Hancock. The impairment status of Saddle Creek Below Lake Hancock was evaluated using NNC over the verified period used for the initial impairment. Saddle Creek Below Lake Hancock is located within the West Central nutrient threshold region, therefore; the TP and TN thresholds are 0.49 and 1.65 mg/L, respectively. The results of the analysis support the initial impairment determination and indicate that Saddle Creek Below Lake Hancock was impaired for elevated chlorophyll-a concentrations over the verified period (**Table 166**).

In addition, Saddle Creek Below Lake Hancock water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that Saddle Creek Below Lake Hancock continues to be impaired for elevated chlorophyll-a concentrations (**Table 167**).

Figure 187. Location of water quality sampling sites in Saddle Creek Below Lake Hancock (WBID 1623K).

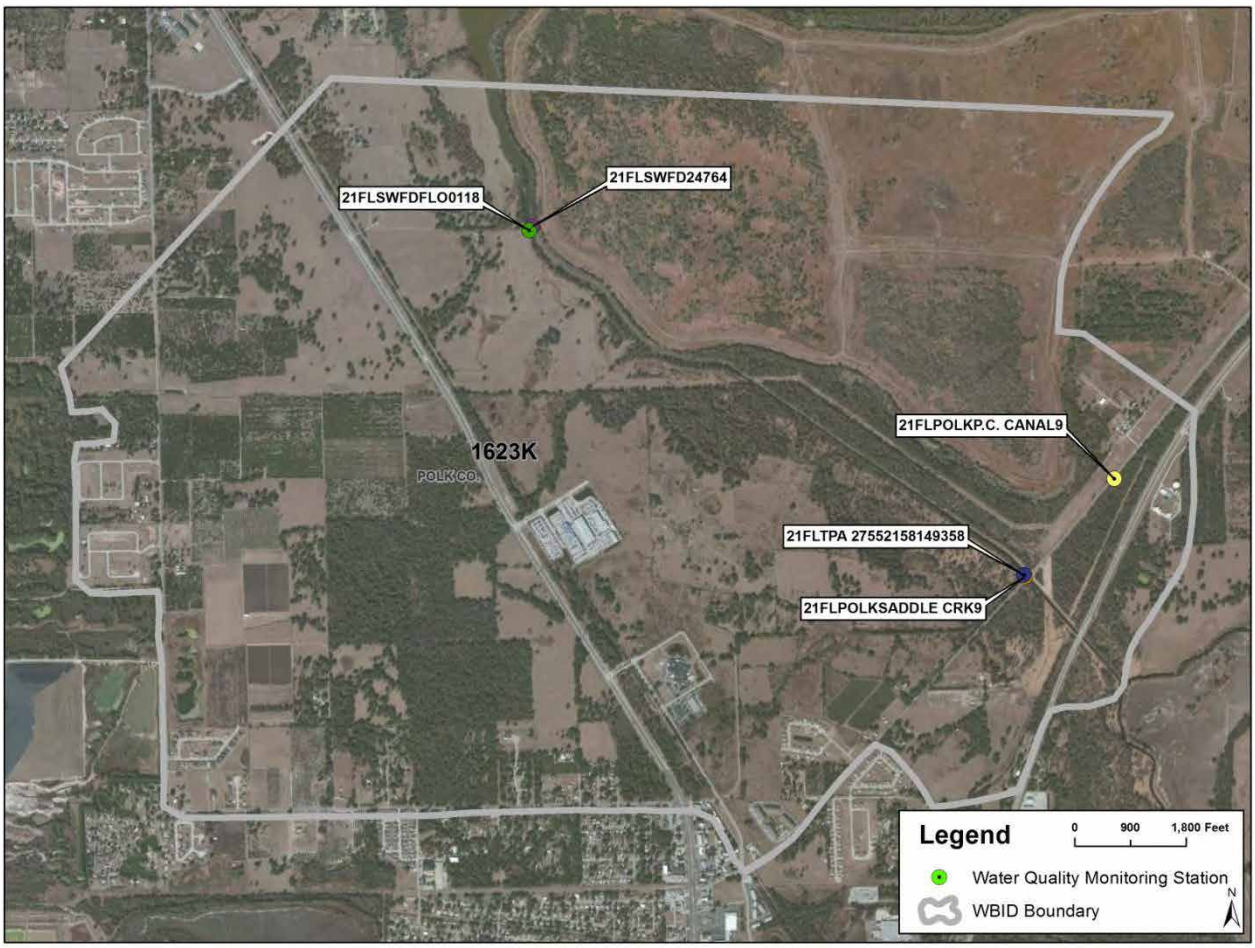


Table 166. Results of NNC evaluation for Saddle Creek Below Lake Hancock (WBID 1623K) over verified period for nutrient impairment (January 1, 1997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1623K	SADDLE CREEK BELOW LAKE HANCOCK	1997	**80.1**	**3.252**	0.332
1623K	SADDLE CREEK BELOW LAKE HANCOCK	1998	**121.3**	**3.053**	**0.507**
1623K	SADDLE CREEK BELOW LAKE HANCOCK	1999	**128.8**	**2.476**	0.262
1623K	SADDLE CREEK BELOW LAKE HANCOCK	2000	**61.9**	**3.419**	**0.532**
1623K	SADDLE CREEK BELOW LAKE HANCOCK	2001	**35.0**	**4.170**	**1.422**
1623K	SADDLE CREEK BELOW LAKE HANCOCK	2002	**77.2**	**2.716**	**0.643**
1623K	SADDLE CREEK BELOW LAKE HANCOCK	2003	**156.7**	**3.258**	**0.708**
1623K	SADDLE CREEK BELOW LAKE HANCOCK	2004	**120.7**	**3.927**	**0.609**
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 167. Results of NNC evaluation for Saddle Creek Below Lake Hancock (WBID 1623K) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1623K	SADDLE CREEK BELOW LAKE HANCOCK	2003	**156.7**	**3.258**	**0.708**
1623K	SADDLE CREEK BELOW LAKE HANCOCK	2004	**98.3**	**3.147**	**0.640**
1623K	SADDLE CREEK BELOW LAKE HANCOCK	2005	**218.6**	**4.335**	0.434
1623K	SADDLE CREEK BELOW LAKE HANCOCK	2006	**96.8**	**3.261**	0.386
1623K	SADDLE CREEK BELOW LAKE HANCOCK	2007	**194.3**	**5.763**	0.464
1623K	SADDLE CREEK BELOW LAKE HANCOCK	2008	**311.0**	**9.982**	**0.656**
1623K	SADDLE CREEK BELOW LAKE HANCOCK	2009	-	-	-
1623K	SADDLE CREEK BELOW LAKE HANCOCK	2010	**124.0**	**3.294**	0.344
1623K	SADDLE CREEK BELOW LAKE HANCOCK	2011	**345.1**	**3.597**	0.372
1623K	SADDLE CREEK BELOW LAKE HANCOCK	2012	**424.3**	**4.467**	0.414
1623K	SADDLE CREEK BELOW LAKE HANCOCK	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.15. West Wales Drainage Canal (WBID 1626)

West Wales Drainage Canal (**Figure 188**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 1997 to June 30, 2004 verified period as part of the Group 3, Cycle 1 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in West Wales Drainage Canal. The impairment status of West Wales Drainage Canal was evaluated using NNC over the verified period used for the initial impairment. West Wales Drainage Canal is located within the West Central nutrient threshold region, therefore; the TP and TN thresholds are 0.49 and 1.65 mg/L, respectively. The results of the analysis were not consistent with the initial impairment determination and indicate that there are insufficient data to determine if the West Wales Drainage Canal was impaired for nutrients (**Table 168**). There were insufficient chlorophyll-a or nutrient and SCI data to determine impairment status over the initial verified period.

In addition, West Wales Drainage Canal water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that there were insufficient data for West Wales Drainage Canal to determine if the WBID is impaired for nutrients (**Table 169**). There were insufficient chlorophyll-a or nutrient and SCI data to determine impairment status over the 2003 to 2013 time period. However based upon the available data, chlorophyll-a and TP concentrations appear below the criteria. There were not SCI data available for review.

Figure 188. Location of water quality sampling sites in West Wales Drainage Canal (WBID 1626).

Table 168. Results of NNC evaluation for West Wales Drainage Canal (WBID 1626) over verified period for nutrient impairment (January 1, 19997 to June 30, 2004).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1626	WEST WALES DRAINAGE CANAL	1997	-	**1.846**	0.091
1626	WEST WALES DRAINAGE CANAL	1998	-	-	-
1626	WEST WALES DRAINAGE CANAL	1999	-	-	-
1626	WEST WALES DRAINAGE CANAL	2000	-	-	-
1626	WEST WALES DRAINAGE CANAL	2001	-	-	-
1626	WEST WALES DRAINAGE CANAL	2002	-	-	-
1626	WEST WALES DRAINAGE CANAL	2003	2.6	**1.653**	0.064
1626	WEST WALES DRAINAGE CANAL	2004	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 169. Results of NNC evaluation for West Wales Drainage Canal (WBID 1626) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1626	WEST WALES DRAINAGE CANAL	2003	2.6	**1.653**	0.064
1626	WEST WALES DRAINAGE CANAL	2004	-	-	-
1626	WEST WALES DRAINAGE CANAL	2005	-	-	-
1626	WEST WALES DRAINAGE CANAL	2006	-	-	-
1626	WEST WALES DRAINAGE CANAL	2007	-	-	-
1626	WEST WALES DRAINAGE CANAL	2008	9.1	**2.933**	0.113
1626	WEST WALES DRAINAGE CANAL	2009	-	-	-
1626	WEST WALES DRAINAGE CANAL	2010	-	-	-
1626	WEST WALES DRAINAGE CANAL	2011	-	-	-
1626	WEST WALES DRAINAGE CANAL	2012	-	-	-
1626	WEST WALES DRAINAGE CANAL	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.16. Thirtymile Creek (WBID 1639)

Thirtymile Creek (**Figure 189**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 2001 to June 30, 2008 verified period as part of the Group 2, Cycle 2 review. An adopted TMDL was developed by FDEP to identify proposed load reductions to improve water quality in Thirtymile Creek. In Thirtymile Creek, sampling station 21FLTPA 24020077 appears to be located outside of the WBID boundary and the station descriptor is inconclusive. The station was not removed from analysis. It is recommended that the station coordinates and description be further validated by the respective sampling entity in order to confirm the station location.

The impairment status of Thirtymile Creek was evaluated using NNC over the verified period used for the initial impairment. Thirtymile Creek is located within the West Central nutrient threshold region, therefore; the TP and TN thresholds are 0.49 and 1.65 mg/L, respectively. The results of the analysis were not consistent with the initial impairment determination and indicate that there are insufficient data to determine if the Thirtymile Creek was impaired for nutrients (**Table 170**). There were insufficient SCI data to determine impairment status over the initial verified period.

In addition, Thirtymile Creek water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that there were insufficient data for Thirtymile Creek to determine if the WBID is impaired for nutrients (**Table 171**). There were insufficient SCI data to determine impairment status over the 2003 to 2013 time period. Nutrient thresholds have consistently been exceeded by both nitrogen and phosphorus concentrations. However, there was one SCI reported from August 2008 indicating a healthy stream (SCI=39). Chlorophyll-a concentrations have been consistently below the 20.0 µg/L standard.

Figure 189. Location of water quality sampling sites in Thirtymile Creek (WBID 1639).

Table 170. Results of NNC evaluation for Thirtymile Creek (WBID 1639) over verified period for nutrient impairment (January 1, 2001 to June 30, 2008).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1639	THIRTYMILE CREEK	2001	2.0	**2.273**	**1.843**
1639	THIRTYMILE CREEK	2002	8.2	**2.859**	**1.524**
1639	THIRTYMILE CREEK	2003	3.5	**3.640**	**0.993**
1639	THIRTYMILE CREEK	2004	1.3	**3.961**	**1.888**
1639	THIRTYMILE CREEK	2005	2.4	**2.100**	**1.810**
1639	THIRTYMILE CREEK	2006	1.5	0.984	**0.745**
1639	THIRTYMILE CREEK	2007	1.3	1.214	**0.863**
1639	THIRTYMILE CREEK	2008	3.5	1.146	**0.498**
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 171. Results of NNC evaluation for Thirtymile Creek (WBID 1639) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1639	THIRTYMILE CREEK	2003	3.5	**3.640**	**0.993**
1639	THIRTYMILE CREEK	2004	1.3	**3.961**	**1.888**
1639	THIRTYMILE CREEK	2005	2.4	**2.100**	**1.810**
1639	THIRTYMILE CREEK	2006	1.5	0.984	**0.745**
1639	THIRTYMILE CREEK	2007	1.3	1.214	**0.863**
1639	THIRTYMILE CREEK	2008	2.4	1.169	**0.572**
1639	THIRTYMILE CREEK	2009	2.8	1.007	**1.455**
1639	THIRTYMILE CREEK	2010	3.6	1.146	**1.031**
1639	THIRTYMILE CREEK	2011	3.1	1.140	**1.223**
1639	THIRTYMILE CREEK	2012	-	-	-
1639	THIRTYMILE CREEK	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.17. Hookers Prairie (WBID 1673)

Hookers Prairie (**Figure 190**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 2001 to June 30, 2008 verified period as part of the Group 2, Cycle 2 review. The impairment status of Hookers Prairie was evaluated using NNC over the verified period used for the initial impairment. Hookers Prairie is located within the West Central nutrient threshold region, therefore; the TP and TN thresholds are 0.49 and 1.65 mg/L, respectively. The results of the analysis were not consistent with the initial impairment determination and indicate that there are insufficient data to determine if the Hookers Prairie was impaired for nutrients (**Table 172**). There were insufficient SCI data to determine impairment status over the initial verified period.

In addition, Hookers Prairie water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that there were insufficient data for Hookers Prairie to determine if the WBID is impaired for nutrients (**Table 173**). There were insufficient SCI data to determine impairment status over the 2003 to 2013 time period. However based upon the available data, water quality conditions appear below the criteria for chlorophyll-a and TN concentrations. There were not SCI data available for review.

Figure 190. Location of water quality sampling sites in Hookers Prairie (WBID 1673).

Table 172. Results of NNC evaluation for Hookers Prairie (WBID 1673) over verified period for nutrient impairment (January 1, 2001 to June 30, 2008).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1673	HOOKERS PRAIRIE	2001	-	1.449	**2.851**
1673	HOOKERS PRAIRIE	2002	-	0.937	**2.567**
1673	HOOKERS PRAIRIE	2003	-	1.063	**1.423**
1673	HOOKERS PRAIRIE	2004	1.7	1.192	**1.529**
1673	HOOKERS PRAIRIE	2005	4.8	**1.749**	**2.330**
1673	HOOKERS PRAIRIE	2006	-	-	-
1673	HOOKERS PRAIRIE	2007	3.8	1.586	**0.830**
1673	HOOKERS PRAIRIE	2008	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 173. Results of NNC evaluation for Hookers Prairie (WBID 1673) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1673	HOOKERS PRAIRIE	2003	-	1.063	**1.423**
1673	HOOKERS PRAIRIE	2004	1.7	1.192	**1.529**
1673	HOOKERS PRAIRIE	2005	4.8	**1.749**	**2.330**
1673	HOOKERS PRAIRIE	2006	-	-	-
1673	HOOKERS PRAIRIE	2007	3.8	1.586	**0.830**
1673	HOOKERS PRAIRIE	2008	-	-	-
1673	HOOKERS PRAIRIE	2009	-	-	-
1673	HOOKERS PRAIRIE	2010	-	-	-
1673	HOOKERS PRAIRIE	2011	-	-	-
1673	HOOKERS PRAIRIE	2012	-	-	-
1673	HOOKERS PRAIRIE	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.18. South Port Canal (WBID 3180B)

South Port Canal (**Figure 191**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 2003 to June 30, 2010 verified period as part of the Group 4, Cycle 2 review. The impairment status of South Port Canal was evaluated using NNC over the verified period used for the initial impairment. South Port Canal is located within the Peninsula nutrient threshold region, therefore; the TP and TN thresholds are 0.12 and 1.54 mg/L, respectively. The results of the analysis were not consistent with the initial impairment determination and indicate that there are insufficient data to determine if the South Port Canal was impaired for nutrients (**Table 174**). There were insufficient chlorophyll-a or TN and SCI data to determine impairment status over the initial verified period.

In addition, South Port Canal water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that there were insufficient data for South Port Canal to determine if the WBID is impaired for nutrients (**Table 175**). There were insufficient chlorophyll-a or TN and SCI data to determine impairment status over the 2003 to 2013 time period. However based upon the available data, water quality conditions appear below the criteria. There were not SCI data available for review.

Figure 191. Location of water quality sampling sites in South Port Canal (WBID 3180B).

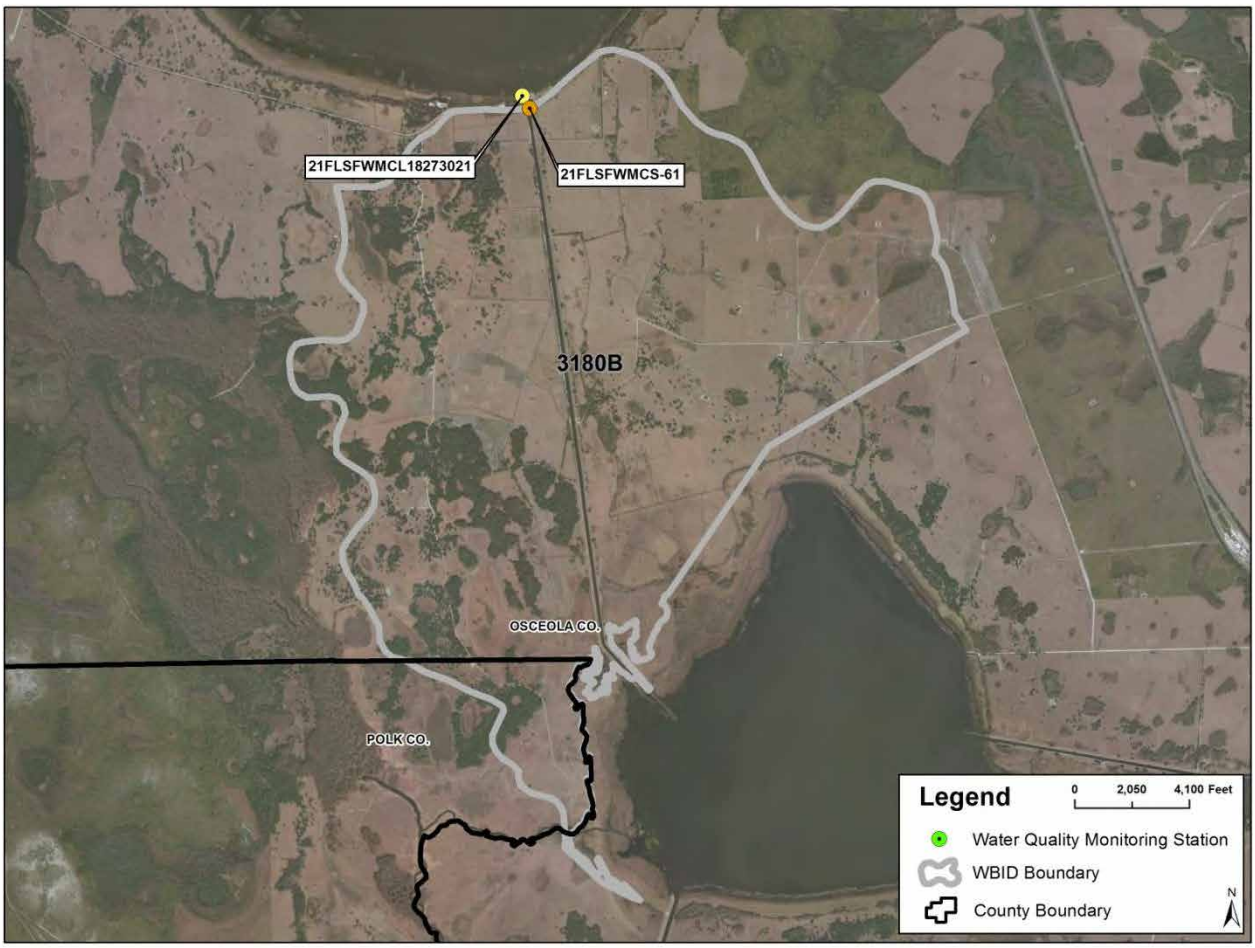


Table 174. Results of NNC evaluation for South Port Canal (WBID 3180B) over verified period for nutrient impairment (January 1, 2003 to June 30, 2010).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
3180B	SOUTH PORT CANAL	2003	-	-	-
3180B	SOUTH PORT CANAL	2004	18.8	1.433	0.076
3180B	SOUTH PORT CANAL	2005	-	-	-
3180B	SOUTH PORT CANAL	2006	-	-	0.089
3180B	SOUTH PORT CANAL	2007	-	-	0.047
3180B	SOUTH PORT CANAL	2008	-	-	0.048
3180B	SOUTH PORT CANAL	2009	-	-	0.051
3180B	SOUTH PORT CANAL	2010	-	-	0.048
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 175. Results of NNC evaluation for South Port Canal (WBID 3180B) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
3180B	SOUTH PORT CANAL	2003	-	-	-
3180B	SOUTH PORT CANAL	2004	18.8	1.433	0.076
3180B	SOUTH PORT CANAL	2005	-	-	-
3180B	SOUTH PORT CANAL	2006	-	-	0.089
3180B	SOUTH PORT CANAL	2007	-	-	0.047
3180B	SOUTH PORT CANAL	2008	-	-	0.048
3180B	SOUTH PORT CANAL	2009	-	-	0.051
3180B	SOUTH PORT CANAL	2010	-	-	0.049
3180B	SOUTH PORT CANAL	2011	**-**	**-**	**-**
3180B	SOUTH PORT CANAL	2012	-	-	-
3180B	SOUTH PORT CANAL	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.19. Packingham Slough (WBID 3186E)

Packingham Slough (**Figure 192**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 2003 to June 30, 2010 verified period as part of the Group 4, Cycle 2 review. In Packingham Slough, sampling station 21FLSWMS65A appears to be located outside of the WBID boundary and the station descriptor is inconclusive. The station was not removed from analysis. It is recommended that the station coordinates and description be further validated by the respective sampling entity in order to confirm the station location.

The impairment status of Packingham Slough was evaluated using NNC over the verified period used for the initial impairment. Packingham Slough is located within the Peninsula nutrient threshold region, therefore; the TP and TN thresholds are 0.12 and 1.54 mg/L, respectively. The results of the analysis were not consistent with the initial impairment determination and indicate that there are insufficient data to determine if the Packingham Slough was impaired for nutrients (**Table 176**). There were insufficient SCI data to determine impairment status over the initial verified period. However, neither chlorophyll-a nor nutrient concentrations exceeded the criteria for impairment.

In addition, Packingham Slough water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that there were insufficient data for Packingham Slough to determine if the WBID is impaired for nutrients (**Table 177**). There were insufficient SCI data to determine impairment status over the 2003 to 2013 time period. However based upon the available data, water quality conditions appear below the criteria. Nutrient values have remained below the thresholds for both nitrogen and phosphorus. Additionally, the annual geometric mean for chlorophyll-a has remained below the 20.0 µg/L standard. There were not SCI data available for review.

Figure 192. Location of water quality sampling sites in Packingham Slough (WBID 3186E).

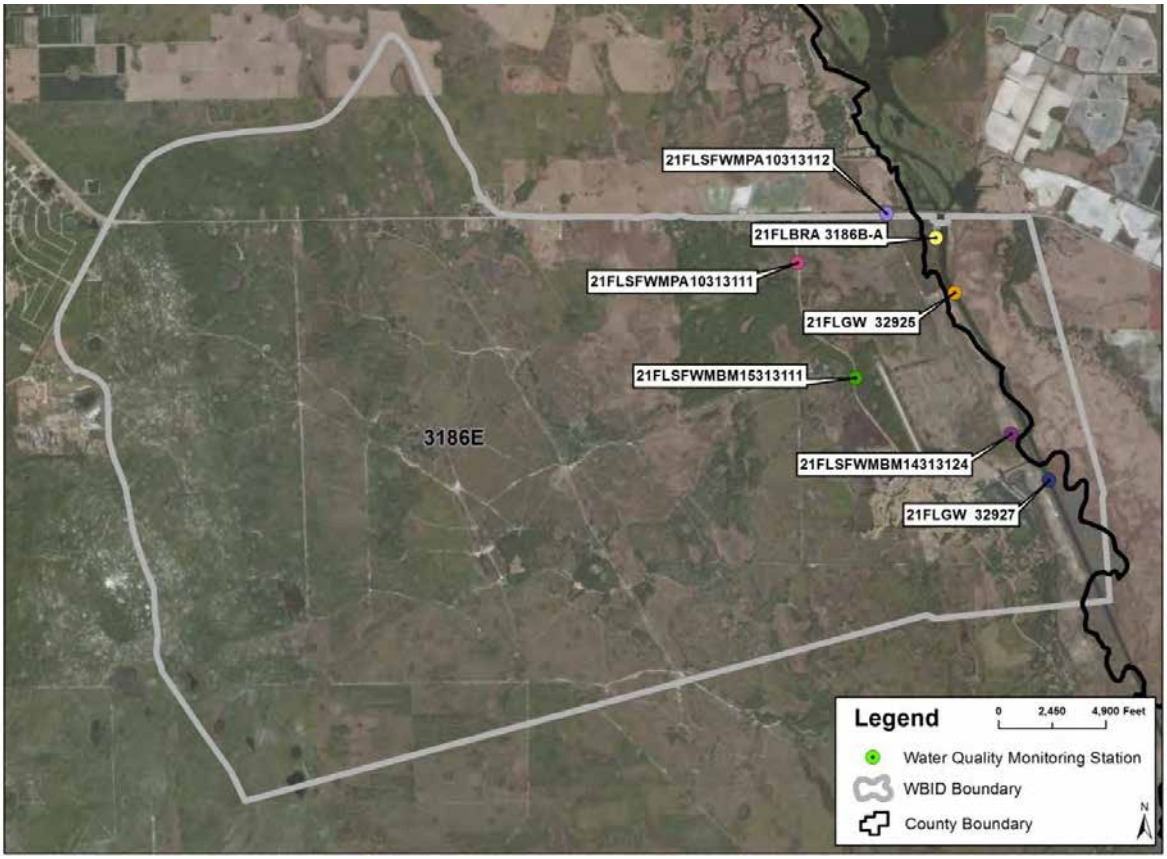


Table 176. Results of NNC evaluation for Packingham Slough (WBID 3186E) over verified period for nutrient impairment (January 1, 2003 to June 30, 2010).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
3186E	PACKINGHAM SLOUGH	2003	14.1	1.181	0.060
3186E	PACKINGHAM SLOUGH	2004	13.5	1.241	0.061
3186E	PACKINGHAM SLOUGH	2005	12.3	1.200	0.084
3186E	PACKINGHAM SLOUGH	2006	9.9	1.307	0.104
3186E	PACKINGHAM SLOUGH	2007	15.6	1.248	0.078
3186E	PACKINGHAM SLOUGH	2008	18.2	1.325	0.063
3186E	PACKINGHAM SLOUGH	2009	16.2	1.261	0.054
3186E	PACKINGHAM SLOUGH	2010	10.7	1.213	0.072
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 177. Results of NNC evaluation for Packingham Slough (WBID 3186E) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
3186E	PACKINGHAM SLOUGH	2003	14.1	1.181	0.060
3186E	PACKINGHAM SLOUGH	2004	13.5	1.241	0.061
3186E	PACKINGHAM SLOUGH	2005	12.3	1.200	0.084
3186E	PACKINGHAM SLOUGH	2006	9.9	1.307	0.104
3186E	PACKINGHAM SLOUGH	2007	15.6	1.248	0.078
3186E	PACKINGHAM SLOUGH	2008	18.2	1.325	0.063
3186E	PACKINGHAM SLOUGH	2009	16.2	1.261	0.054
3186E	PACKINGHAM SLOUGH	2010	10.8	1.098	0.062
3186E	PACKINGHAM SLOUGH	2011	-	1.142	0.067
3186E	PACKINGHAM SLOUGH	2012	-	-	-
3186E	PACKINGHAM SLOUGH	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

7.20. Blanket Bay Slough (WBID 3186G)

Blanket Bay Slough (**Figure 193**) was declared impaired for nutrients due to elevated chlorophyll-a during the January 1, 2003 to June 30, 2010 verified period as part of the Group 4, Cycle 2 review. The impairment status of Blanket Bay Slough was evaluated using NNC over the verified period used for the initial impairment. Blanket Bay Slough is located within the Peninsula nutrient threshold region, therefore; the TP and TN thresholds are 0.12 and 1.54 mg/L, respectively. The results of the analysis support the initial impairment determination and indicate that Blanket Bay Slough was impaired for elevated TP concentrations and SCI scores over the verified period (**Table 178**).

In addition, Blanket Bay Slough water quality data were compared to the NNC for the period of 2003 to 2013 to determine if a change in water quality conditions had occurred. Results of the water quality comparison using current data indicate that Blanket Bay Slough continues to be impaired for TP concentrations and SCI scores (**Table 179**). Two SCI surveys were completed, September 2009 and January 2010, with scores of 21 and 25, respectively. Both surveys failed the faunal evaluation. Coupled with a TP concentration from 2006 to 2011, Blanket Bay Slough has deemed impaired.

Figure 193. Location of water quality sampling sites in Blanket Bay Slough (WBID 3186G).

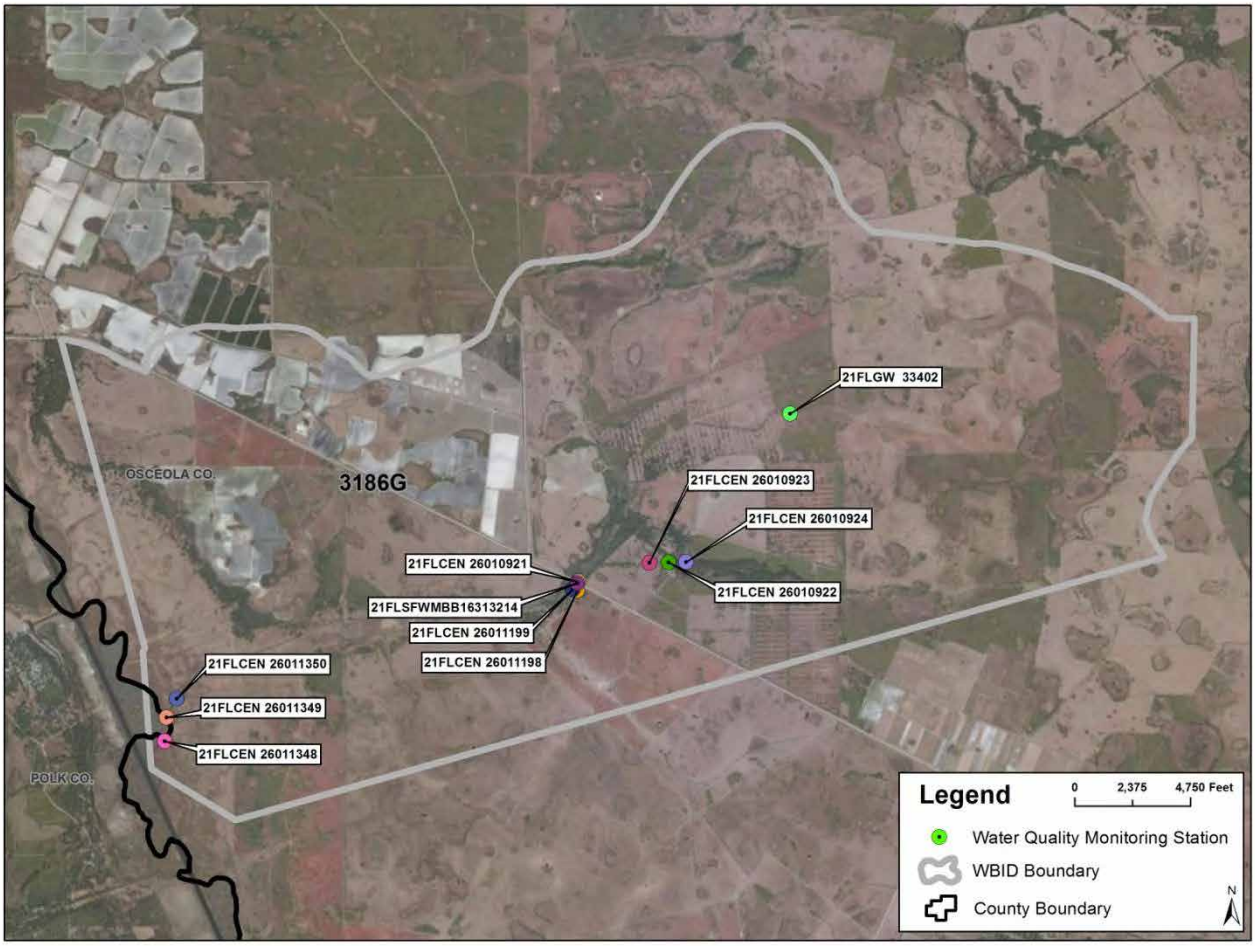


Table 178. Results of NNC evaluation for Blanket Bay Slough (WBID 3186G) over verified period for nutrient impairment (January 1, 2003 to June 30, 2010).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
3186G	BLANKET BAY SLOUGH	2003	6.9	**2.141**	**0.244**
3186G	BLANKET BAY SLOUGH	2004	-	-	-
3186G	BLANKET BAY SLOUGH	2005	-	-	**0.336**
3186G	BLANKET BAY SLOUGH	2006	-	-	**0.442**
3186G	BLANKET BAY SLOUGH	2007	-	-	**0.362**
3186G	BLANKET BAY SLOUGH	2008	**27.3**	**1.819**	**0.186**
3186G	BLANKET BAY SLOUGH	2009	-	-	-
3186G	BLANKET BAY SLOUGH	2010	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

Table 179. Results of NNC evaluation for Blanket Bay Slough (WBID 3186G) over recent period (2003-2013).

WBID	Waterbody Name	Year	Geometric Mean		
			Chlorophyll-a, corrected (µg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
3186G	BLANKET BAY SLOUGH	2003	-	-	-
3186G	BLANKET BAY SLOUGH	2004	6.9	**2.141**	**0.244**
3186G	BLANKET BAY SLOUGH	2005	-	-	-
3186G	BLANKET BAY SLOUGH	2006	-	-	**0.336**
3186G	BLANKET BAY SLOUGH	2007	-	-	**0.442**
3186G	BLANKET BAY SLOUGH	2008	-	-	**0.362**
3186G	BLANKET BAY SLOUGH	2009	**27.3**	**1.819**	**0.186**
3186G	BLANKET BAY SLOUGH	2010	-	-	**0.234**
3186G	BLANKET BAY SLOUGH	2011	-	-	**0.182**
3186G	BLANKET BAY SLOUGH	2012	-	-	-
3186G	BLANKET BAY SLOUGH	2013	-	-	-
- Indicates insufficient data to calculate geometric mean					
Values in bold indicate an exceedance of NNC criteria					

8. Polk County Stream Impairment Summary

8.1. Verified Period

Twenty streams were identified as verified impaired by FDEP for elevated nutrients where evaluated using the NNC. Four streams had sufficient data to be determined impaired for either elevated chlorophyll-a concentrations or exceeding SCI and nutrient thresholds (**Table 180**). Of the 20 streams, none were found unimpaired for chlorophyll-a or nutrient and SCI metrics. Sixteen streams had insufficient data to evaluate at least one of the metrics used to determine an impairment designation (**Table 181**).

8.2. Recent Analysis (2003-2013)

The 20 impaired streams were analyzed using a more recent data set (2003-2013) to determine if there was evidence of a changed in impairment status. Four streams had sufficient data to be determined impaired for either elevated chlorophyll-a concentrations or exceeding SCI and nutrient thresholds (**Table 182**). None of the streams were found unimpaired for all of the metrics used to determine impairment. Sixteen streams had insufficient data to evaluate at least one of the metrics used to determine an impairment designation (**Table 183)**.

The four streams found to be impaired in both the verified period and 2003 to 2013 time period were: Lake Marion Creek, Banana Lake Canal, Saddle Creek Below Lake Hancock, and Blanket Bay Slough. Currently, none of the waterbodies have an adopted TMDL prepared.

Table 180. List of Polk County Streams found to be impaired when evaluated using the NNC over verified period.

Type	Group	Cycle	Verified Period		WBID	Waterbody Name	Impairment Status			
			Start Date	End Date			Chlorophyll-a	Total Nitrogen	Total Phosphorus	Stream Condition Index
303(d) list	4	2	1/1/2003	6/30/2010	1472A1	LAKE MARION CREEK	**Yes**	Yes	No	No
303(d) list	3	1	1/1/1997	6/30/2004	1549A	BANANA LAKE CANAL	**Yes**	Yes	Yes	ID
303(d) list	3	1	1/1/1997	6/30/2004	1623K	SADDLE CREEK BELOW LAKE HANCOCK	**Yes**	Yes	Yes	ID
303(d) list	4	2	1/1/2003	6/30/2010	3186G	BLANKET BAY SLOUGH	ID	ID	**Yes**	**Yes**
Values in bold indicate an exceedance of NNC criteria										

Table 181. List of Polk County Streams found to have insufficient data when evaluated using the NNC over verified period.

Type	Group	Cycle	Verified Period		WBID	Waterbody Name	Impairment Status			
			Start Date	End Date			Chlorophyll-a	Total Nitrogen	Total Phosphorus	Stream Condition Index
303(d) list	2	2	1/1/2001	6/30/2008	1443A	HILLSBOROUGH RIVER	ID	No	No	No
303(d) list	2	2	1/1/2001	6/30/2008	1483	BALD EAGLE CREEK	ID	ID	ID	ID
303(d) list	2	2	1/1/2001	6/30/2008	1495B	ITCHEPACKESASSA CREEK	No	Yes	Yes	ID
303(d) list	3	2	1/1/2002	6/30/2009	1497	SADDLE CREEK	No	No	Yes	ID
TMDL	3	1	1/1/1997	6/30/2004	1501A	LAKE LENA RUN	ID	ID	ID	ID
303(d) list	3	2	1/1/2002	6/30/2009	1521C	LAKE LULU RUN	ID	ID	ID	ID
303(d) list	3	2	1/1/2002	6/30/2009	1539	PEACE CREEK DRAINAGE CANAL	No	Yes	Yes	ID
TMDL	2	2	1/1/2001	6/30/2008	1543A	LAKE HUNTER OUTLET	ID	ID	ID	ID
303(d) list	3	2	1/1/2002	6/30/2009	1580	WAHNETA FARMS DRAINAGE CANAL	No	No	No	ID
TMDL	3	1	1/1/1997	6/30/2004	1613	PEACE CREEK TRIBUTARY CANAL	ID	ID	ID	ID

Type	Group	Cycle	Verified Period		WBID	Waterbody Name	Impairment Status			
			Start Date	End Date			Chlorophyll-a	Total Nitrogen	Total Phosphorus	Stream Condition Index
TMDL	3	1	1/1/1997	6/30/2004	1617	LAKE EFFIE OUTLET	ID	ID	ID	ID
TMDL	3	1	1/1/1997	6/30/2004	1626	WEST WALES DRAINAGE CANAL	ID	ID	ID	ID
TMDL	2	2	1/1/2001	6/30/2008	1639	THIRTYMILE CREEK	No	Yes	Yes	ID
303(d) list	2	2	1/1/2001	6/30/2008	1673	HOOKERS PRAIRIE	No	No	Yes	ID
303(d) list	4	2	1/1/2003	6/30/2010	3180B	SOUTH PORT CANAL	ID	ID	No	ID
303(d) list	4	2	1/1/2003	6/30/2010	3186E	PACKINGHAM SLOUGH	No	No	No	ID

Table 182. List of Polk County Streams found to be impaired when evaluated using the NNC over the 2003-2013 period.

Type	WBID	Waterbody Name	Impairment Status			
			Chlorophyll-a	Total Nitrogen	Total Phosphorus	Stream Condition Index
303(d) list	1472A1	LAKE MARION CREEK	**Yes**	Yes	No	No
303(d) list	1549A	BANANA LAKE CANAL	**Yes**	Yes	Yes	ID
303(d) list	1623K	SADDLE CREEK BELOW LAKE HANCOCK	**Yes**	Yes	Yes	ID
303(d) list	3186G	BLANKET BAY SLOUGH	ID	ID	**Yes**	**Yes**
Values in bold indicate an exceedance of NNC criteria						

Table 183. List of Polk County Streams found to have insufficient data when evaluated using the NNC over verified period.

Type	WBID	Waterbody Name	Impairment Status			
			Chlorophyll-a	Total Nitrogen	Total Phosphorus	Stream Condition Index
303(d) list	1443A	HILLSBOROUGH RIVER	ID	No	No	ID
303(d) list	1483	BALD EAGLE CREEK	ID	ID	ID	ID

303(d) list	1495B	ITCHEPACKESASSA CREEK	No	Yes	Yes	No
303(d) list	1497	SADDLE CREEK	No	No	Yes	ID
TMDL	1501A	LAKE LENA RUN	No	No	No	ID
303(d) list	1521C	LAKE LULU RUN	ID	ID	ID	ID
303(d) list	1539	PEACE CREEK DRAINAGE CANAL	No	Yes	Yes	ID
TMDL	1543A	LAKE HUNTER OUTLET	ID	ID	ID	ID
303(d) list	1580	WAHNETA FARMS DRAINAGE CANAL	No	No	No	ID
TMDL	1613	PEACE CREEK TRIBUTARY CANAL	ID	ID	ID	ID
TMDL	1617	LAKE EFFIE OUTLET	ID	ID	ID	ID
TMDL	1626	WEST WALES DRAINAGE CANAL	ID	ID	ID	ID
TMDL	1639	THIRTYMILE CREEK	No	Yes	Yes	ID
303(d) list	1673	HOOKERS PRAIRIE	No	No	Yes	ID
303(d) list	3180B	SOUTH PORT CANAL	ID	ID	No	ID
303(d) list	3186E	PACKINGHAM SLOUGH	No	No	No	ID

9. Implications for Polk County in terms of TMDLs

9.1. Introduction to TMDL issues related to use of TSI vs. NNC

When comparing water quality characterization techniques, there are a number of differences between the use of TSI vs. NNC. For high color lakes (i.e., color > 40 PCU), NNC allows for much higher levels of TP and TN without exceeding guidance criteria, especially if factors such as high levels of tannins and/or the presence of submerged aquatic vegetation help to keep chlorophyll-a concentrations to less than 20 µg/L. For low color lakes (i.e., color ≤ 40 PCU) that are classified as "alkaline" (i.e., $CaCO_3$ > 20 mg/L) chlorophyll-a targets are 20 µg/L. Using TSI, the default chlorophyll-a target for a low color lake was 5 µg/L; TP and TN target values for low color lakes are correspondingly very low using TSI. Since most low color lakes in Polk County are alkaline, water quality targets for TP and TN using NNC are much more likely to be achievable than those that would be derived using TSI.

As this report summarizes, there were 13 lakes on FDEP"s Verified Impaired list where there are insufficient data to determine if they exceed criteria laid out in NNC guidance documents (FDEP 2013). And while 43 lakes on the Verified Impaired List were in exceedance of NNC guidance for at least one parameter (chlorophyll-a, TN or TP) there were 11 lakes on the Verified Impaired list (compiled using TSI) that are not impaired using NNC.

A number of lakes and streams within Polk County have either draft or final TMDLs produced for them, and all of them are based on the nutrient-chlorophyll-a relationships embedded within the TSI calculations. In those instances, projects and/or permit-related obligations could be designed, permitted and constructed in the TMDL implementation phase for these "verified impaired" waterbodies that might not bring about the desired response in water quality.

For some lakes, such as Lake Hancock, their TMDL status is somewhat unsettled. The Draft TMDL for Lake Hancock (FDEP 2005) is now more than seven years old, and it is not yet clear whether or not a revised TMDL were produced. One of the reasons for the delay in the development of the Lake Hancock TMDL appears to be issues raised in a report produced for Polk County and FDEP (PBS&J 2008a). Those issues include the following: 1) the Draft TMDL included groundwater seepage into Lake Hancock that does not appear to be possible due to it being perched above the surficial aquifer, 2) the nitrogen budget for Lake Hancock needs to account for the significant amount of nitrogen fixation occurring in the lake, and 3) internal phosphorus loads from the organic rich sediment are likely a much more important influence on the lake"s water quality than nutrient loads from the watershed, the focus of the Draft TMDL.

A brief review of potential TMDL issues related to those waterbodies with final TMDLs is provided in the following sections.

9.2. TMDL issues relevant for the Winter Haven Chain of Lakes system

Within the Winter Haven Chain of Lakes System, there are two final TMDLs that have relevance for Polk County, FDEP"s Nutrient TMDL for the Winter Haven Southern Chain of Lakes (FDEP 2007) and EPA"s Nutrient TMDL for Winter Haven Northern Chain of Lakes, Lake Haines and Lake Smart (EPA 2006). Both of these TMDLs are final, not draft, and therefore the regulatory impacts of implementing their load reductions for stormwater have much greater significance to Polk County than the uncertain status of the Draft TMDL for Lake Hancock.

For the Southern Chain of Lakes TMDL, FDEP contracted PBS&J to review the appropriateness of water quality targets and load reduction goals, as part of the pre-BMAP phase (PBS&J 2008b). In that pre-BMAP report, it was noted that the use of TSI for setting water quality targets was problematic for high color lakes,

as there was no relationship between either nitrogen or phosphorus and chlorophyll-a concentrations in those lakes. For low color lakes relationships were found between TN and chlorophyll-a and TP and chlorophyll-a, but target TN and TP values derived using empirical relationships differed dramatically from target TN and TP values based on TSI calculations. FDEP reviewed and accepted the modified water quality targets produced in that report (PBS&J 2008b) as an official part of the pre-BMAP portion of the TMDL program. The revised water quality targets developed in the pre-BMAP report (PBS&J 2008b) were then used to develop a series of projects, on a lake by lake basis, for the Water Quality Management Plan (WQMP) produced for the City of Winter Haven and the Southwest Florida Water Management District (SWFWMD; PBS&J 2010).

While the water quality restoration projects outlined for the Southern Chain of Lakes (PBS&J 2010) are consistent with the revised water quality targets developed for FDEP in the pre-BMAP process (PBS&J 2008b), it does not appear that FDEP has formally substituted those modified water quality targets into a revised TMDL. The modified water quality targets first developed in the pre-BMAP report (PBS&J 2008b) and used to develop lake restoration strategies (PBS&J 2010) are consistent with recent NNC values for lakes. Therefore, modification of the water quality targets within the Final TMDL to fit with guidance from the pre-BMAP report, the WQMP and NNC would not appear to be overly problematic.

For the Northern Chain of Lakes, FDEP contracted with PBS&J to review and revise, if necessary, the water and nutrient budgets associated with groundwater seepage for Lakes Conine, Haines, Rochelle and Smart (PBS&J 2009). For that effort, PBS&J installed peizometers and seepage meters into the shoreline and lake bottoms, respectively, of those four lakes, and quantified groundwater inflows and nutrient loads over the course of six months. While groundwater inflow rates were found similar to values used in FDEP"s preliminary models, the phosphorus flux from groundwater inflows were measured at rates much higher than modeled inputs. The under-reported groundwater inflow rates would mean that stormwater inflows are likely overstated in FDEP"s existing models, which were themselves based on the Pollutant Load Reduction Goal report produced for the SWFWMD by USF (2005). However, it does not appear that the revised groundwater flux estimates developed for FDEP by PBS&J (2009) have been used to modify the U.S. EPA"s TMDL for Lakes Haines and Smart (EPA 2006). As such, the existing TMDL for Lakes Haines and Smart incorporates groundwater inflow estimates for TP that are underestimates, and that the whole-lake TP budget for Lakes Haines and Smart is likely overestimating the importance of stormwater inflows (a major concern for entities with MS4 permits).

9.3. TMDL issues relevant to Lake Hunter and other hypereutrophic lakes

Lake Hunter is undoubtedly a lake with challenging water quality, and it is in need of restoration projects aimed at improving its water quality. However, the Lake Hunter TMDL (FDEP 2004) includes both problematic loading model assumptions and water quality targets. Since the stormwater load reductions contained within that TMDL are so large (80 percent reductions in both TN and TP loads) it is important to understand the implications to Polk County and local municipalities that are contained within TMDLs such as those developed for hypereutrophic lakes like Lake Hunter.

The water quality targets set for Lake Hunter in its TMDL (FDEP 2004) are based on achieving a TSI value of 60, despite the lakes being low color lakes that would normally default to a TSI target of 40. The target chlorophyll-a value equivalent to a TSI value of 60 is 20 µg/L, vs. a corresponding chlorophyll-a target value of 5 µg/L for a TSI value of 40. While this higher TSI target value results in TN and TP targets that are more likely to be achievable (because they are lower) than with the stricter default TSI value of 40, it also highlights the arbitrary and somewhat capricious approach to setting water quality targets found in some TMDLs, as opposed to deriving empirically-based targets for these data-rich lakes.

In addition to having problematic water quality targets, the loading model for the Lake Hunter TMDL (FDEP 2004) was not able to determine the source(s) of the very high levels of TN within the lake. Despite the fact that there were no data to verify the loading model assumptions, the Lake Hunter TMDL not only calls for

reductions in stormwater loads of TN and TP of 80 percent (extremely problematic scenarios) the TMDL assumes that all the septic tanks within the lakes watershed were removed. While such an extremely expensive activity might have some benefit to Lake Hunter"s water quality, it is important to remember that the septic tank removal program"s predicted impact is based on model assumptions rather than actual data. The load reductions themselves are meant to meet a water quality target based not on empirically-derived equations relating TN and TP to chlorophyll-a concentrations, but on TSI, which is no longer the technique used in Florida for classifying water quality within lakes.

Similar to Lake Hancock, the Lake Hunter TMDL (FDEP 2004) nutrient budget does not fully account for the significant amount of nitrogen fixation that is probably occurring in the lake. As well, internal phosphorus loads from the organic rich sediment are likely a much more important influence on the lake"s water quality than nutrient loads (especially for TN) from the watershed. At a minimum, implementation of the Lake Hunter TMDL, and other TMDLs in Polk County, should occur only after the calculation of locally-derived water quality targets for TN and TP, and comparison to NNC criteria.

9.4. TMDL issues relevant for Thirty-mile Creek, Saddle Creek, and other stream segments

In response to a number of complaints related to its problematic standards for dissolved oxygen (DO), FDEP has recently developed DO criteria that are much more realistic for Florida waters. In the past, FDEP"s DO standard was routinely "violated" in natural waterways, giving rise to situations such as the TMDL for the Gordon River (Collier County) where the reference sites used in the TMDL also failed the DO standard (FDEP 2008). The revised DO criteria for Florida"s waterbodies will likely result in fewer "false positives" or waterbodies designated as impaired for DO that are naturally low in DO. This could help Polk County more effectively focus its resources on truly impaired waterbodies.

Unfortunately, TMDLs for Thirty-mile Creek (FDEP 2004) and Saddle Creek, Peace Creek and Lake Lena Run (EPA 2006) are still based in part on the determination that DO levels less than 5 mg/L are necessarily brought about by elevated levels of nutrients. While it is more likely than not that Saddle Creek and Lake Lena Run experience excessive nutrient loads, the TMDLs for those waterbodies (and in Thirty-mile Creek as well) are based in part on load reductions needed to get DO levels higher than 5 mg/L. The development of the new DO criteria is indicative of FDEP acknowledging its prior DO criteria were problematic, as is the newly adopted NNC guidance for streams (FDEP 2013) which require biological confirmation of a nutrient problem prior to placing a stream on the Verified Impaired list. However, the streams listed above already have TMDLs developed for them, and their TMDLs are based on the highly problematic prior DO criteria that FDEP used for target setting in their nutrient load reduction calculations.

9.5. Summary of implications

Numerous impaired waterbodies are located in Polk County and will require the development of a TMDL (or a similar FDEP-approved water quality management plan) to address potential load reductions to improve water quality. It is imperative that proper nutrient targets are used as the baseline for impairment designations, as the implementation of very costly restoration projects hinges on these determinations. FDEP continues to make strides in updating the state-wide water quality standards to better reflect the variability and unique water quality conditions found throughout the state. The adoption of the NNC provides an updated criteria by which fewer "false positives" or waterbodies designated as impaired for nutrients that have unique characteristics which allow for higher nutrient concentrations (i.e., dominate forested wetland boundary) would occur. It is recommended that a more extensive review of water quality should be performed for those waterbodies deemed impaired using the previous water quality standards for nutrients in lakes and streams prior to TMDL development.

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