FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Environmental Assessment and Restoration

Bureau of Watershed Restoration

SOUTHWEST DISTRICT • MANATEE RIVER BASIN

TMDL Report

Dissolved Oxygen TMDL for Nonsense Creek, WBID 1913

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TMDL Program

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http://www.dep.state.fl.us/water/tmdl/docs/AmendedIWR.pdf

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http://www.dep.state.fl.us/water/docs/2008_Integrated_Report.pdf

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Basin Status Report for the Manatee River Basin

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U.S. Environmental Protection Agency Region 4 Total Maximum Daily Loads in Florida

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Chapter 1: INTRODUCTION

1.1 Purpose of Report

This report presents the Total Maximum Daily Load (TMDL) for dissolved oxygen (DO) for Nonsense Creek (also referred to as Unnamed Stream) in the Manatee River Planning Unit of the Manatee River Basin. The stream was verified as impaired for DO and was included on the Verified List of impaired waters for the Manatee River Basin (under the name of Unnamed Stream) that was adopted by Secretarial Order in May 27, 2004. This TMDL establishes the allowable loadings to Nonsense Creek that would restore the waterbody so that it meets its' applicable water quality criteria for DO.

1.2 Identification of Waterbody

Nonsense Creek is located in the central portion of Manatee County, situated between the City of Bradenton to the northwest and the City of Sarasota to the southwest, along the I-75 corridor (**Figure 1.1)**. Nonsense Creek flows primarily in a south/southwesterly direction toward the Braden River and drains an area approximately 1.4 square miles (**Figure 1.2)**. The creek is approximately 0.9 miles long and is a first order stream flowing from a small lake surrounded by marsh at the headwaters. This area in Manatee County is experiencing increased development with commercial centers and medium- to high-density housing.

For assessment purposes, the Florida Department of Environmental Protection (Department) has divided the Manatee River Basin into water assessment polygons with a unique **w**ater**b**ody **id**entification (WBID) number for each watershed or stream reach. This TMDL addresses WBID 1913, Nonsense Creek, for dissolved oxygen.

Nonsense Creek is part of the Manatee River Planning Unit. Planning units are groups of smaller watersheds (WBIDs) that are part of a larger basin unit, in this case the Manatee River Basin. The Manatee River Planning Unit consists of 61 WBIDs. **Figure 1.3** shows the locations of these WBIDs and Nonsense Creek's location in the planning unit.

1.3 Background

This report was developed as part of the Department's watershed management approach for restoring and protecting state waters and addressing TMDL Program requirements. The watershed approach, which is implemented using a cyclical management process that rotates through the state's 52 river basins over a 5-year cycle, provides a framework for implementing the TMDL Program–related requirements of the 1972 federal Clean Water Act and the 1999 Florida Watershed Restoration Act (FWRA) (Chapter 99-223, Laws of Florida).

A TMDL represents the maximum amount of a given pollutant that a waterbody can assimilate and still meet water quality standards, including its applicable water quality criteria and its designated uses. TMDLs are developed for waterbodies that are verified as not meeting their water quality standards. They provide important water quality restoration goals that will guide restoration activities.

Figure 1.1. Location of the Nonsense Creek (WBID 1913) in Manatee County

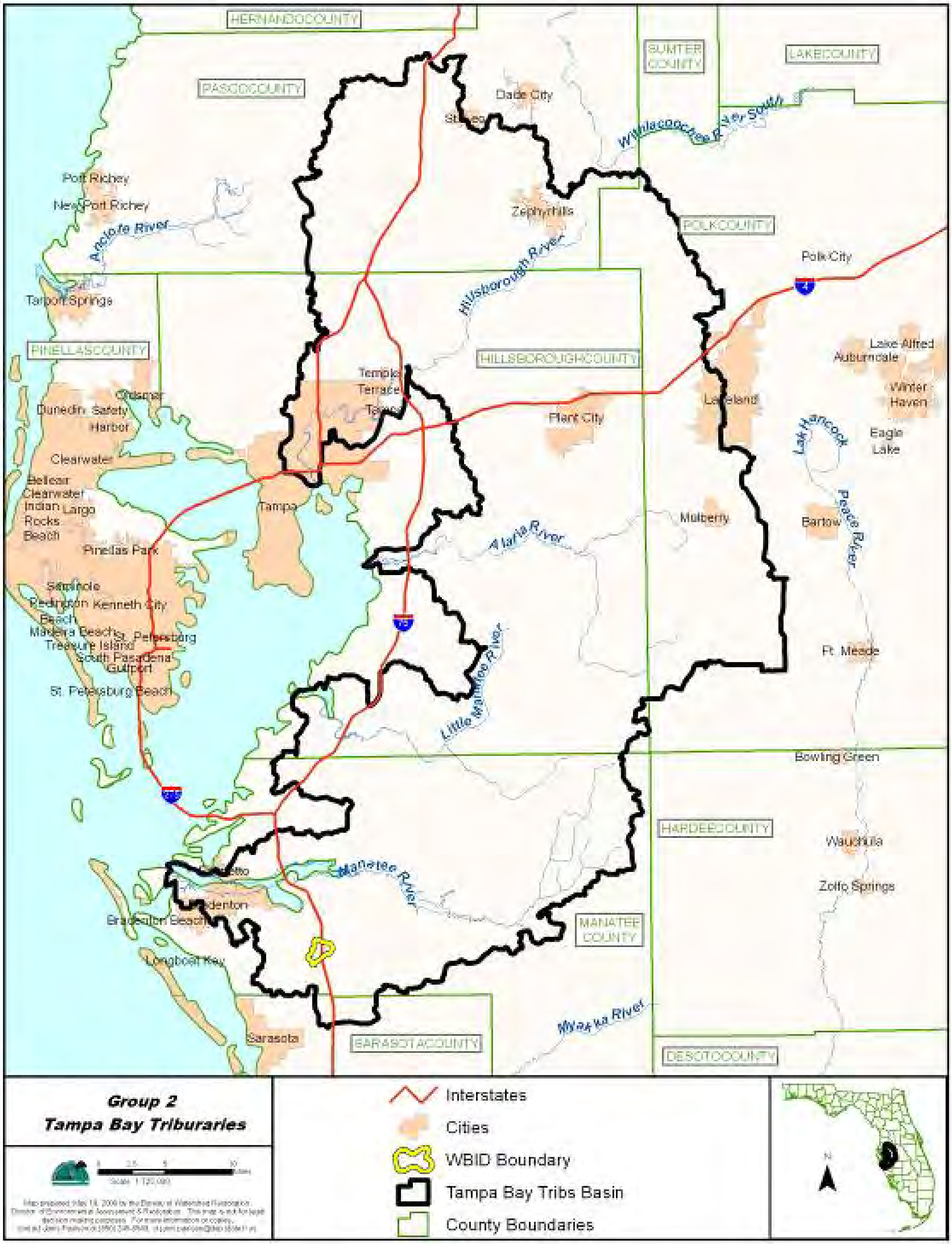


Figure 1.2. Location of the Nonsense Creek (WBID 1913) in Manatee County and Major Hydrological Features in the Area

Figure 1.3. WBIDs in the Manatee River Planning Unit

This TMDL Report will be followed by the development and implementation of a restoration plan, designed to reduce the amount of nutrients that caused the verified impairment of Nonsense Creek. These activities will depend heavily on the active participation of the Southwest Florida Water Management District (SWFWMD), Manatee County, local governments, local businesses, and other stakeholders. The Department will work with these organizations and individuals to undertake or continue reductions in the discharge of pollutants and achieve the established TMDLs for impaired waterbodies.

Chapter 2: DESCRIPTION OF WATER QUALITY PROBLEM

2.1 Statutory Requirements and Rulemaking History

Section 303(d) of the federal Clean Water Act requires states to submit to the U.S. Environmental Protection Agency (EPA) lists of surface waters that do not meet applicable water quality standards (impaired waters) and establish a TMDL for each pollutant causing the impairment of listed waters on a schedule. The Department has developed such lists, commonly referred to as 303(d) lists, since 1992. The list of impaired waters in each basin, referred to as the Verified List, is also required by the FWRA (Subsection 403.067[4], Florida Statutes [F.S.]); the state's 303(d) list is amended annually to include basin updates.

Florida's 1998 303(d) list included 10 waterbodies in the Manatee River Basin. However, the FWRA (Section 403.067, F.S.) stated that all previous Florida 303(d) lists were for planning purposes only and directed the Department to develop, and adopt by rule, a new science-based methodology to identify impaired waters. After a long rulemaking process, the Environmental Regulation Commission adopted the new methodology as Rule 62-303, Florida Administrative Code (F.A.C.) (Identification of Impaired Surface Waters Rule, or IWR), in April 2001; the rule was modified in 2006 and 2007.

2.2 Information on Verified Impairment

The Department used the IWR to assess water quality impairments in the Nonsense Creek watershed and verified that this waterbody segment is impaired for dissolved oxygen based on data in the Department's IWR database for the period January 1996 – June 2003. **Tables 2.1** through **2.4** summarize the more recent dissolved oxygen data for the second cycle verification period, which for Group 2 waters was January 1, 2001, through June 30, 2008, by overall, month, season, and year, respectively.

There is an 18.2 percent overall exceedance rate for dissolved oxygen in Nonsense Creek during the verified period (**Table 2.1**). Exceedances occur in all seasons and in all months except for January, March, and September (**Tables 2.2** and **2.3**). During the verified period, samples ranged from 1.3 to 16.3 milligrams per liter (mg/L).

When aggregating data collected during the verified period (January 2000 – June 2008) by season, the lowest percentage of exceedances occurred in the fall and the highest in summer. Possible relationships between DO and other water quality parameters will be further assessed using the complete historical dataset in Chapter 5.

Table 2.1. Summary of DO Monitoring Data for Nonsense Creek (WBID 1913) During the Verified Period (January 1, 2001 – June 30, 2008)

Waterbody (WBID)	Parameter	Dissolved Oxygen
Nonsense Creek (1913)	Total number of samples	77
	IWR-required number of exceedances for the Verified List	12
	Number of observed exceedances	14 (18.2%)
	Number of observed non-exceedances	63
	Number of seasons during which samples were collected	4
	Highest observation (mg/L)	16.3
	Lowest observation (mg/L)	1.3
	Median observation (mg/L)	5.5
	Mean observation (mg/L)	5.6
	Median value for 76 BOD observations (mg/L)	2.8
	Median value for 72 TN observations (mg/L)	0.95
	Median value for 71 TP observations (mg/L)	0.06
	Possible causative pollutant by IWR	BOD
	FINAL ASSESSMENT	**Impaired**

Table 2.2. Summary of DO Data by Month for the Verified Period (January 1, 2001 – June 30, 2008)

Month	Observations	Minimum	Maximum	Median	Mean	No of Exceedances	% Exceedance	Mean Precipitation (inches)
January	8	5.0	8.9	7.4	7.3	0	0.0%	2.32
February	8	4.2	13.6	7.3	7.8	1	12.5%	3.08
March	6	5.0	8.6	6	6.5	0	0.0%	3.37
April	6	2.0	7.5	5	5.1	1	16.7%	2.37
May	4	3.1	5.6	5	4.6	2	50.0%	2.14
June	6	3.2	6.6	5.8	5.5	1	16.7%	9.29
July	7	4.0	6.3	5.3	5.2	2	28.6%	8.75
August	5	3.4	6.2	5.5	5.2	1	20.0%	9.95
September	7	5.0	6.7	5.8	5.8	0	0.0%	9.32
October	7	2.9	16.3	6.15	6.7	3	42.9%	3.13
November	7	4.5	8.5	6.9	6.5	1	14.3%	1.50
December	6	4.2	9.4	6.5	6.3	2	33.3%	2.98

Table 2.3. Summary of DO Data by Year for the Verified Period (January 1, 2001 – June 30, 2008)

Season	Observations	Minimum	Maximum	Median	Mean	No of Exceedances	% Exceedance	Mean Precipitation (inches)
Winter	22	4.2	13.6	7.35	7.26	1	4.55%	8.10
Spring	16	2	7.5	5.5	5.14	4	25.00%	13.80
Summer	19	3.4	6.7	5.4	5.43	3	15.79%	28.02
Fall	20	2.9	16.3	6.25	6.48	6	30.00%	7.61

Table 2.4 Summary of DO Data by Year for the Verified Period (January 1, 2001 – June 30, 2008)

Year	Observations	Minimum	Maximum	Median	Mean	No of Exceedances	% Exceedance	Total Precipitation (inches)
2001	7	4.6	8.2	5	5.8	1	14.29%	68.25
2002	9	4	7.57	6.3	6.4	1	11.11%	68.27
2003	12	2	8.9	5.65	5.8	3	25.00%	61.94
2004	11	5.2	16.3	7.3	8.3	0	0.00%	54.73
2005	12	5.3	8.7	6.45	6.7	0	0.00%	55.21
2006	12	4	7.4	5.45	5.6	2	16.67%	60.30
2007	12	2.9	8.4	4.75	4.8	6	50.00%	37.23
2008	2	4.2	5.8	5	5	1	50.00%	18.65

*Data only extend through June 30, 2008

Chapter 3. DESCRIPTION OF APPLICABLE WATER QUALITY STANDARDS AND TARGETS

3.1 Classification of the Waterbody and Criteria Applicable to the TMDL

Florida's surface waters are protected for five designated use classifications, as follows:

Class I	**Potable water supplies**
Class II	**Shellfish propagation or harvesting**
Class III	**Recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife**
Class IV	**Agricultural water supplies**
Class V	**Navigation, utility, and industrial use (there are no state waters currently in this class)**

Nonsense Creek (WBID 1913) is a Class I waterbody, with a designated use of potable water supplies. The Class I water quality criterion applicable to the impairment addressed by this TMDL is for dissolved oxygen.

3.2 Applicable Water Quality Standards and Numeric Water Quality Target

Numeric criteria for DO are expressed in terms of minimum and daily average concentrations. The water quality criterion for the protection of Class I waters, as established by Rule 62-302, F.A.C., states the following:

> ***Dissolved Oxygen Criteria:***
> *Shall not be less than 5.0. Normal daily and seasonal fluctuations above these levels shall be maintained.*

The IWR assessment linked BOD as the causative pollutant for the low dissolved oxygen exceedances. The biological oxygen demand (BOD) criterion in Rule 62-302, F.A.C., is expressed as a narrative:

> ***BOD:***
> *Shall not be increased to exceed values which would cause dissolved oxygen to be depressed below the limit established for each class, and in no case, shall it be great enough to produce nuisance conditions.*

BOD is a measure of the oxygen used by microorganisms to decompose organic waste present in a body of water. When organic matter such as dead plants, leaves, grass clippings, manure, or sewage is present, the bacteria will begin the process of breaking down this waste. The demand for dissolved oxygen increases when decomposition happens, due to all of the bacteria, so the BOD level will be high. As the waste is consumed or dispersed through the water, the BOD levels will begin to decline. It is not a precise quantitative test, although it is widely used as an indication of the quality of water.

Nitrogen and phosphorus in body of water can contribute to high BOD levels. They are plant nutrients and can cause plant life and algae to grow quickly. When the plants die, this contributes to the organic waste in the water, which is then decomposed by bacteria. When BOD levels are high, dissolved oxygen levels decrease in the body of water. Since less dissolved oxygen is available in the water, fish and other aquatic organisms may not survive.

3.2.1 Identification of Causative Pollutants

After verification of the low dissolved oxygen in Nonsense Creek, the causative pollutants were identified by investigating those parameters typically responsible for depressed DO. These included nutrients, nitrogen and phosphorus, and BOD_5. One method of identifying causative pollutants is to use statewide screening level concentrations set at the 70th percentile of all STORET data across the state from 1970 to 1987 (Freidemann and Hand, July 1989). This approach is useful if there are no significant regional differences in what is defined as a waterbody meeting its' intended designated uses. The Department's statewide screening level for streams is 2.0 mg/L for BOD_5, 1.6 mg/L for TN, and 0.22mg/L for TP. To determine a nutrient or BOD_5 level protective of a dissolved oxygen concentration of 5.0 mg/L or greater a reference approach was used, which is discussed further in Chapter 5.

Chapter 4: ASSESSMENT OF SOURCES

4.1 Types of Sources

An important part of the TMDL analysis is the identification of pollutant source categories, source subcategories, or individual sources of pollutants in the watershed and the amount of pollutant loading contributed by each of these sources. Sources are broadly classified as either "point sources" or "nonpoint sources." Historically, the term "point sources" has meant discharges to surface waters that typically have a continuous flow via a discernable, confined, and discrete conveyance, such as a pipe. Domestic and industrial wastewater treatment facilities (WWTFs) are examples of traditional point sources. In contrast, the term "nonpoint sources" was used to describe intermittent, rainfall-driven, diffuse sources of pollution associated with everyday human activities, including runoff from urban land uses, agriculture, silviculture, and mining; discharges from failing septic systems; and atmospheric deposition.

However, the 1987 amendments to the Clean Water Act redefined certain nonpoint sources of pollution as point sources subject to regulation under the EPA's National Pollutant Discharge Elimination System (NPDES) Program. These nonpoint sources included certain urban stormwater discharges, including those from local government master drainage systems, construction sites over five acres, and a wide variety of industries (see **Appendix A** for background information on the federal and state stormwater programs).

To be consistent with Clean Water Act definitions, the term "point source" will be used to describe traditional point sources (such as domestic and industrial wastewater discharges) **AND** stormwater systems requiring an NPDES stormwater permit when allocating pollutant load reductions required by a TMDL (see **Section 6.1**). However, the methodologies used to estimate nonpoint source loads do not distinguish between NPDES stormwater discharges and non-NPDES stormwater discharges, and as such, this source assessment section does not make any distinction between the two types of stormwater.

4.2 Potential Sources of Nutrients in the Nonsense Creek Watershed

4.2.1 Point Sources

There are no NPDES permitted wastewater facilities discharging directly or indirectly into the watershed.

Municipal Separate Storm Sewer System Permittees

The stormwater collection systems owned and operated by Manatee County and Co-Permittees (FDOT District 1) are covered by a Phase I NPDES municipal separate storm sewer system (MS4) permit (FLS000036). There are no Phase II MS4 permits identified for these waterbodies.

4.2.2 Land Uses and Nonpoint Sources

Nutrient loadings to Nonsense Creek are generated from nonpoint sources in the watershed. These potential sources include loadings from surface runoff, ground water inflow, and septic tanks.

Land Uses

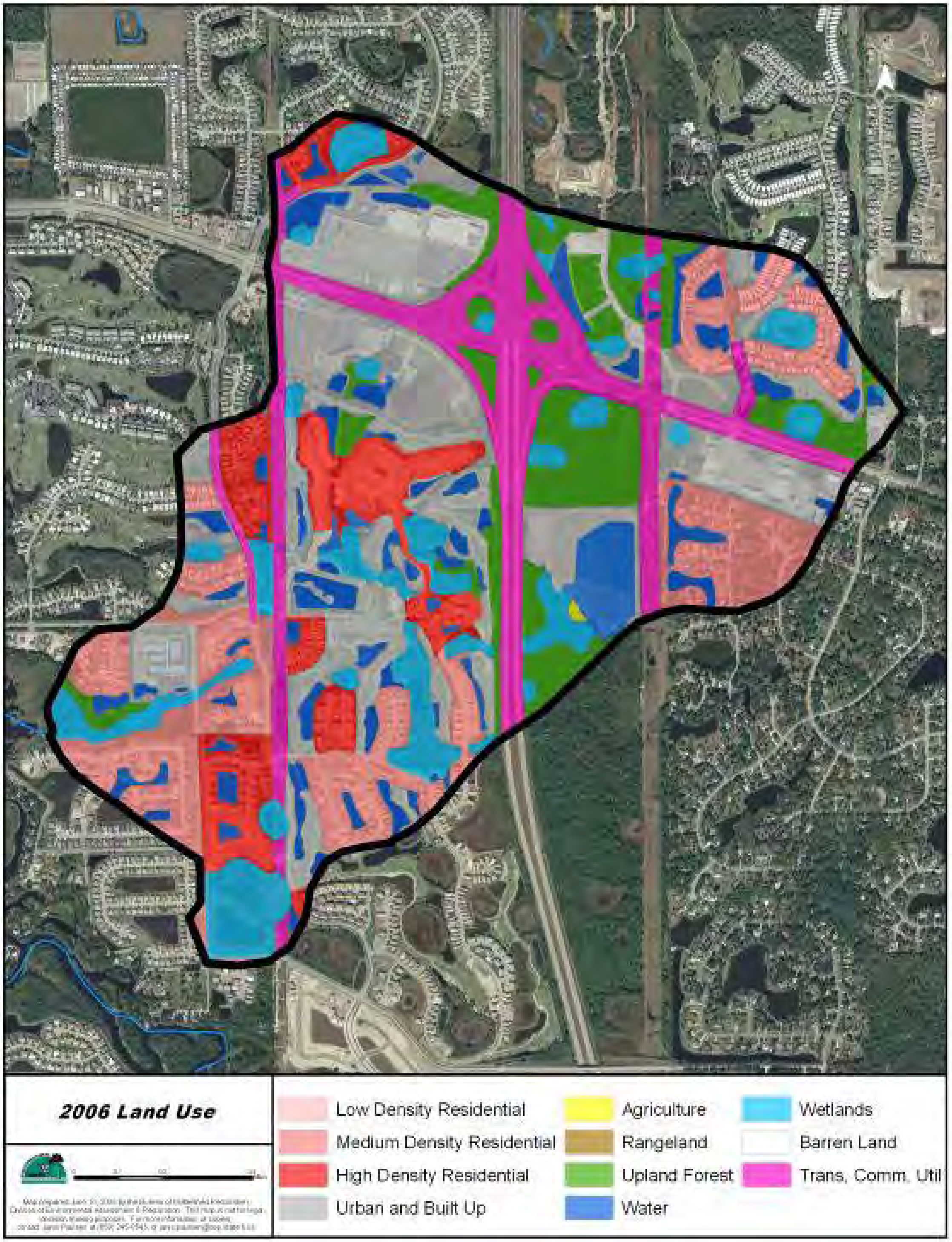
The spatial distribution and acreage of different land use categories were identified using the SWFWMD's year 2006 land use coverage (scale 1:51,000) contained in the Department's geographic information system (GIS) library. Land use categories in the watershed were aggregated using the Level 3 land use codes and tabulated in **Table 4.1**. **Figure 4.1** shows the acreage of the principal land uses in the watershed at the Level 3 land use code.

As shown in **Table 4.1**, the total area of the Nonsense Creek watershed (WBID 1913) is about 1,190 acres. The dominant land use category is urban land use (urban and built-up; low-, medium-, and high-density residential; and transportation, communication, and utilities) which accounts for about 69.1 percent of the total basin area. Of the 822 acres of urban lands, residential land use occupies about 335 acres, or about 28.1 percent of the total basin area. Natural land use areas, which include water/wetlands, upland forest, and barren land, occupy about 366 acres, accounting for about 30.8 percent of the total basin area.

Table 4.1. Classification of Land Use Categories in the Nonsense Creek Watershed

Level 4 Land Use Code	Description	Acres	% of Total
1100	Residential, Low Density <Less than two dwelling units per acre>	0.26	0.02%
1200	Residential, Medium Density <Two-five dwelling units per acre>	218.04	18.32%
1300	Residential, High Density	116.31	9.77%
1400	Commercial and Service	98.71	8.30%
1700	Institutional	19.05	1.60%
1820	Golf Courses	116.79	9.81%
1900	Open Land	83.08	6.98%
2600	Other Open Lands <Rural>	0.75	0.06%
3200	Shrub and Brush land	0.84	0.07%
4110	Pine Flatwoods	93.73	7.88%
4340	Hardwood - Coniferous Mixed	29.37	2.47%
5300	Reservoirs	115.43	9.70%
6150	Streams and Lake Swamps (Bottomland)	63.54	5.34%
6210	Cypress	1.69	0.14%
6410	Freshwater Marshes	51.35	4.32%
6430	Wet Prairies	8.23	0.69%
6440	Emergent Aquatic Vegetation	3.21	0.27%
8100	Transportation	120.49	10.13%
8300	Utilities	49.12	4.13%

Figure 4.1. Principal Land Uses in the Nonsense Creek Watershed



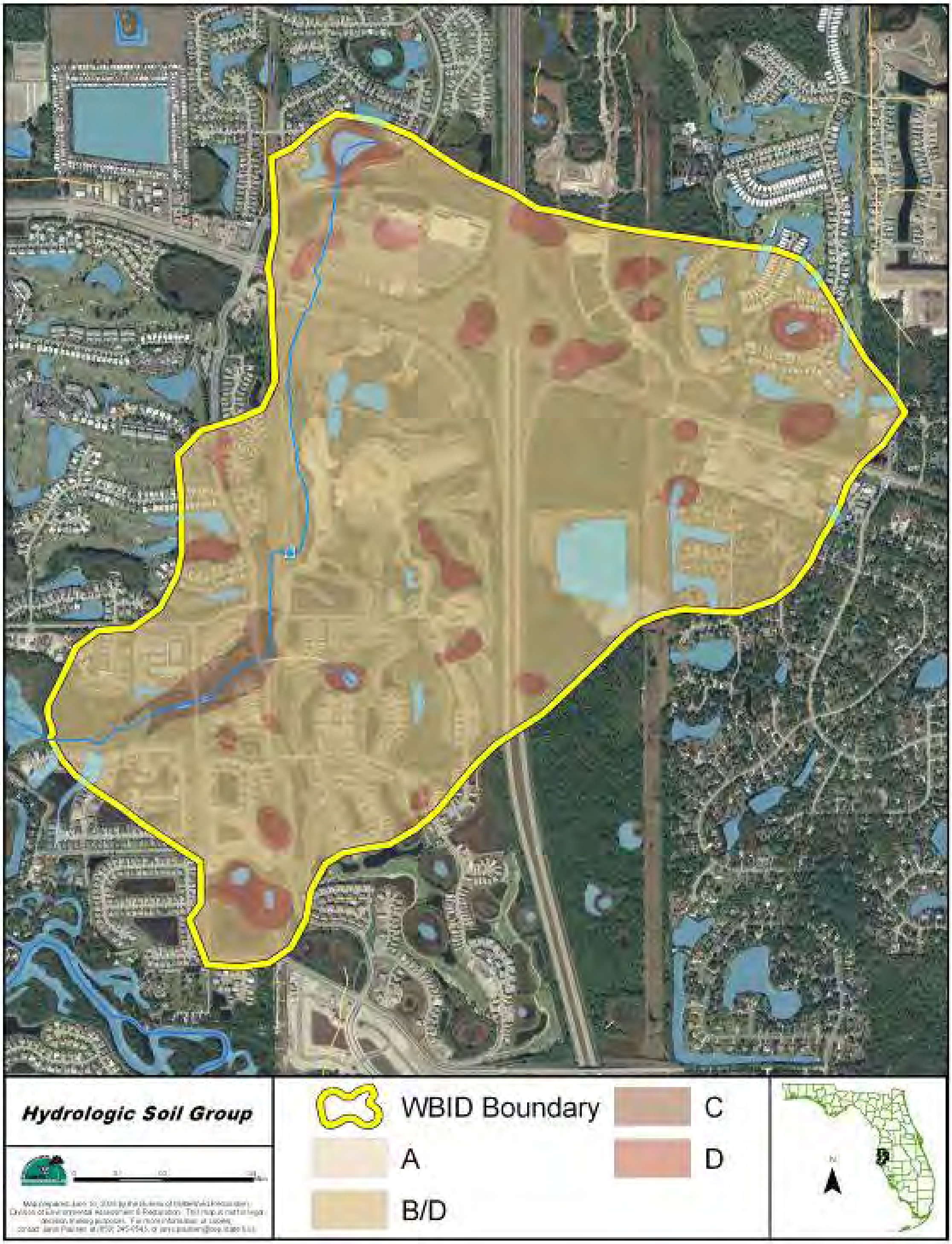
Soil Characteristics

The Soil Survey Geographic Database (SSURGO) in the Department's GIS database from the SWFWMD was accessed to provide coverage of hydrologic soil groups in the Nonsense Creek watershed (**Figure 4.2**). **Table 4.2** briefly describes the major hydrology soil classes. Soil group B/D (89.2%) is the predominant soil type interspersed with soil group D (8.4%).

Table 4.2. Description of Hydrologic Soil Classes from the SSURGO Database

Hydrology Class	Description	% of Total
A	High infiltration rates. Soils are deep, well-drained to excessively drained sands and gravels.	0.60
A/D	Drained/undrained hydrology class of soils that can be drained and are classified.	Not present
B	Moderate infiltration rates. Deep and moderately deep, moderately well- and well-drained soils that have moderately coarse textures.	Not present
B/D	Drained/undrained hydrology class of soils that have moderately coarse textures.	89.19
C	Slow infiltration rates. Soils with layers impeding downward movement of water, or soils that have moderately fine or fine textures.	1.80
C/D	Drained/undrained hydrology class of soils that can be drained and classified.	Not present
D	Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.	8.41

Figure 4.2. Hydrologic Soil Groups Distribution in the Nonsense Creek Watershed



Population

Household size and housing unit information from the 2000 census at the block level was obtained from the U.S Census Bureau. GIS was used to estimate the fraction of each block in the Nonsense Creek watershed and then applied to the block information to estimate the population. Based on **Table 4.3**, the population in the watershed is estimated at 4,512, along with 2,056 housing units.

Table 4.3. Estimated Average Household Size in the Nonsense Creek Watershed

Tract	Block	Census Block Area	Estimated Block Area in Watershed	Housing Units in Census Block	Housing Units in Watershed	Average Household Size	Population
20.04	3	1267.11	125.22	787	78	2.65	207
20.05	1	519.87	1.09	627	2	1.99	4
20.05	2	1250.69	645.75	237	122	2.22	271
20.07	1	8946.59	186.98	501	11	2.42	27
20.08	1	1278.55	229.84	590	106	2.91	309
20.08	2	973.25	1.89	1233	3	2.97	9
Estimated Total					**322**		**827**

Data from U.S. Census Bureau Website, 2000, based Manatee County blocks that are present in the Nonsense Creek watershed.
Census Block Area in acres.

Septic Tanks

Based on 2008 Florida Department of Health (FDOH) onsite sewage GIS coverage (http://www.doh.state.fl.us/environment/programs/EhGis/EhGisDownload.htm), and on the 2000 census estimates, it was reasoned the medium-density residences within the Census Tract 20.08, Block 1, in the Nonsense Creek watershed are using septic tanks (**Figure 4.3**) estimated to be 55 residences. Using 70 gallons/day/person (EPA, 1999), and drainfield total nitrogen (TN) and total phosphorus (TP) concentrations of 36 mg/L and 15 mg/L, respectively, potential annual ground water loads of TN and TP were calculated. This is a screening level calculation, and soil types, the age of the system, vegetation, proximity to a receiving water, and other factors will influence the degree of attenuation of this load (**Table 4.4**).

Leaking or Overflowing Wastewater Collection Systems

Other than the estimated 55 residences are currently using septic tank systems, the remaining 772 medium- and high-density residential units are likely connected to a municipal wastewater facility. An EPA Region 4 memorandum on estimating water quality loadings from MS4 areas (EPA, 2000) suggests that a 5 percent leakage rate from collection systems is realistic. Using the 2000 Census block information, a 5 percent leakage for 70 gallon per person per day discharge, and EPA values for nitrogen and phosphorus concentration in raw sewage yield potential annual loading of nitrogen and phosphorus of 1,229 lbs/yr and 512 lbs/yr, respectively (**Table 4.5**).

Table 4.4. Estimated Nitrogen and Phosphorus Annual Loading from Septic Tanks in the Nonsense Creek Watershed

Tract	Block	Estimated Number of Households on Septic	Average Household Size	Gallons/Person/Day[1]	TN in Drainfield (mg/L)	TP in Drainfield (mg/L)	Estimated Annual TN Load (lbs/yr)	Estimated Annual TP Load (lbs/yr)
20.08	1	55	2.91	70	36	15	1,229	512
Estimated Total							1,229	512

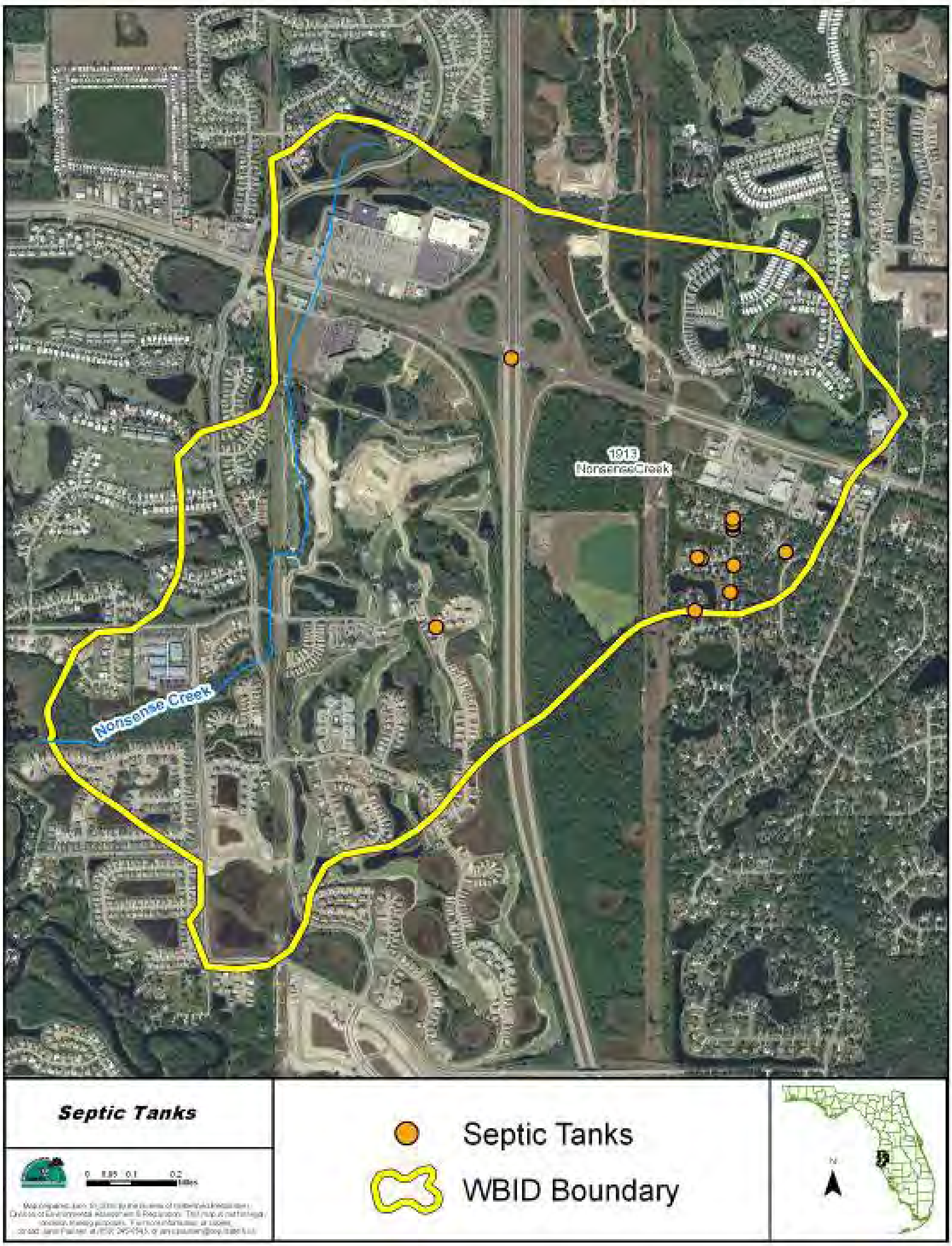
[1]EPA, 1999

Table 4.5. Estimated Nitrogen and Phosphorus Annual Loading from Wastewater Collection Systems in the Nonsense Creek Watershed

Tract	Block	Estimated Number of Households on Sewer	Average Household Size	Gallons/Person/Day[1]	TN in Sewage (mg/L)	TP in Sewage (mg/L)	Estimated Annual TN Load (lbs/yr)	Estimated Annual TP Load (lbs/yr)
20.04	3	78	2.65	3.5	36	15	79	33
20.05	1	2	1.99	3.5	36	15	2	1
20.05	2	122	2.22	3.5	36	15	104	43
20.07	1	11	2.42	3.5	36	15	10	4
20.08	1	51	2.91	3.5	36	15	57	24
20.08	2	3	2.97	3.5	36	15	3	1
Estimated Total							**255**	**106**

[1]EPA, 2002; based on 70 gallons/per person/day with a leakage rate of 5 percent

Figure 4.3. Distribution of Onsite Sewage Disposal Systems (Septic Tanks) in the Nonsense Creek Watershed



4.3 Source Summary

4.3.1 Summary of Nutrient Loadings to Nonsense Creek from Various Sources

Screening level estimates of annual nitrogen and phosphorus loadings to the watershed were developed based on the 2006 land use and hydrologic soil groups. GIS shapefiles of land use and hydrologic soil groups were used to determine the acreage associated with various Level 2 land uses and soils. Estimates for annual runoff coefficients and event mean concentrations (EMCs) were based on Harper and Baker (2007) and Gao (2006). A screening level estimate of annual runoff was calculated by multiplying the long-term annual average rainfall of 52.4 inches (Bradenton 5ESE, 1965-2008) by the respective runoff coefficient and area. Estimates of annual nitrogen and phosphorus loading were obtained by multiplying the annual runoff by the corresponding EMC. A more detailed loading analysis could be performed based on development of site specific runoff coefficients, EMCs, and knowledge of Best Management Practices (BMPs) that have been implemented in the watershed.

Agriculture

At the level 3 land use category, one agricultural code was identified in the Nonsense Creek watershed. According to Harper et al. (2007), mean stormwater concentrations for total nitrogen and total phosphorus from general agriculture are 2.79 mg/L and 0.431 mg/L respectively. **Table 4.6** summarizes the screening level estimates for nitrogen and phosphorus loads from agricultural sources.

Table 4.6. Estimated Annual Average TN and TP Loads from Agriculture in the Nonsense Creek Watershed

Land Use Classification	Soil Group	Acres	Annual Runoff Coefficient	Gross Runoff (AcreFt)	Estimated TN Load (lbs)	Estimated TP Load (lbs)
Other Open Lands <Rural>	B/D	0.75	0.089	0.29	2.21	0.34
SUM		**0.75**		**0.29**	**2.21**	**0.34**

Urban Areas

There are 652 acres in the Level 1 category of urban and built-up in the watershed with 99 acres (8.3%) in commercial and service. Medium- and high-density residential represents approximately 28% of the total acreage in the watershed. Transportation, communication and utilities represent about 14% of the watershed area or 169 acres. Large portions of the remaining acreage, approximately 116 acres, are golf courses. **Table 4.7** summarizes the screening level estimates for nitrogen and phosphorus loads from urban and built-up categories in the watershed.

Table 4.7. Estimated Urban and Built-up Annual Nitrogen and Phosphorus Loading in the Nonsense Creek Watershed

Land Use Classification	Soil Group	Acres	Annual Runoff Coefficient	Gross Runoff (AcreFt)	Estimated TN Load (lbs)	Estimated TP Load (lbs)
Residential, low density - less than 2 dwelling units/acre	B/D	0.26	0.08	0.09	0.70	0.11
Residential, medium density - 2-5 dwelling units/acre	A	0.21	0.04	0.04	0.29	0.04
	B/D	197.91	0.11	93.33	708.11	109.14
	C	12.48	0.19	10.13	76.88	11.85
	D	7.44	0.25	8.19	62.12	9.57
Residential, high density - 6 or more dwelling units/acre	B/D	109.64	0.24	114.90	871.77	134.36
	D	6.66	0.35	10.19	77.28	11.91
Commercial and services	B/D	90.70	0.35	138.62	1051.72	162.09
	D	8.01	0.44	15.21	115.42	17.79
Institutional	B/D	17.57	0.24	18.49	140.27	21.62
	C	1.48	0.31	2.00	15.17	2.34
Golf Courses	B/D	112.27	0.09	43.63	331.05	51.02
	D	4.51	0.23	4.45	33.79	5.21
Open land	A	0.96	0.02	0.09	0.67	0.10
	B/D	81.05	0.09	31.50	238.99	36.83
	D	1.06	0.23	1.05	7.96	1.23
Transportation	B/D	108.65	0.29	139.02	1054.71	162.55
	C	0.32	0.35	0.49	3.69	0.57
	D	11.52	0.38	18.86	143.07	22.05
Utilities	A	1.83	0.15	1.18	8.95	1.38
	B/D	44.52	0.28	54.04	410.04	63.20
	C	0.47	0.33	0.68	5.16	0.79
	D	2.30	0.38	3.76	28.55	4.40
SUM		**821.84**		**709.95**	**5,386**	**830**

Forest/Wetland/Water/Open Lands Areas

Estimates for nitrogen and phosphorus loadings from land uses in the forest, wetland, and water level 2 classifications are summarized in **Table 4.8**. Wetlands and upland forests represented 11.7 and 1.7 percent, respectively of the acreage in the watershed.

Table 4.8. Estimated Forest/Wetland/Water/Open Lands Annual Nitrogen and Phosphorus Loading in the Nonsense Creek Watershed

Land Use Classification	Soil Group	Acres	Annual Runoff Coefficient	Gross Runoff (AcreFt)	Estimated TN Load (lbs)	Estimated TP Load (lbs)
Shrub and Brushland	B/D	0.84	0.09	0.33	2.47	0.38
	D	0.00	0.23	0.00	0.03	0.00
Pine Flatwoods	A	0.01	0.02	0.00	0.01	0.00
	B/D	87.68	0.09	33.93	257.45	39.68
	C	0.27	0.17	0.20	1.51	0.23
	D	5.76	0.23	5.67	43.04	6.63
Hardwood Conifer Mixed	B/D	24.88	0.09	9.63	73.04	11.26
	D	4.50	0.23	4.43	33.61	5.18
Reservoirs	A	3.89	0.44	7.39	56.04	8.64
	B/D	106.48	0.44	202.44	1535.91	236.72
	C	1.16	0.44	2.20	16.72	2.58
	D	3.90	0.44	7.41	56.26	8.67
Stream and Lake Swamps (Bottomland)	A	0.27	0.44	0.52	3.93	0.61
	B/D	53.73	0.44	102.15	775.02	119.45
	C	5.19	0.44	9.87	74.85	11.54
	D	4.34	0.44	8.26	62.64	9.65
Cypress	B/D	1.69	0.44	3.21	24.39	3.76
Freshwater Marshes	B/D	13.51	0.44	25.69	194.92	30.04
	D	37.83	0.44	71.93	545.72	84.11
Wet Prairies	B/D	6.24	0.44	11.86	89.95	13.86
	D	1.99	0.44	3.78	28.69	4.42
Emergent Aquatic Vegetation	B/D	2.99	0.44	5.69	43.15	6.65
	D	0.22	0.44	0.41	3.12	0.48
SUM		**367.38**		**517.00**	**3,922.45**	**604.54**

Table 4.9 summarizes the various estimates from various land uses in the watershed. It is important to note that this is not a complete list and represents estimates of potential loadings. In addition, proximity to the waterbody, site specific soil characteristics, and rainfall frequency and magnitude are just a few of the factors that could influence and determine the actual loadings from these sources that reach Nonsense Creek. For example, where are the improved pasture and high-density residential areas relative to Nonsense Creek, and is there riparian buffer areas between these land uses and the stream? What types of best BMPs, both structural and nonstructural, have been implemented for specific land uses in the watershed that reduce the actual nutrient loads delivered to Nonsense Creek? Finally, the age and condition of the septic systems and drainage characteristics in the watershed compared with the county overall could affect assumptions about the assimilation and/or retention of nutrients.

Table 4.9. Summary of Estimated Potential Annual Nitrogen and Phosphorus Loading from Various Sources in the Nonsense Creek Watershed

Source	Total Nitrogen (lbs/yr)	Total Phosphorus (lbs/yr)
Septic Tanks*	1,229	512
Leaking Collection Systems*	255	106
Agriculture	2.21	0.34
Urban and Built-up	5,386	830
Forest/Wetland/Water/Open Lands	3,922	604

*Potential contribution to ground water

Chapter 5: DETERMINATION OF ASSIMILATIVE CAPACITY

5.1 Determination of Loading Capacity

The TMDL methodology used for Nonsense Creek is the load duration curve. Also known as the "Kansas Approach" because it was developed by the state of Kansas, this method has been well documented in the literature, with improved modifications used by EPA Region 4. Basically, the method relates the pollutant concentration to the flow of the stream, in order to establish the existing loading capacity and the allowable pollutant load (TMDL) under a spectrum of flow conditions. It then determines the maximum allowable pollutant load and load reduction requirement based on the analysis of the critical flow conditions. This method requires four steps to develop the TMDL and establish the required load reduction:

1. Develop the flow duration curve,
2. Develop the load duration curve for both the allowable load and existing loading,
3. Define the critical conditions, and
4. Establish the needed load reduction by comparing the existing loading with the allowable load under critical conditions.

5.1.1 Data Used in the Determination of the TMDL

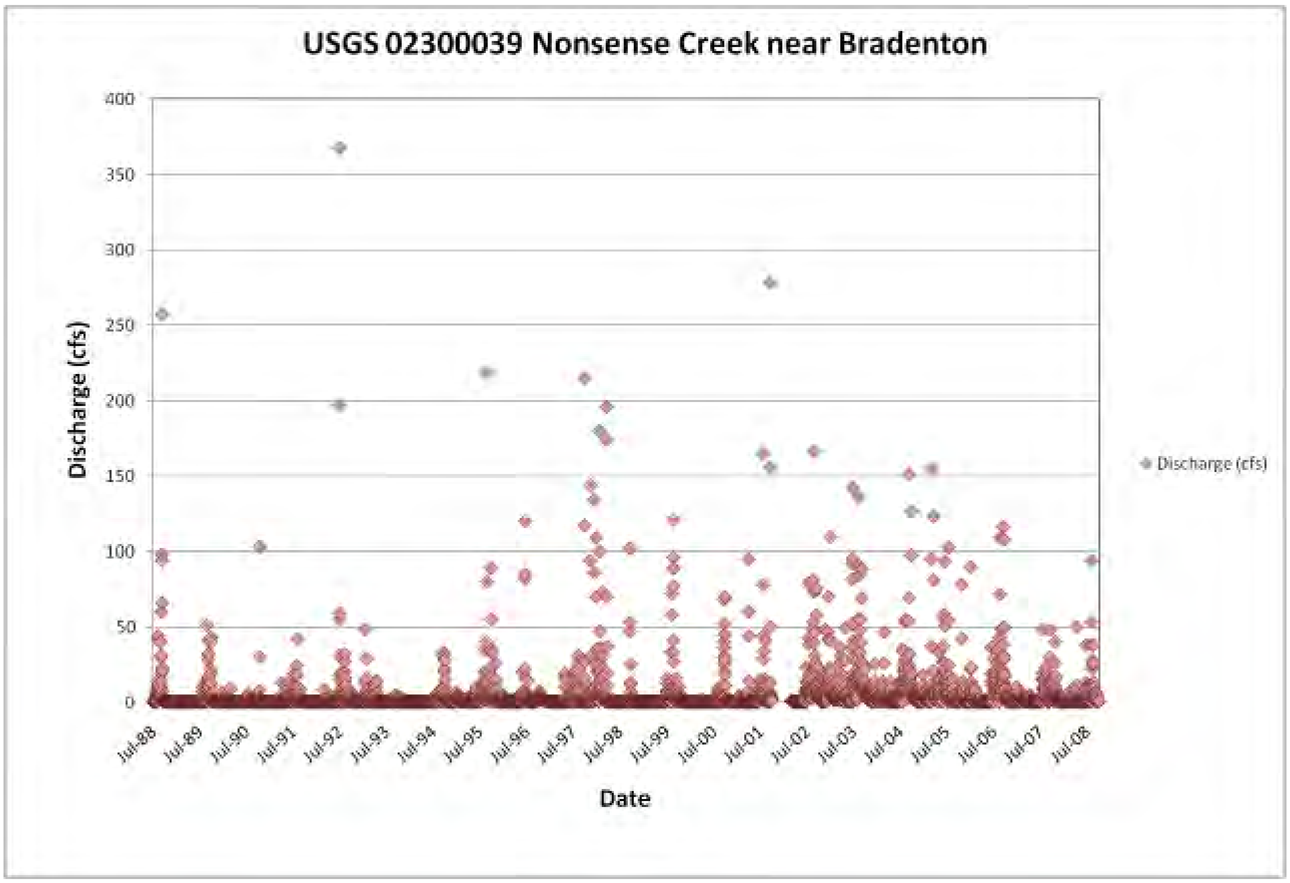
Total nitrogen concentration, BOD, and flow measurements were used to estimate both the allowable nutrient loads and existing nutrient loads. A USGS stream flow gaging site on Nonsense Creek (02300039) has daily discharge data over the period from July 1, 1988 to September 30, 2008 (**Figure 5.1**). **Table 5.1** provides physical and stream flow statistics for the gage.

Table 5.1. Physical and Statistical Summary for USGS Gaging Site in the Nonsense Creek Watershed

USGS Gage 02300039	
Drainage Area (square miles)	1.4
Period of Record	7/1/1988-9/30/2008
Mean Basin Elevation (feet)	20
Stream slope (feet/mile)	33
Flow Duration	**cfs**
1%	52.1
5%	9.05
10%	3.8
20%	1.4
25%	0.94
30%	0.59
40%	0.22

USGS Gage 02300039	
Flow Duration	**cfs**
50%	0.08
60%	0.02
70%	0
75%	0
80%	0
90%	0
95%	0
99%	0

Figure 5.1 Daily Discharge Recorded at USGS Gage 02300039: Nonsense Creek near Bradenton, FL



Two sampling stations on Nonsense Creek have historical observations for dissolved oxygen and nutrients (**Figure 5.2**). **Table 5.2** contains summary information for each of the stations. A statistical summary of major water quality parameters from the available data is presented in **Table 5.3**, and **Appendix B** contains historical 5-day biological oxygen demand (BOD_5) biological oxygen demand, dissolved oxygen (DO), total nitrogen (TN), and total phosphorus (TP) available observations from sampling sites in WBID 1913.

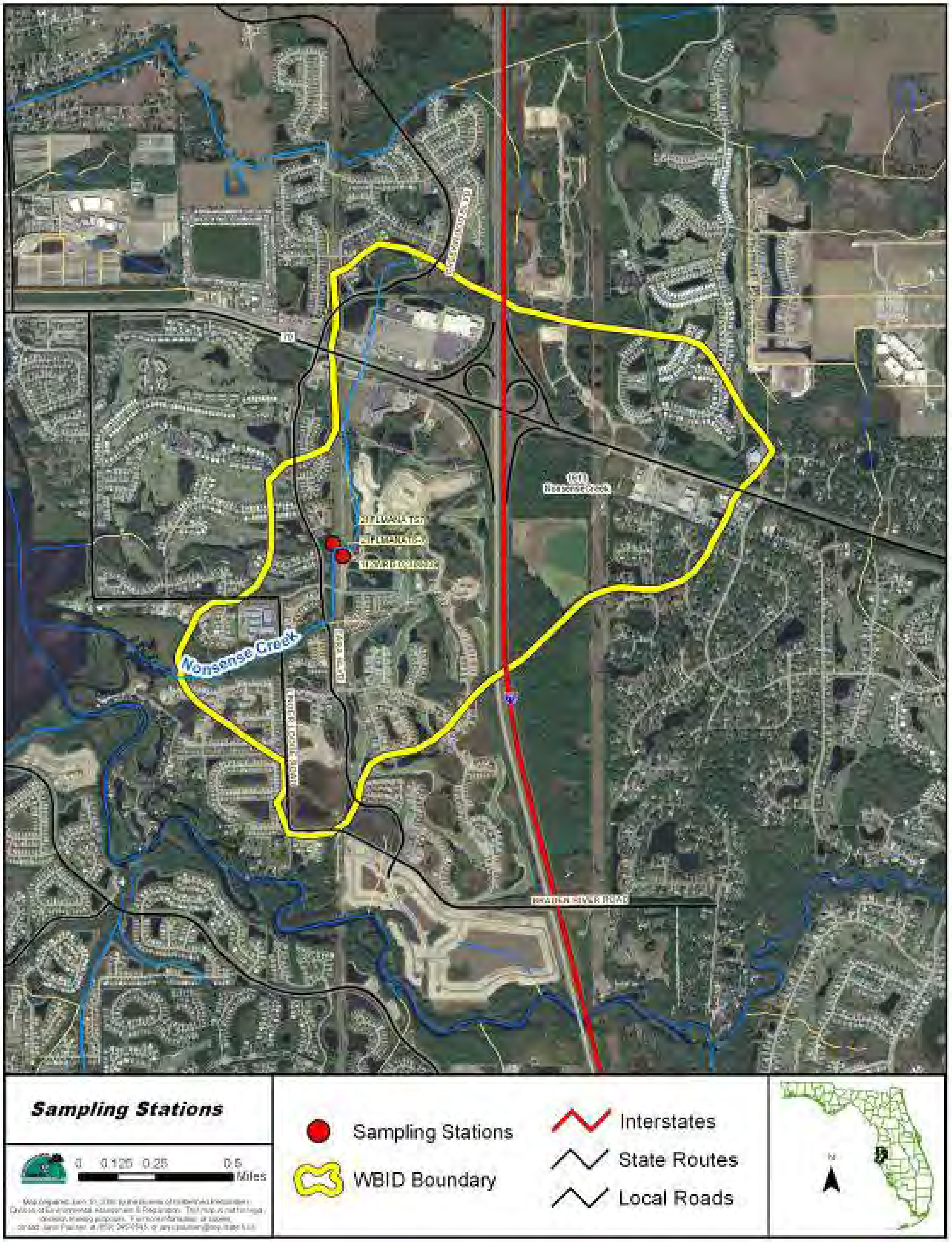
Table 5.2. Sampling Station Summary for the Nonsense Creek Watershed

Station	STORET ID	Station Owner	Years With Data	BOD Samples	DO Samples	TN Samples	TP Samples
Nonsense Creek	21FLMANATS7	Manatee County	1990-2008	129	224	207	203
Nonsense Creek Near Bradenton, FL	112WRD 023000039	USGS	1993-1997	0	4	14	14

Table 5.3. Summary Statistics for Major Water Quality Parameters Measured in Nonsense Creek

Parameter	Sample Number	Minimum	25th Percentile	Median	Mean	75th Percentile	Maximum
BOD5 (mg/L)	76	1.4	2.0	2.7	3.0	3.6	6.5
DO (mg/L)	80	2.0	5.0	6.0	6.2	7.1	16.3
TN (mg/L)	72	0.20	0.79	0.95	1.03	1.23	2.2
TP (mg/L)	71	0.01	0.06	0.06	0.21	0.16	1.9

Figure 5.2. Historical Sampling Sites in the Nonsense Creek Watershed



Figures 5.3 through **5.6** present the historical observations for DO, TN, TP and BOD over time. A linear regression was performed to determine if temporal changes explained the variance in the sample results. The correlation value, R^2, was calculated to determine if any variance was temporally dependent for the entire historical period. As the figures show, the R^2 values for each parameter ranged from 0.0002 to 0.0149 with a p = 0.5 indicating the improbability that the sample results are dependent over long periods of time. **Appendix C** contains plots of the same parameters by season, month, and year.

Figure 5.3. Historical DO Observations for Nonsense Creek

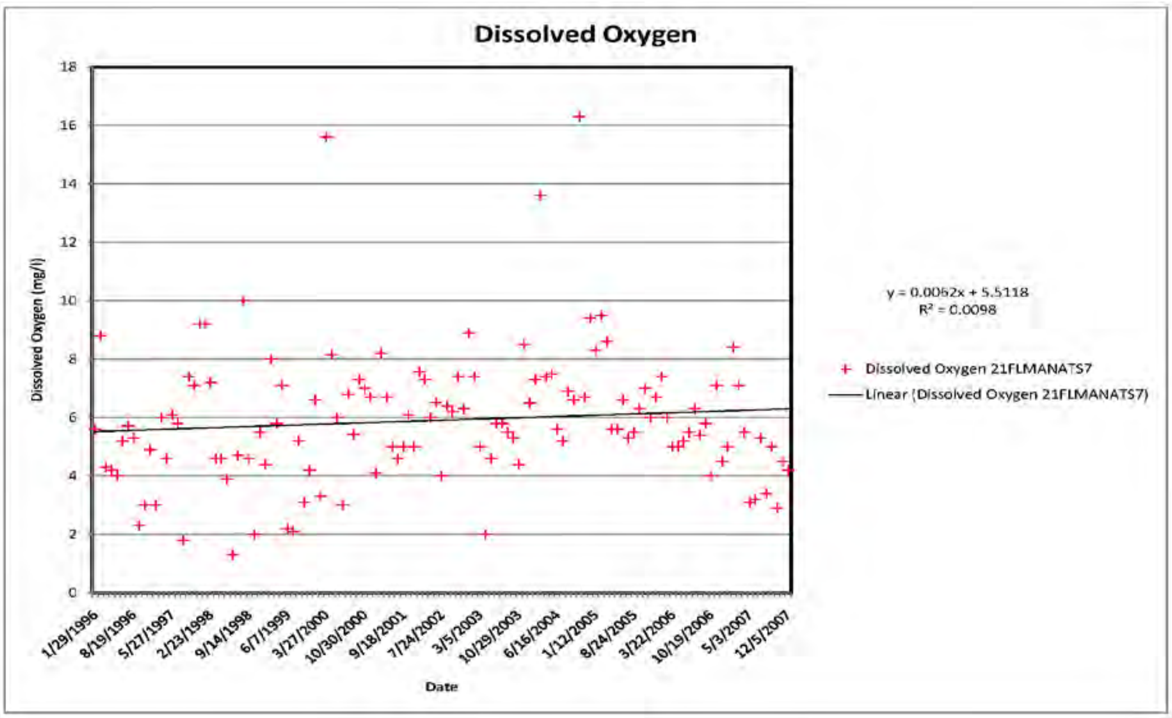


Figure 5.4. Historical TN Observations for Nonsense Creek

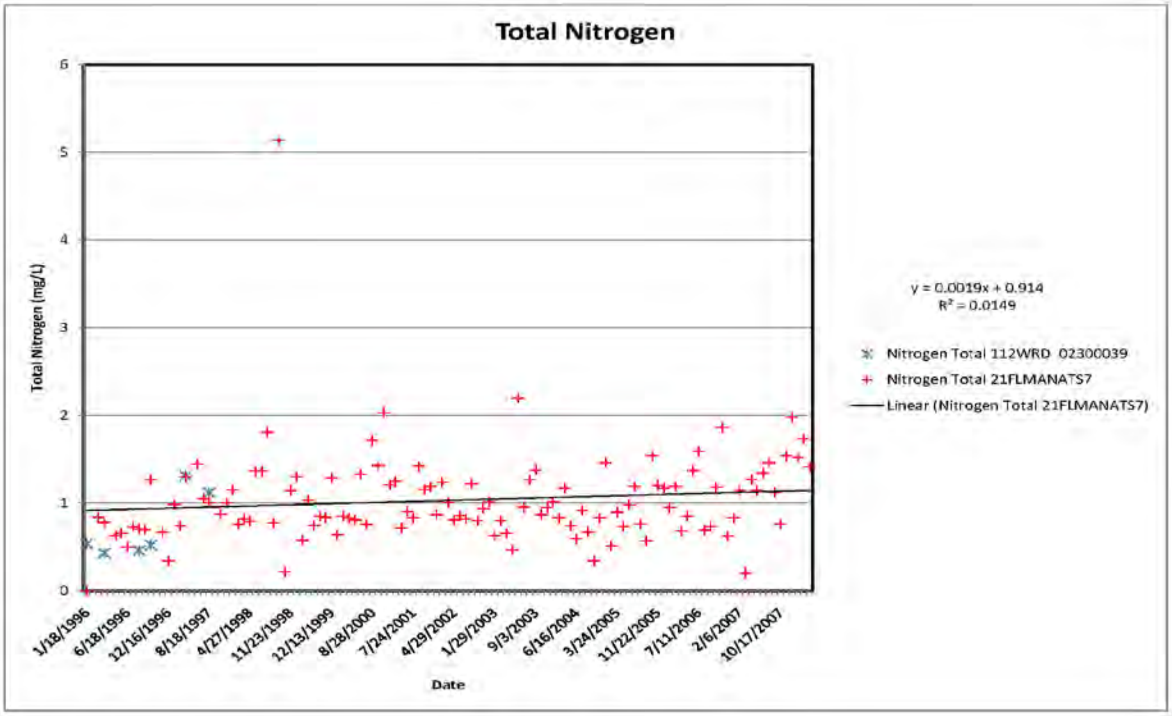


Figure 5.5. Historical TP Observations for Nonsense Creek

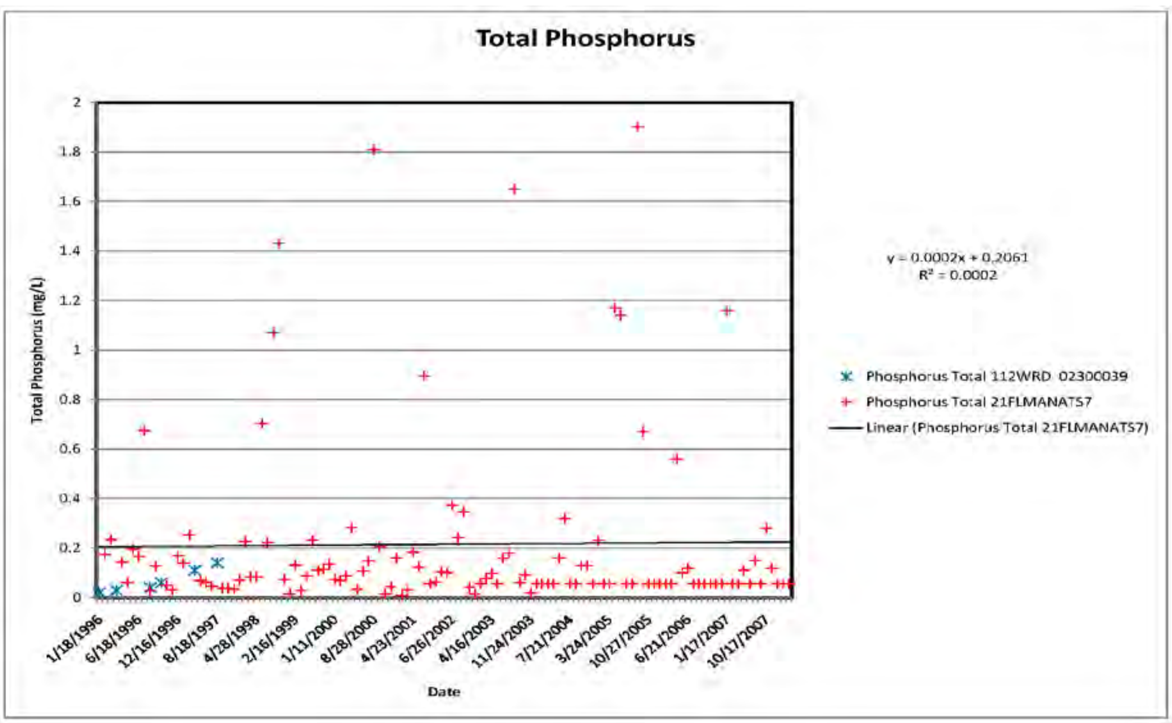
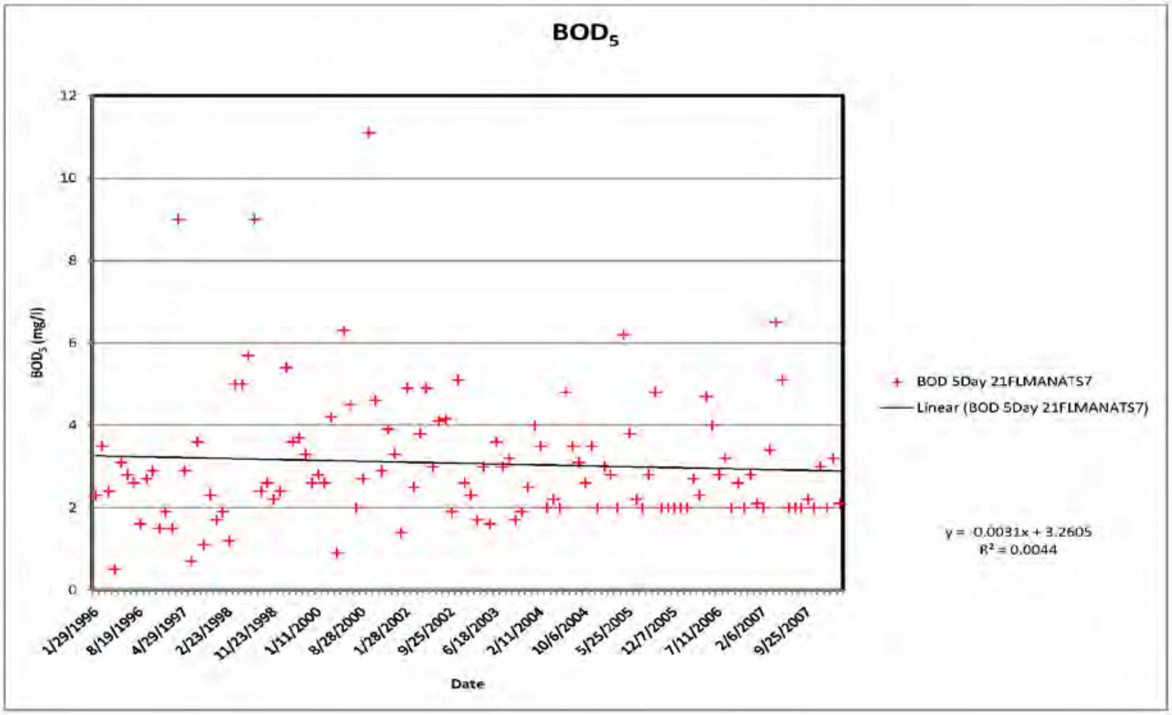


Figure 5.6. Historical BOD_5 Observations for Nonsense Creek



5.1.2 TMDL Development Process

TMDL Targets for Dissolved Oxygen

As discussed earlier in Chapter 3, once the Nonsense Creek watershed was verified for low dissolved oxygen, the causative pollutants were identified using statewide screening level concentrations set at the 70th percentile of all STORET data from 1970 to 1987. The Department's statewide screening levels for streams are 2.0 mg/L for BOD_5, 1.6 mg/L for TN, and 0.22 mg/L for TP. By comparing the median values of available data from the Nonsense Creek watershed to the screening level concentrations for streams, it was determined BOD was the causative pollutant. This approach is useful if there are no significant regional differences in the waterbody meeting its' designated uses.

It was also recognized BOD_5 is a qualitative test used to indicate the general health of a body of water where the presence of nutrients may increase oxygen demand and lower the dissolved oxygen concentrations. It has been noted that there are significantly lower nutrient levels leading to impairment in southwest Florida than the statewide screening levels indicated. To determine a nutrient or BOD_5 level protective of a dissolved oxygen concentration of 5.0 mg/L or greater a reference approach was used.

The reference approach utilizes data from WBIDs in the same hydrological basin (Manatee River planning unit) with similar designated uses as the Nonsense Creek watershed. Only sampling stations in each reference WBID with data of four or more sampling events were selected to encompass the seasonal and monthly variances. **Appendix D** contains data of the reference sampling stations. The data for DO, BOD, TN and TP were aggregated from sampling stations in WBIDs found not to be impaired for DO (**Table 5.4**). **Table 5.5** shows the annual median values calculated for BOD_5, DO, TN, and TP for all data corresponding to the statewide screening level for BOD_5 concentration of 2.0 mg/L or less for streams.

Table 5.4 Summary of "Not Impaired" Manatee River Planning Unit Stations

WBID	Designated Use	Station	BOD_5	Dissolved Oxygen	Total Nitrogen	Total Phosphorus
1807A	Potable Water Supply	21FLMANAUM1	118	155	145	141
1807C	Potable Water Supply	112WRD 02299950	16	32	20	32
		21FLTPA 24010002	19	23	18	18
1807D	Potable Water Supply	21FLMANAD3	96	100	94	96
1819	Predominantly Fresh Waters	21FLMANAGC2	92	96	88	92
		21FLTPA 24010063	6	6	6	6
		21FLTPA 273206982240096	6	6	6	6
1912	Potable Water Supply	21FLMANATS5	131	173	158	158

Table 5.5 Annual Medians of "Not Impaired" Manatee River Planning Unit Sample Stations

Date	BOD (mg/L)	DO (mg/L)	TN (mg/L)	TP (mg/L)
1996	1.2	6.90	0.72	0.16
1997	1.2	7.10	0.66	0.37
1998	1.4	6.80	0.82	0.37
1999	1.5	6.95	0.80	0.27
2000	1.6	7.65	1.07	0.36
2001	1.5	7.55	1.07	0.40
2002	1.9	7.18	1.17	0.41
2003	1.5	7.72	0.99	0.33
2004	2.0	7.85	0.66	0.13
2005	2.0	6.98	1.01	0.24
2006	2.0	6.92	0.90	0.12
2007	1.9	7.10	0.72	0.40
2008	2.0	7.45	0.96	0.06
Annual Average	**1.67**	**7.24**	**0.89**	**0.28**
Nonsense Creek	**2.7**	**6.0**	**0.95**	**0.06**

The results from the reference approach suggest a relationship between nutrients, BOD, and DO. A Spearman correlation matrix was used to assess the potential relationships between the water quality parameters (**Appendix E**). The results of the Spearman test, at an alpha (α) level of 0.05, determined both total phosphorus and total nitrogen had a significant positive effect on BOD where the concentrations for TN and TP increase, as the concentration for BOD increases. **Figures 5.7** and **5.8** show the relationship between BOD and TN and TP. As BOD was linked as a possible causative pollutant for low DO concentrations by the statewide screening level concentrations, the correlation between BOD, TN, and TP indicate by establishing targets for nutrients thereby lowering the BOD concentration, DO concentrations would respond positively.

As **Table 5.5** indicates, the total phosphorus concentration meets the statewide screening levels for streams and is below the annual average median calculated for the unimpaired reference sites. As a result, the TMDL targets of 0.89 mg/L for TN and 2.0 mg/L for BOD were selected as the levels predicted to achieve a minimum DO of 5.0 mg/L. The proposed TN and BOD target concentration should be both protective of the dissolved oxygen criteria and meet reasonable expectations of attainability when compared to standards of local WBIDs that are not impaired for DO.

Figure 5.7. Relationship Between BOD_5 and TN Observations for Nonsense Creek

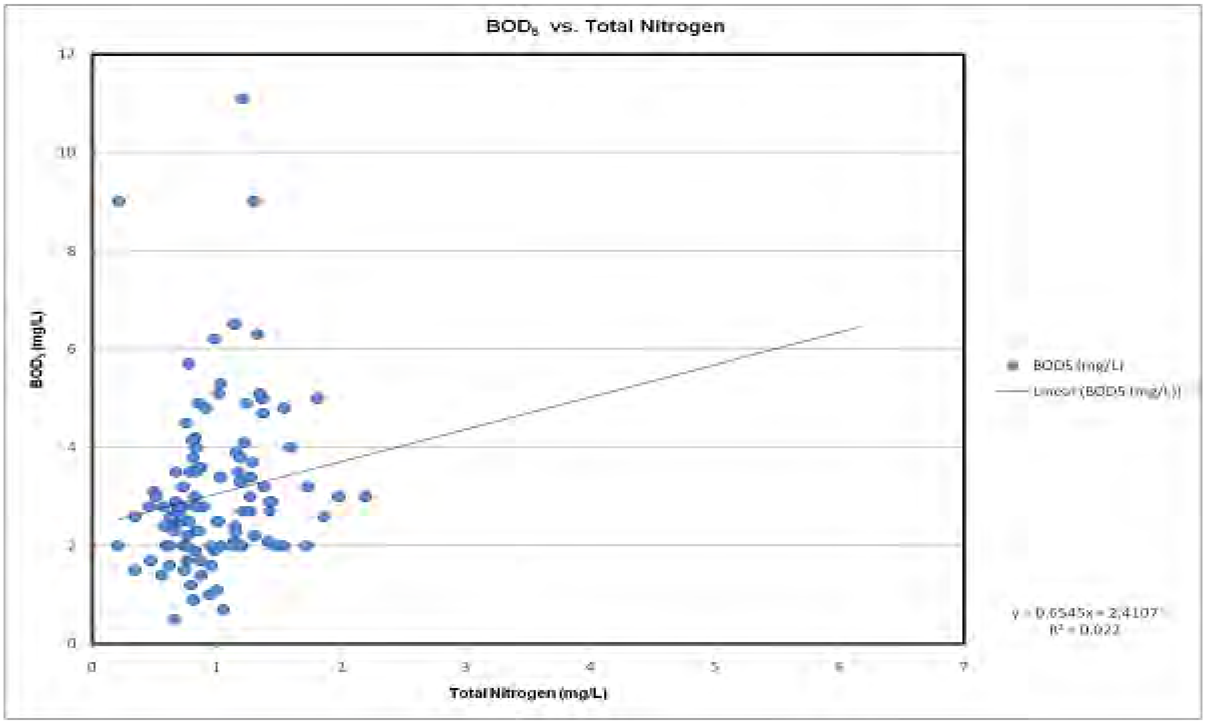
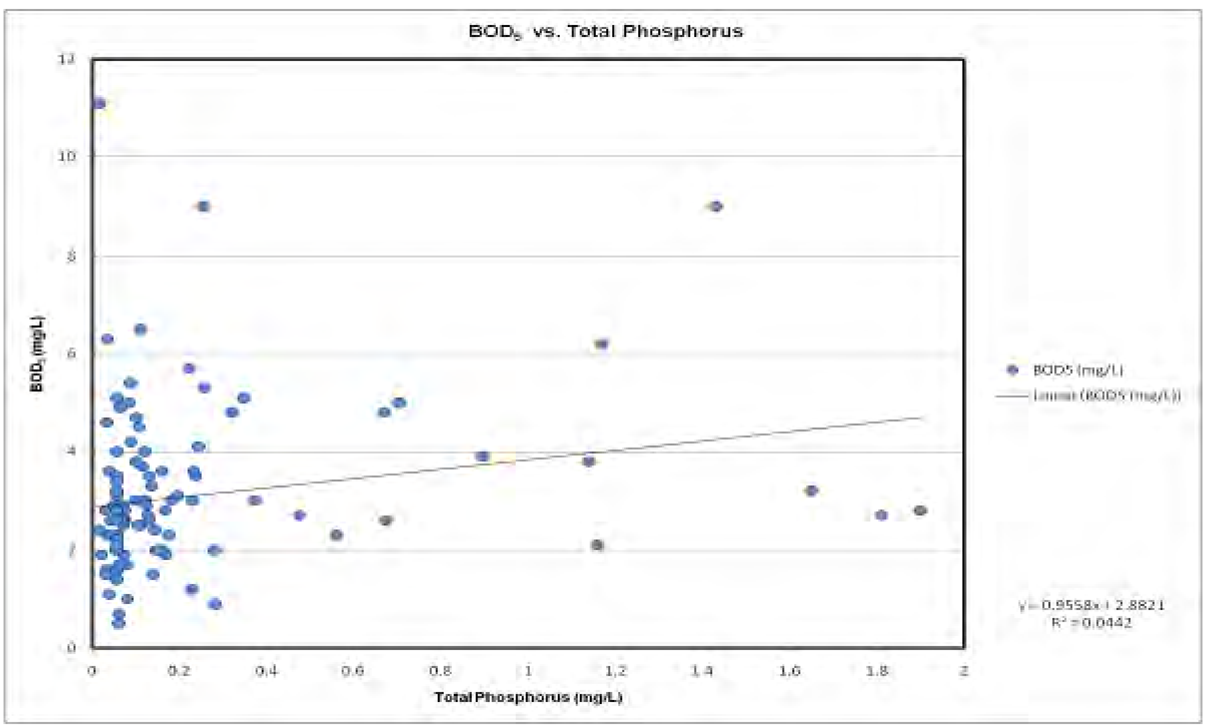


Figure 5.8. Relationship Between BOD_5 and TP Observations for Nonsense Creek



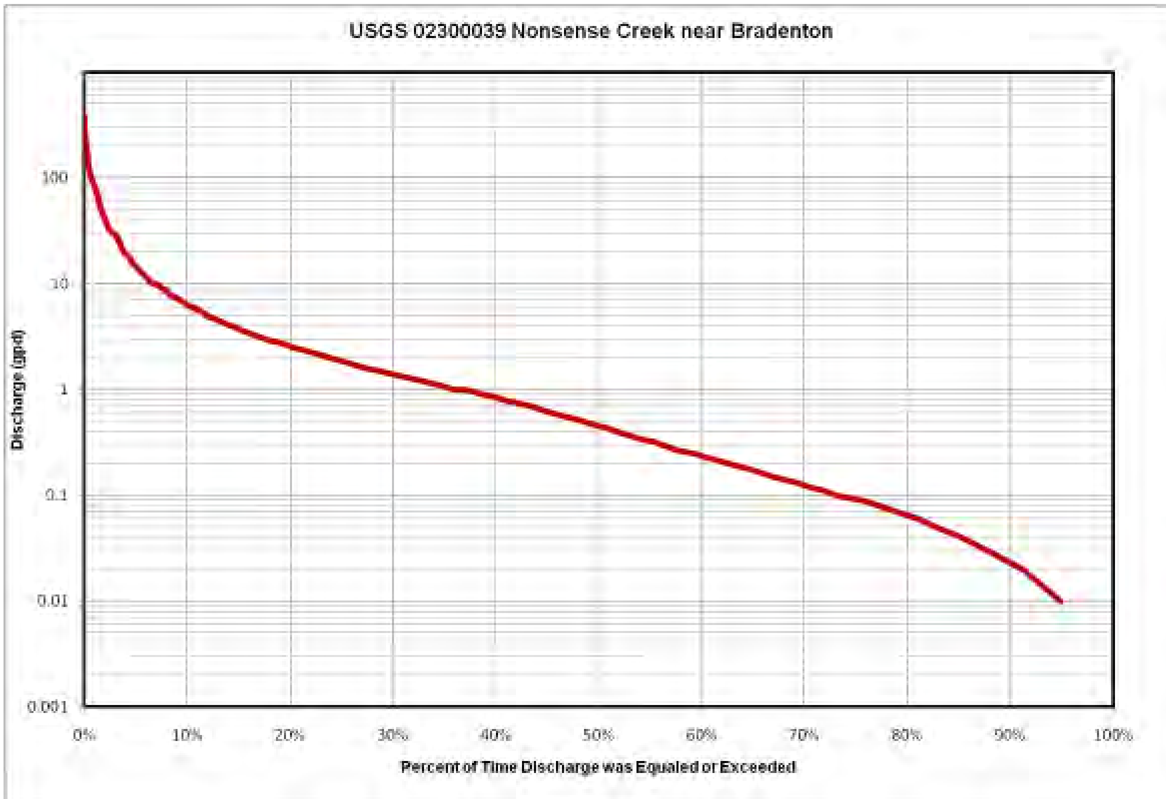
Develop the Flow Duration Curve

The load duration was chosen for TMDL development for several reasons. The calculated loads do not require any assumptions regarding loading rates, stream hydrology, land use conditions, or soil types. All available flow and water quality data are used providing an insight into critical conditions. The method also accurately identifies the allowable and existing loads at the point in the stream where sufficient data were collected.

The first step in the development of load duration curves is to create *flow duration curves.* This is a cumulative frequency curve of daily mean flows without regard to chronology of occurrence (Leopold, 1994). The flow duration curve includes all flows observed at the gage for the applicable period of record; flow rates are typically sorted from the highest value to the lowest. For each flow value the curve displays the corresponding percent of time that flow value is met or exceeded–the flow duration interval (FDI). Extremely high flows are rarely exceeded and have low FDI values; very low flows are often exceeded and have high FDI values.

The range of flows from the USGS flow gage was divided into “flow zones.” The concept of zones is adopted from Dr. Bruce Cleland (Cleland, August 15, 2002). The purpose of the zones is to demarcate hydrologic conditions between drought and peak flood into flow ranges such as low, dry, average, moist, and high. Expressing the flows in terms of frequency of recurrence (duration) allows a linkage of exceedances of the criterion to specific flow intervals and durations. Following Dr. Cleland’s approach (Cleland, September 2003), the Department selected the following flow zones: “High” (0 – 10), “Moist” (11 – 40), “Mid-Range” (41 – 60), “Dry” (61 – 90), and “Low” (91 – 100). **Figure 5.9** shows the flow duration curve for USGS Gage 02300039 (located approximately 0.5 mile upstream from the mouth of the slough). The period of record used for the flow duration analysis for gage 02300039 is July 1, 1988 to September 30, 2008.

Figure 5.9 Flow Duration Curve for USGS Gage 02300039, Nonsense Creek near Bradenton, FL



Develop the Load Duration Curves for Both the Allowable Load and Existing Loading Capacity

A load duration limit curve can be created from a flow duration curve by multiplying the flow values by the applicable water quality criterion or target and a conversion factor (equation 1). The independent x-axis remains as the FDI, and the dependent y-axis depicts the load at that point in the watershed rather than the flow. The limit curve or target line therefore represents the allowable load (or the TMDL) at each flow condition.

Allowable load = (observed flow) x (conversion factor) x (state criteria or target) (1)

Existing loading = (observed flow) x (conversion factor) x (measured concentration) (2)

The load duration curve for the Nonsense Creek is shown in **Figure 5.10**, using a target of 0.89 mg/L total nitrogen. **Figure 5.10** also displays the observed loads, which are calculated by multiplying the sampled total nitrogen concentration by the daily mean flow (equation 2). Points plotting above the curve represent exceedances of the target and are therefore unallowable loads. Those plotted below the curve represent compliance with the target and allowable daily loads.

As shown in **Figures 5.10**, exceedances for TN proposed target in Nonsense Creek occur across the entire span of the flow record. The nature of the impairment can be inferred based on when the loads occur (Cleland, 2003). In general, exceedances on the right side of the curve typically occur during low-flow events, which implies a contribution from either point sources or base flow, which could come from the load from failed septic tanks and sewer line leakage that interact with surface water. The exceedances that appear on the left side of the curve usually represent loading from stormwater-related sources.

The BOD concentration of 2.0 mg/L was selected as the proposed target. As displayed in **Table 5.5**, lower median values for BOD are related to lower nutrient values resulting in higher dissolved oxygen levels. The screening level criteria for streams of 2.0 mg/L BOD will be protective of the dissolved oxygen criteria. **Figure 5.11** displays the BOD target loadings, exceedances and non-exceedances where exceedances occur in all flow regimes.

Figure 5.10 Load Duration Curve for Total Nitrogen in Nonsense Creek, WBID 1913

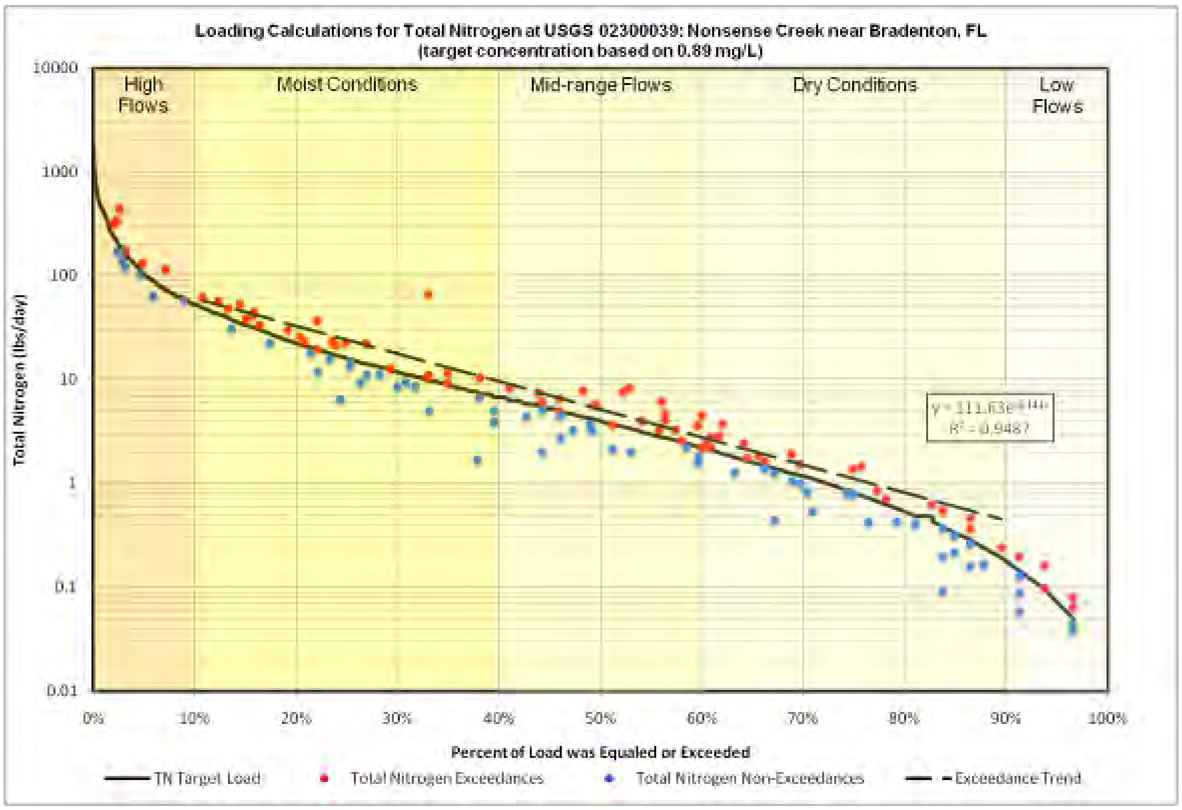
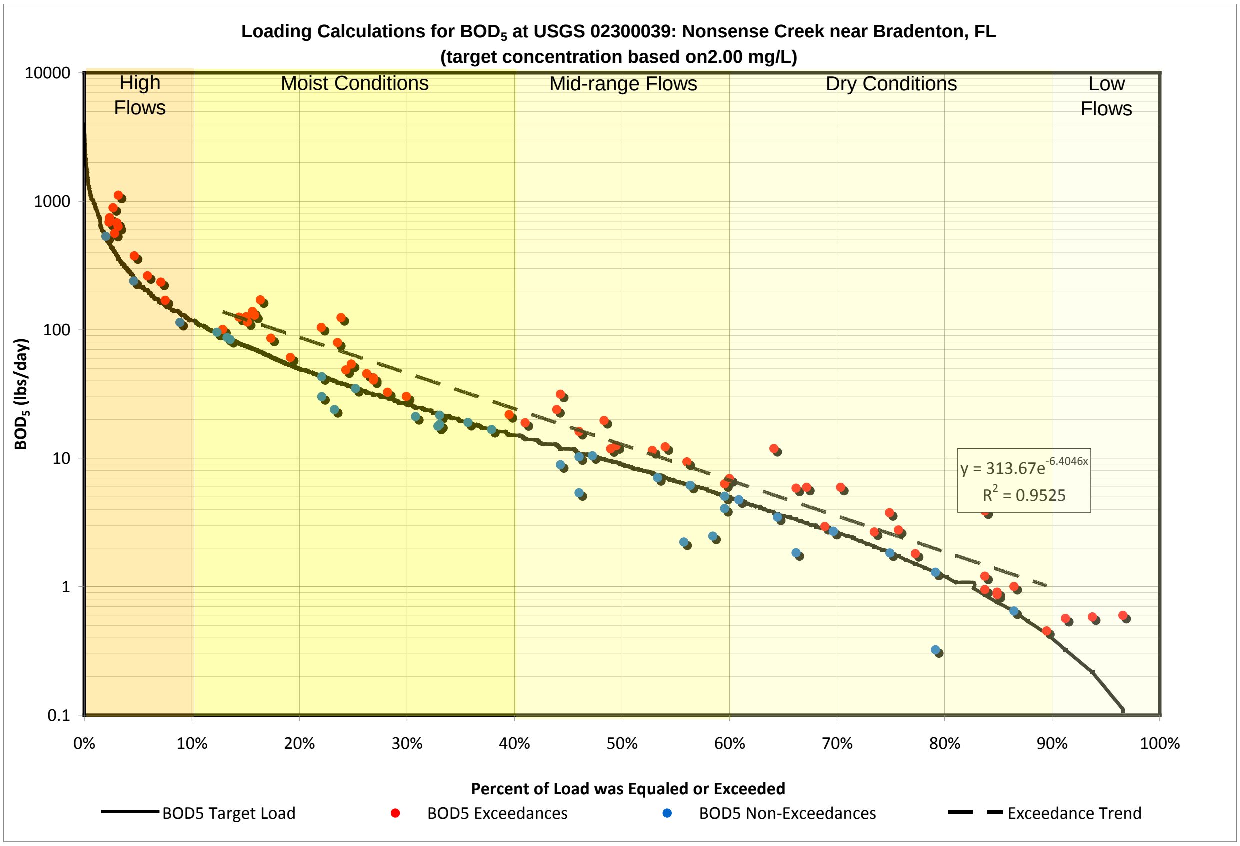


Figure 5.11 Load Duration Curve for BOD_5 in Nonsense Creek, WBID 1913



Define the Critical Condition

The critical condition for nutrient loadings in a given watershed depends on many factors, including the presence of point sources and the land use pattern in the watershed. Typically, the critical condition for nonpoint sources is an extended dry period followed by a rainfall runoff event. During the wet weather period, rainfall washes off nutrients that have built up on the land surface under dry conditions, resulting in the wet weather exceedances. However, significant nonpoint source contributions can also appear under dry conditions without any major surface runoff event. This usually happens when nonpoint sources contaminate the surficial aquifer, and nutrients are brought into the receiving waters through base flow. In addition, wildlife having direct access to the receiving water can contribute to the exceedance during dry weather. The critical condition for point source loading typically occurs during periods of low stream flow, when dilution is minimized.

Loads that plot above the curve during flow duration intervals of 85 to 99 (low flow conditions) are likely indicative of constant discharge sources such as wastewater treatment plants, irrigation return flows, or dry weather flows. Those plotting above the curve between flow duration intervals of 10 to 70 reflect wet weather contributions associated with sheet and rill erosion, wash off processes, and, potentially, stream bank erosion. Those loads plotted above the curve at flow duration intervals greater than 90 or less than 10 percent reflect extreme hydrologic conditions of drought or flood, respectively.

For the Nonsense Creek watershed because TN exceedances occur throughout the flow record, no critical flow condition was defined for this TMDL. The Department used the flow records and water quality data available between the 10th to 90th percentile flow duration intervals for the TMDL analysis. Flow conditions that were exceeded less than 10 percent of the time were not used because they represent abnormally high-flow events, and flow conditions occurring greater than 90 percent of the time were not used because they are extreme low-flow events.

Establish the Needed Load Reduction by Comparing the Existing Load with the Allowable Load under the Critical Condition

In **Figures 5.10**, points plotting above the load duration curves represent exceedances of the proposed target for TN respectively and are therefore unallowable loads. The percent reduction required to achieve the target load was determined by first establishing a trend line for the loads that exceeded the allowable loading. Loadings between the 10th to 90th percentiles were used for the trend line analysis. Exceedances occurring during abnormally high-flow events (10% of the time or less) or low-flow events (90% or greater) were not used in the analysis. Several types of trend lines were examined, and the exponential function was found to have the highest correlation coefficient (R^2) or "goodness of fit". The R^2 indicates how closely the estimated values for the trend line correspond to actual data. A trend line is most reliable when its R^2 value is near 1.00. Therefore, the exponential function was used to predict the existing loads at every 5th percentile flow interval between the 10th and 90th percentile. The following is the exponential equation developed to predict the total nitrogen existing loading:

total nitrogen = 111.63e$^{-6.141x}$ **(3)**

Where:

X is the flow duration interval between the 10th and 90th percentile.

A similar equation was also developed to predict the BOD_5 existing loadings. Equation 4 calculates the existing loadings for total nitrogen:

BOD_5 = 313.67e$^{-6.4046x}$ **(4)**

Where:

X is the flow duration interval between the 10th and 90th percentile.

For comparative purposes, the allowable loadings were calculated as the product of the water quality target and the flow corresponding to a given flow duration interval between the 10th and 90th percentile (in increments of 5 percent).

A percent reduction was calculated for each interval between the 10th and 90th percentile flow intervals using the following equation:

load reduction = (existing loading – allowable loading) * 100 / existing loading **(5)**

The final percent reduction needed was the median of all the percent reductions calculated at the various recurrence intervals between the 10th and 90th percentile. The calculations of the TMDL and percent reductions for total nitrogen and BOD in Nonsense Creek are shown in **Tables 5.6** and **5.7**, respectively.

Table 5.6 Calculations for Total Nitrogen Reductions for the Nutrients TMDL for Nonsense Creek

Flow Interval	Flow (cfs)	Allowable Load	Existing Load	Percent Reduction
10.00%	11.00	52.80	60.41	12.59%
15.00%	6.90	33.14	44.44	25.41%
20.00%	4.60	22.08	32.69	32.45%
25.00%	3.30	15.83	24.05	34.17%
30.00%	2.40	11.52	17.69	34.87%
35.00%	1.80	8.64	13.01	33.60%
40.00%	1.40	6.72	9.57	29.79%
45.00%	1.10	5.28	7.04	25.01%
50.00%	0.82	3.94	5.18	24.00%
55.00%	0.61	2.93	3.81	23.15%
60.00%	0.46	2.21	2.80	21.22%
65.00%	0.33	1.58	2.06	23.17%
70.00%	0.25	1.20	1.52	20.88%
75.00%	0.17	0.82	1.12	26.86%
80.00%	0.11	0.53	0.82	35.66%
85.00%	0.07	0.34	0.60	44.34%
90.00%	0.04	0.19	0.44	56.77%
Median				**26.86%**

Table 5.7 Calculations for BOD_5 Reductions for the Nutrients TMDL for Nonsense Creek

Flow Interval	Flow (cfs)	Allowable Load	Existing Load	Percent Reduction
10.00%	11.00	118.65	165.32	28.23%
15.00%	6.90	74.48	120.02	37.95%
20.00%	4.60	49.62	87.13	43.05%
25.00%	3.30	35.57	63.26	43.77%
30.00%	2.40	25.89	45.92	43.63%
35.00%	1.80	19.42	33.34	41.76%
40.00%	1.40	15.10	24.20	37.61%
45.00%	1.10	11.87	17.57	32.47%
50.00%	0.82	8.85	12.76	30.66%
55.00%	0.61	6.58	9.26	28.95%

Flow Interval	Flow (cfs)	Allowable Load	Existing Load	Percent Reduction
60.00%	0.46	4.96	6.72	26.20%
65.00%	0.33	3.56	4.88	27.07%
70.00%	0.25	2.70	3.54	23.90%
75.00%	0.17	1.83	2.57	28.72%
80.00%	0.11	1.19	1.87	36.47%
85.00%	0.07	0.76	1.36	44.31%
90.00%	0.04	0.43	0.98	56.17%
Median				**36.47%**

5.1.3 Critical Conditions/Seasonality

A nonparametric test (Kruskal-Wallis) was applied to the BOD_5, DO, TN, and TP datasets to determine whether there were significant difference among seasons and months. Kruskal-Wallis tests the medians between groups and then calculates if there is any significant difference between the groups (chi-square). If a chi-square value calculated is greater than the expected value, then there are significant differences between the medians (**Appendix F**). None of the parameters exhibited any differences between months or seasons. However, all of the parameters did show annual median differences where chi-square was greater than expected.

For the Nonsense Creek watershed rainfall data (**Appendix G**) were used to compare with the measured DO data. Measurements were sorted by month and season to determine whether there was a temporal pattern of exceedances. Daily rainfall data from Bradenton 5ESE were also obtained and included in the analysis. **Table 5.6**, **Figures 5.11a** and **5.11b** presents summary statistics by month and season, for dissolved oxygen measurements. The data for Nonsense Creek reflected a temporal pattern of critical seasonal increase.

A major advantage of flow duration curves is the ability to consider the general hydrologic condition of the watershed. However, they provide limited information regarding the magnitude or nature of the various sources.

Table 5.6 Summary Statistics of Dissolved Oxygen Data for Nonsense Creek, WBID 1913, by Month and Season

Month	Number of Observations	Minimum	Maximum	Median	Mean	Number of Exceedances	% Exceedance of DO	Average Monthly Rainfall (in)
January	16	2.4	9.2	7.5	6.90	2	12.5%	2.74
February	16	3.3	116.1	7.4	14.17	2	12.5%	2.51
March	13	4.3	15.6	6.0	6.92	2	15.4%	3.42
April	17	2.0	8.2	5.0	5.16	7	41.2%	1.76
May	10	2.6	6.1	4.9	4.63	5	50.0%	2.70
June	17	1.3	6.6	5.5	4.82	6	35.3%	8.10

Month	Number of Observations	Minimum	Maximum	Median	Mean	Number of Exceedances	% Exceedance of DO	Average Monthly Rainfall (in)
July	18	2.1	7.0	5.3	5.16	6	33.3%	8.83
August	16	2.0	10.0	5.4	5.60	3	18.8%	9.47
September	19	1.5	7.3	5.0	4.68	8	42.1%	7.41
October	15	2.0	16.3	5.2	5.79	7	46.7%	2.92
November	16	3.1	8.5	5.8	5.78	6	37.5%	1.99
December	15	2.7	9.4	4.8	5.73	8	53.3%	2.29
Season	**Number of Observations**	**Minimum**	**Maximum**	**Median**	**Mean**	**Number of Exceedances**	**% Exceedance of DO**	**Average Monthly Rainfall (in)**
Winter	45	2.4	116.1	7.3	9.5	6	13.3%	8.67
Spring	44	1.3	8.2	5.1	4.9	18	40.9%	12.48
Summer	53	1,5	10	5.3	5,1	17	32.1%	25.72
Fall	46	2.0	16.3	5.4	5.8	21	45.7%	7.10

Figure5.11a Monthly Dissolved Oxygen Exceedances and Rainfall for Nonsense Creek

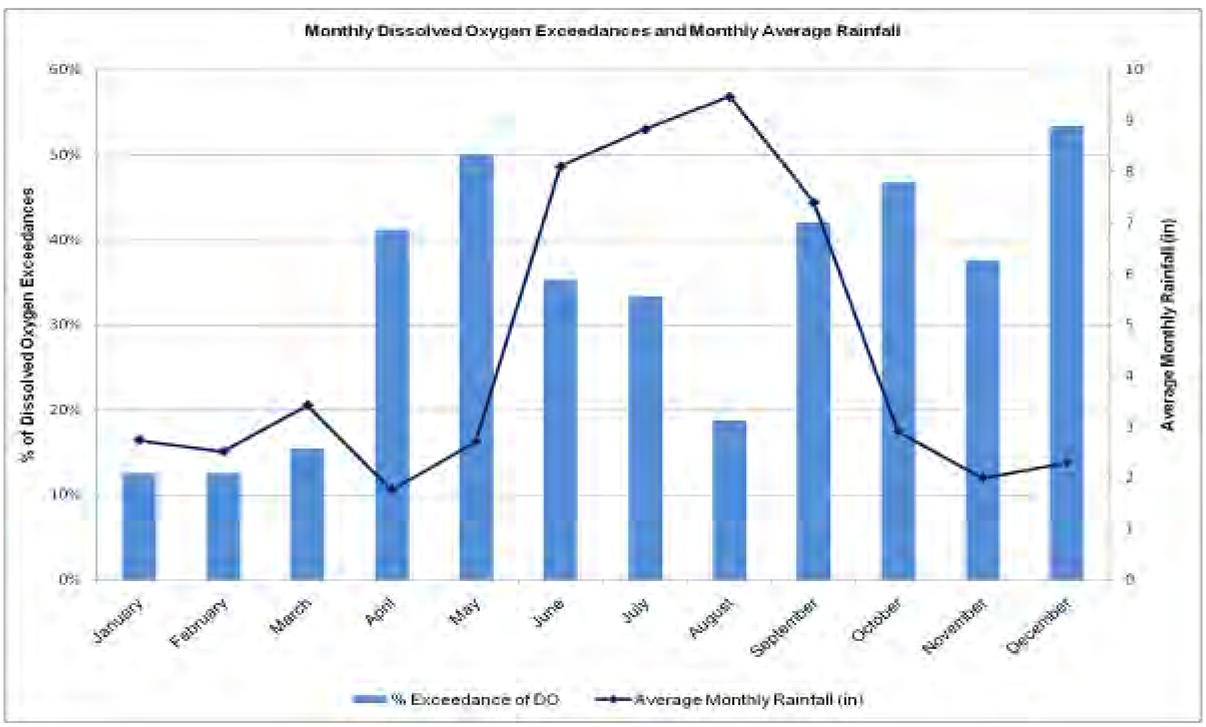
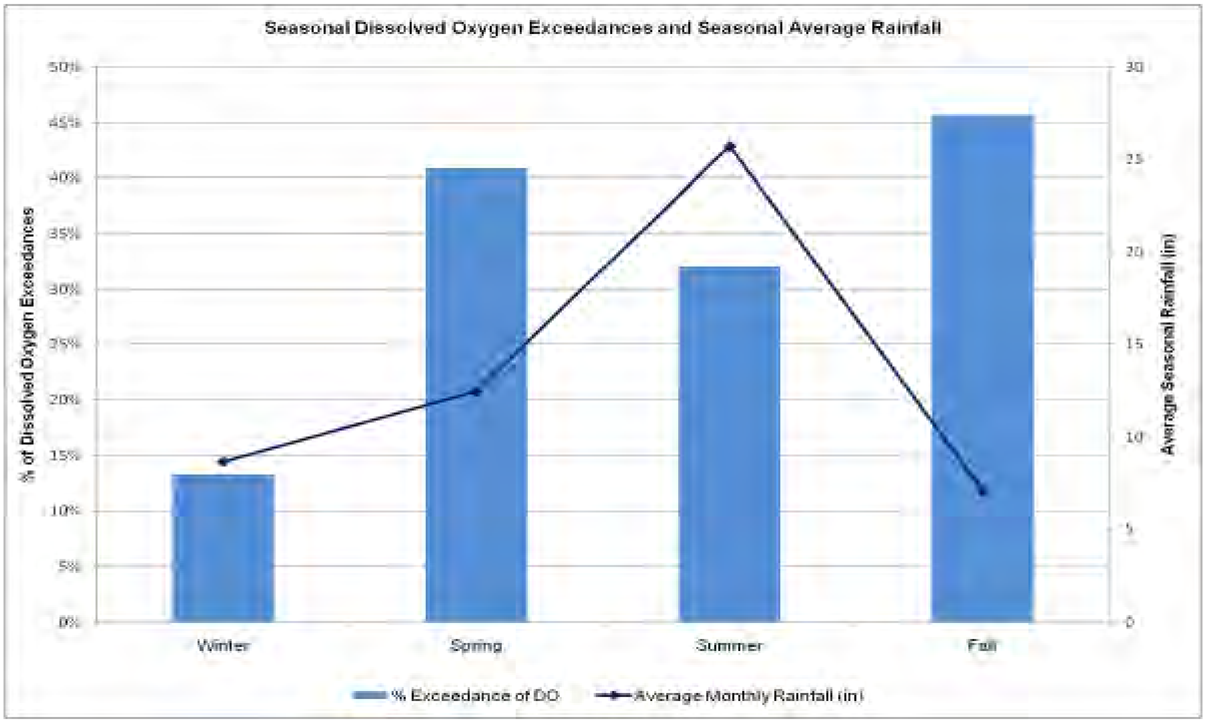


Figure5.11b Seasonal Dissolved Oxygen Exceedances and Rainfall for Nonsense Creek



Chapter 6: DETERMINATION OF THE TMDL

6.1 Expression and Allocation of the TMDL

The objective of a TMDL is to provide a basis for allocating acceptable loads among all of the known pollutant sources in a watershed so that appropriate control measures can be implemented and water quality standards achieved. A TMDL is expressed as the sum of all point source loads (Wasteload Allocations, or WLAs), nonpoint source loads (Load Allocations, or LAs), and an appropriate margin of safety (MOS), which takes into account any uncertainty concerning the relationship between effluent limitations and water quality:

$$\textbf{TMDL} = \sum \textbf{WLAs} + \sum \textbf{LAs} + \textbf{MOS}$$

As discussed earlier, the WLA is broken out into separate subcategories for wastewater discharges and stormwater discharges regulated under the NPDES Program:

$$\textbf{TMDL} \cong \sum \textbf{WLAs}_{\textbf{wastewater}} + \sum \textbf{WLAs}_{\textbf{NPDES Stormwater}} + \sum \textbf{LAs} + \textbf{MOS}$$

It should be noted that the various components of the revised TMDL equation may not sum up to the value of the TMDL because (a) the WLA for NPDES stormwater is typically based on the percent reduction needed for nonpoint sources and is also accounted for within the LA, and (b) TMDL components can be expressed in different terms (for example, the WLA for stormwater is typically expressed as a percent reduction, and the WLA for wastewater is typically expressed as mass per day).

WLAs for stormwater discharges are typically expressed as “percent reduction” because it is very difficult to quantify the loads from MS4s (given the numerous discharge points) and to distinguish loads from MS4s from other nonpoint sources (given the nature of stormwater transport). The permitting of stormwater discharges also differs from the permitting of most wastewater point sources. Because stormwater discharges cannot be centrally collected, monitored, and treated, they are not subject to the same types of effluent limitations as wastewater facilities, and instead are required to meet a performance standard of providing treatment to the “maximum extent practical” through the implementation of BMPs.

This approach is consistent with federal regulations (40 CFR § 130.2[I]), which state that TMDLs can be expressed in terms of mass per time (e.g., pounds per day), toxicity, or **other appropriate measure**. TMDLs for Nonsense Creek are expressed in terms of a percent reduction in total nitrogen and 5-day biological oxygen demand to meet both the DO criteria (**Table 6.1**).

Table 6.1. TMDL Components for Nonsense Creek

WBID	Parameter	TMDL (mg/L)	WLA		LA (% Reduction)[1]	MOS
			Wastewater (mg/L)	NPDES Stormwater (% Reduction)[1]		
1913	TN	0.89	NA	27%	27%	Implicit
1913	BOD_5	2.0	NA	36%	36%	Implicit

[1] As the TMDL represents a percent reduction, it also complies with EPA requirements to express the TMDL on a daily basis.

6.2 Load Allocation

Reductions of 27% for total nitrogen and 36% for BOD_5 are required from nonpoint sources. It should be noted that the load allocation includes loading from stormwater discharges that are not part of the NPDES Stormwater Program.

6.3 Wasteload Allocation

6.3.1 NPDES Wastewater Discharges

There are currently no permitted NPDES discharges in the Nonsense Creek watershed; however, any future discharge permits issued in the watershed will also be required to meet the state's Class I criterion for DO and contain appropriate discharge limitations on nitrogen that will comply with the TMDL.

6.3.2 NPDES Stormwater Discharges

The WLA for stormwater discharges with an MS4 permit would responsible for a reduction in current anthropogenic TN loadings of 27% and 26% for BOD_5. It should be noted that any MS4 permittee is only responsible for reducing the loads associated with stormwater outfalls that it owns or otherwise has responsible control over, and it is not responsible for reducing other nonpoint source loads in its jurisdiction.

6.4 Margin of Safety

Consistent with the recommendations of the Allocation Technical Advisory Committee (Department, 2001), an implicit MOS was used in the development of this TMDL. An implicit MOS was provided by the conservative decisions associated with a number of analysis assumptions, the development of site-specific alternative water quality targets, and the development of assimilative capacity.

Chapter 7: NEXT STEPS: IMPLEMENTATION PLAN DEVELOPMENT AND BEYOND

7.1 Basin Management Action Plan

Following the adoption of this TMDL by rule, the Department will determine the best course of action regarding its implementation. Depending upon the pollutant(s) causing the waterbody impairment and the significance of the waterbody, the Department will select the best course of action leading to the development of a plan to restore the waterbody. Often this will be accomplished cooperatively with stakeholders by creating a Basin Management Action Plan, referred to as the BMAP. Basin Management Action Plans are the primary mechanism through which TMDLs are implemented in Florida [see Subsection 403.067(7) F.S.]. A single BMAP may provide the conceptual plan for the restoration of one or many impaired waterbodies.

If the Department determines a BMAP is needed to support the implementation of this TMDL, a BMAP will be developed through a transparent stakeholder-driven process intended to result in a plan that is cost-effective, technically feasible, and meets the restoration needs of the applicable waterbodies. Once adopted by order of the Department Secretary, BMAPs are enforceable through wastewater and municipal stormwater permits for point sources and through BMP implementation for nonpoint sources. Among other components, BMAPs typically include:

- Water quality goals (based directly on the TMDL);
- Refined source identification;
- Load reduction requirements for stakeholders (quantitative detailed allocations, if technically feasible);
- A description of the load reduction activities to be undertaken, including structural projects, nonstructural BMPs, and public education and outreach;
- A description of further research, data collection, or source identification needed in order to achieve the TMDL;
- Timetables for implementation;
- Implementation funding mechanisms;
- An evaluation of future increases in pollutant loading due to population growth;
- Implementation milestones, project tracking, water quality monitoring, and adaptive management procedures; and
- Stakeholder statements of commitment (typically a local government resolution).

BMAPs are updated through annual meetings and may be officially revised every five years. Completed BMAPs in the state have improved communication and cooperation among local stakeholders and state agencies, improved internal communication within local governments, applied high-quality science and local information in managing water resources, clarified obligations of wastewater point source, MS4 and non-MS4 stakeholders in TMDL implementation, enhanced transparency in DEP decision-making, and built strong relationships between DEP and local stakeholders that have benefited other program areas.

However, in some basins, and for some parameters, particularly those with fecal coliform impairments, the development of a BMAP using the process described above will not be the most efficient way to restore a waterbody, such that it meets its' designated uses. Why? Because fecal coliform impairments result from the cumulative effects of a multitude of potential sources, both natural and anthropogenic. Addressing these problems requires good old fashioned detective work that is best done by those in the area. There are a multitude of assessment tools that are available to assist local governments and interested stakeholders in this detective work. The tools range from the simple – such as Walk the WBIDs and GIS mapping - to the complex such as Bacteria Source Tracking. Department staff will provide technical assistance, guidance, and oversight of local efforts to identify and minimize fecal coliform sources of pollution. Based on work in the Lower St Johns River tributaries and the Hillsborough River basin, the Department and local stakeholders have developed a logical process and tools to serve as a foundation for this detective work. In the near future, the Department will be releasing these tools to assist local stakeholders with the development of local implementation plans to address fecal coliform impairments. In such cases, the Department will rely on these local initiatives as a more cost-effective and simplified approach to identify the actions needed to put in place a roadmap for restoration activities, while still meeting the requirements of Chapter 403.067(7), F.S.

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Appendices

Appendix A: Background Information on Federal and State Stormwater Programs

In 1982, Florida became the first state in the country to implement statewide regulations to address the issue of nonpoint source pollution by requiring new development and redevelopment to treat stormwater before it is discharged. The Stormwater Rule, as authorized in Chapter 403, F.S., was established as a technology-based program that relies on the implementation of BMPs that are designed to achieve a specific level of treatment (i.e., performance standards) as set forth in Rule 62-40, F.A.C. In 1994, the Department's stormwater treatment requirements were integrated with the stormwater flood control requirements of the water management districts, along with wetland protection requirements, into the Environmental Resource Permit regulations.

Rule 62-40 also requires the state's water management districts to establish stormwater pollutant load reduction goals (PLRGs) and adopt them as part of a Surface Water Improvement and Management (SWIM) plan, other watershed plan, or rule. Stormwater PLRGs are a major component of the load allocation part of a TMDL. To date, stormwater PLRGs have been established for Tampa Bay, Lake Thonotosassa, the Winter Haven Chain of Lakes, the Everglades, Lake Okeechobee, and Lake Apopka.

In 1987, the U.S. Congress established Section 402(p) as part of the federal Clean Water Act Reauthorization. This section of the law amended the scope of the federal NPDES permitting program to designate certain stormwater discharges as "point sources" of pollution. The EPA promulgated regulations and began implementing the Phase I NPDES stormwater program in 1990. These stormwater discharges include certain discharges that are associated with industrial activities designated by specific standard industrial classification (SIC) codes, construction sites disturbing 5 or more acres of land, and master drainage systems of local governments with a population above 100,000, which are better known as MS4s. However, because the master drainage systems of most local governments in Florida are interconnected, the EPA implemented Phase I of the MS4 permitting program on a countywide basis, which brought in all cities (incorporated areas), Chapter 298 urban water control districts, and the Florida Department of Transportation throughout the 15 counties meeting the population criteria. The Department received authorization to implement the NPDES stormwater program in 2000.

An important difference between the federal NPDES and the state's stormwater/environmental resource permitting programs is that the NPDES Program covers both new and existing discharges, while the state's program focus on new discharges only. Additionally, Phase II of the NPDES Program, implemented in 2003, expands the need for these permits to construction sites between 1 and 5 acres, and to local governments with as few as 1,000 people. While these urban stormwater discharges are now technically referred to as "point sources" for the purpose of regulation, they are still diffuse sources of pollution that cannot be easily collected and treated by a central treatment facility, as are other point sources of pollution such as domestic and industrial wastewater discharges. It should be noted that all MS4 permits issued in Florida include a reopener clause that allows permit revisions to implement TMDLs when the implementation plan is formally adopted.

Appendix B: Historical BOD_5, DO, TN, and TP Observations in Nonsense Creek, 1990–2008

Date	Station	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1/1/1990	21FLMANATS7			0.282	1.432
2/1/1990	21FLMANATS7			0.493	
3/20/1990	21FLMANATS7			0.916	0.114
7/10/1990	21FLMANATS7		5.1	0.9	
7/24/1990	21FLMANATS7		5.5	1.101	0.4
8/15/1990	21FLMANATS7		8.4	1.32	0.375
8/28/1990	21FLMANATS7		4.6	1.762	0.3
9/11/1990	21FLMANATS7		5.6	1.263	0.934
11/6/1990	21FLMANATS7		4.7		
12/4/1990	21FLMANATS7		3.2	0.37	0.091
1/22/1991	21FLMANATS7		7.5	0.622	0.175
2/25/1991	21FLMANATS7		4.4	0.381	0.22
3/13/1991	21FLMANATS7		5.8	0.545	0.135
4/16/1991	21FLMANATS7		3.7	0.396	0.122
5/28/1991	21FLMANATS7		5.2	6.172	0.078
6/11/1991	21FLMANATS7			1.27	0.033
6/24/1991	21FLMANATS7		5.7	0.858	0.016
7/8/1991	21FLMANATS7		5.5	1.292	0.01
7/29/1991	21FLMANATS7		4.4	1.157	0.095
8/5/1991	21FLMANATS7		5.2	0.684	0.068
8/12/1991	21FLMANATS7		5	0.959	0.068
9/9/1991	21FLMANATS7		4.7	1.204	0.07
9/23/1991	21FLMANATS7		3.3	0.646	0.168
3/24/1992	21FLMANATS7		7.5	1.86	0.35
4/13/1992	21FLMANATS7		6.2	1.94	0.076
6/18/1992	21FLMANATS7		3.8	0.515	0.041
8/31/1992	21FLMANATS7		6.7	0.86	0.11
10/26/1992	21FLMANATS7		4.8		0.15
11/2/1992	21FLMANATS7		7.2		0.1
1/20/1993	21FLMANATS7		8		
4/29/1993	21FLMANATS7		5	1.142	1.662
5/24/1993	21FLMANATS7		2.6	1.6	0.09
6/29/1993	21FLMANATS7		6	0.64	
7/20/1993	21FLMANATS7		7	0.52	
8/24/1993	21FLMANATS7		2		0.22
9/27/1993	21FLMANATS7		3.6		0.22
9/29/1993	112WRD 02300039		1.5	1.52	0.09
10/28/1993	21FLMANATS7		5.2	0.85	0.08
12/6/1993	112WRD 02300039		2.7	0.53	0.09
1/12/1994	21FLMANATS7		2.4	0.51	0.18
2/28/1994	21FLMANATS7		7.4	0.36	

Date	Station	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
3/7/1994	112WRD 02300039			0.93	0.11
3/21/1994	21FLMANATS7		4.8	0.8	0.05
4/18/1994	21FLMANATS7		6.6	0.84	0.06
6/20/1994	21FLMANATS7		6.2	1.338	0.117
6/21/1994	112WRD 02300039		4.6	1.02	0.05
7/18/1994	21FLMANATS7		4.1	0.752	0.061
8/9/1994	21FLMANATS7		5.5	1.08	0.15
9/21/1994	21FLMANATS7		5.6	1.147	0.01
10/24/1994	21FLMANATS7		8.4	1.52	0.749
11/11/1994	21FLMANATS7		3.6	0.689	0.084
12/7/1994	21FLMANATS7		7.9	0.641	0.129
12/13/1994	112WRD 02300039		9.2	0.43	0.03
1/11/1995	21FLMANATS7		8.2	1.22	0.08
2/16/1995	21FLMANATS7	2.5	6.6	0.77	0.11
3/22/1995	21FLMANATS7	2.5	7	0.7	0.07
4/5/1995	112WRD 02300039			0.72	0.03
4/19/1995	21FLMANATS7	2.8	2.4	0.46	0.03
6/21/1995	21FLMANATS7	1	5	0.94	0.08
6/26/1995	112WRD 02300039			0.83	0.06
7/24/1995	21FLMANATS7	2	5.5	1.034	0.054
8/31/1995	112WRD 02300039			0.79	0.02
9/13/1995	21FLMANATS7	1.4	2.5	0.555	
9/23/1995	21FLMANATS7	3.4	5.2	1.028	
10/17/1995	21FLMANATS7	2.7	2.2	1.208	0.475
11/7/1995	21FLMANATS7	5.3	4.4	1.03	0.256
12/13/1995	21FLMANATS7		4.8	0.823	0.16
1/18/1996	112WRD 02300039			0.54	0.02
1/29/1996	21FLMANATS7	2.3	5.6	0.838	0.175
2/20/1996	21FLMANATS7	3.5	8.8	0.779	0.236
2/22/1996	112WRD 02300039			0.43	0.03
3/18/1996	21FLMANATS7	2.4	4.3	0.63	0.143
4/10/1996	21FLMANATS7	0.5	4.2	0.659	0.06
5/15/1996	21FLMANATS7	3.1	4	0.496	0.196
6/18/1996	21FLMANATS7	2.8	5.2	0.729	0.167
7/9/1996	21FLMANATS7	2.6	5.7	0.702	0.674
8/19/1996	112WRD 02300039			0.46	0.04
8/19/1996	21FLMANATS7	1.6	5.3	0.695	0.029
9/16/1996	21FLMANATS7	2.7	2.3	1.262	0.127
10/4/1996	112WRD 02300039			0.52	0.06
10/28/1996	21FLMANATS7	2.9	3	0.667	0.05
11/12/1996	21FLMANATS7	1.5	4.9	0.339	0.031
12/16/1996	21FLMANATS7	1.9	3	0.981	0.168
2/24/1997	21FLMANATS7	1.5	6	0.736	0.139
3/24/1997	21FLMANATS7	9		1.299	0.254
3/26/1997	112WRD 02300039			1.312	0.11

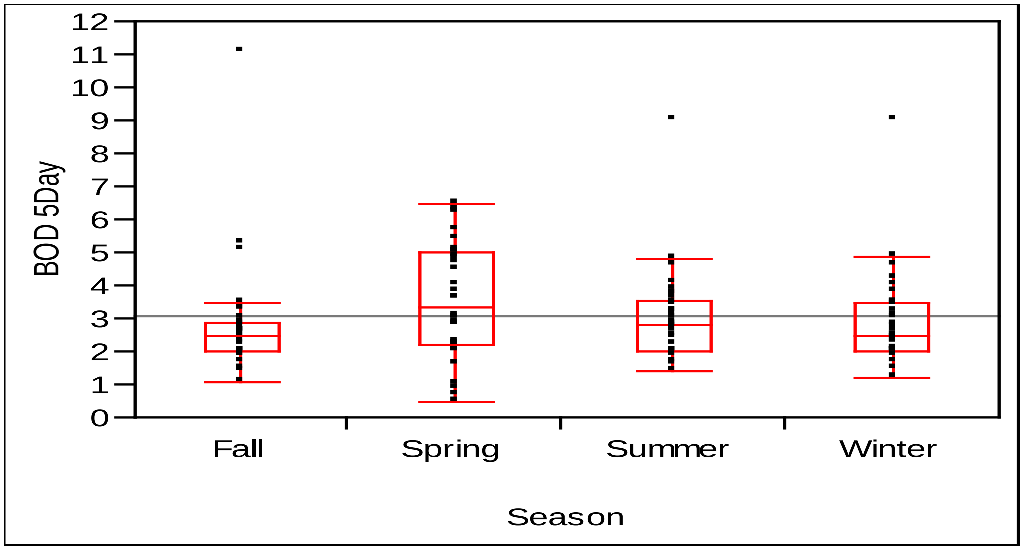
Date	Station	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
4/29/1997	21FLMANATS7	2.9	4.6	1.443	0.069
5/27/1997	21FLMANATS7	0.7	6.1	1.05	0.061
6/30/1997	21FLMANATS7		5.8	1.003	0.047
8/18/1997	112WRD 02300039			1.12	0.14
9/22/1997	21FLMANATS7	3.6	1.8	0.875	0.038
10/6/1997	21FLMANATS7	1.1	7.4	0.999	0.038
11/3/1997	21FLMANATS7	2.3	7.1	1.149	0.035
12/22/1997	21FLMANATS7	1.7	9.2	0.758	
1/12/1998	21FLMANATS7	1.9	9.2	0.823	0.072
2/23/1998	21FLMANATS7	1.2	7.2	0.789	0.227
4/27/1998	21FLMANATS7	5	4.6	1.365	0.084
4/28/1998	21FLMANATS7		4.6	1.365	0.084
5/11/1998	21FLMANATS7	5	3.9	1.809	0.704
6/1/1998	21FLMANATS7	5.7	1.3	0.772	0.223
7/13/1998	21FLMANATS7		4.7	5.133	1.07
8/11/1998	21FLMANATS7	9	10	0.211	1.43
9/14/1998	21FLMANATS7	2.4	4.6	1.143	
10/27/1998	21FLMANATS7	2.6	2		0.073
11/23/1998	21FLMANATS7	2.2	5.5	1.302	
1/12/1999	21FLMANATS7	2.4	4.4	0.577	0.016
2/16/1999	21FLMANATS7		8	1.033	0.132
3/9/1999	21FLMANATS7		5.8	0.746	0.03
4/12/1999	21FLMANATS7	5.4	7.1		0.087
6/7/1999	21FLMANATS7	3.6	2.2	0.848	0.232
7/26/1999	21FLMANATS7		2.1	0.837	0.11
8/9/1999	21FLMANATS7	3.7	5.2	1.286	0.115
11/29/1999	21FLMANATS7	3.3	3.1		0.136
12/13/1999	21FLMANATS7	2.6	4.2	0.637	
1/11/2000	21FLMANATS7	2.8	6.6	0.85	0.074
2/14/2000	21FLMANATS7	2.6	3.3		0.069
3/27/2000	21FLMANATS7	4.2	15.6	0.827	0.088
4/10/2000	21FLMANATS7	0.9	8.15	0.811	0.282
5/16/2000	21FLMANATS7	6.3	6	1.326	0.034
6/26/2000	21FLMANATS7	4.5	3	0.753	0.107
7/17/2000	21FLMANATS7	2	6.8	1.716	0.147
8/28/2000	21FLMANATS7	2.7	5.43	1.426	1.81
9/18/2000	21FLMANATS7		7.3	2.03	0.206
10/30/2000	21FLMANATS7	11.1	7	1.205	0.015
11/27/2000	21FLMANATS7		6.7	1.247	0.044
12/18/2000	21FLMANATS7		4.1	0.714	0.161
1/23/2001	21FLMANATS7		8.2	0.904	0.01
2/20/2001	21FLMANATS7	4.6	6.7		0.033
4/23/2001	21FLMANATS7		5	0.83	0.184
7/24/2001	21FLMANATS7	2.9	4.6	1.421	0.124
9/18/2001	21FLMANATS7	3.9	5	1.153	0.896

Date	Station	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
10/30/2001	21FLMANATS7	3.3	6.1	1.187	
11/13/2001	21FLMANATS7	1.4	5	0.869	0.056
1/28/2002	21FLMANATS7	4.9	7.57	1.238	0.064
2/9/2002	21FLMANATS7	2.5	7.3	1.005	0.104
3/12/2002	21FLMANATS7	3.8	6	0.807	0.1
4/29/2002	21FLMANATS7	4.9		0.855	
6/26/2002	21FLMANATS7	3	6.52	0.821	0.373
7/24/2002	21FLMANATS7	4.1	4	1.216	0.243
8/27/2002	21FLMANATS7	4.15	6.4	0.799	
9/25/2002	21FLMANATS7	1.9			
10/23/2002	21FLMANATS7		6.2	0.94	
11/20/2002	21FLMANATS7	5.1	7.4	1.015	0.347
12/11/2002	21FLMANATS7	2.6	6.3	0.626	0.042
1/29/2003	21FLMANATS7		8.9	0.796	0.016
2/12/2003	21FLMANATS7	2.3	7.4	0.654	0.056
3/5/2003	21FLMANATS7	1.7	5	0.465	0.077
4/16/2003	21FLMANATS7	3	2	2.197	0.098
5/7/2003	21FLMANATS7	1.6	4.6	0.954	0.056
6/18/2003	21FLMANATS7	3.6	5.8		0.159
7/9/2003	21FLMANATS7	3	5.8	1.266	0.18
8/6/2003	21FLMANATS7	3.2	5.5	1.377	1.65
9/3/2003	21FLMANATS7	1.7	5.3	0.868	0.062
10/29/2003	21FLMANATS7		4.4	0.949	0.092
11/24/2003	21FLMANATS7	1.9	8.5		0.02
12/10/2003	21FLMANATS7	2.5	6.5	1.016	
1/14/2004	21FLMANATS7	4	7.3	0.83	0.056
2/11/2004	21FLMANATS7	3.5	13.6	1.17	0.056
3/31/2004	21FLMANATS7	2	7.4	0.74	0.056
4/14/2004	21FLMANATS7	2.2	7.5		0.056
5/12/2004	21FLMANATS7	2		0.59	0.16
6/16/2004	21FLMANATS7	4.8	5.6	0.916	0.32
7/21/2004	21FLMANATS7	3.5	5.2	0.67	0.056
9/2/2004	21FLMANATS7		6.9		
9/30/2004	21FLMANATS7	3.1	6.6		0.056
10/6/2004	21FLMANATS7	2.6	16.3	0.34	0.13
11/17/2004	21FLMANATS7	3.5	6.7	0.83	0.13
12/8/2004	21FLMANATS7	2	9.4	1.46	0.056
1/12/2005	21FLMANATS7	3	8.3	0.51	0.23
2/9/2005	21FLMANATS7	2.8	9.5	0.895	0.056
3/24/2005	21FLMANATS7	2	8.6	0.73	0.056
4/27/2005	21FLMANATS7	6.2	5.6	0.98	1.17
5/25/2005	21FLMANATS7	3.8	5.6	1.19	1.14
6/8/2005	21FLMANATS7	2.2	6.6		0.056
7/27/2005	21FLMANATS7	2	5.3	0.76	0.056
8/24/2005	21FLMANATS7	2.8	5.5	0.57	1.9

Date	Station	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
9/22/2005	21FLMANATS7	4.8	6.3	1.54	0.67
10/27/2005	21FLMANATS7	2	7	1.2	0.056
11/22/2005	21FLMANATS7	2	6	1.17	0.056
12/7/2005	21FLMANATS7	2	6.7	0.95	0.056
1/24/2006	21FLMANATS7	2	7.4	1.19	0.056
2/16/2006	21FLMANATS7	2	6		0.056
3/22/2006	21FLMANATS7	2.7	5	0.68	
4/12/2006	21FLMANATS7	2.3	5	0.85	0.56
5/11/2006	21FLMANATS7	4.7	5.2	1.37	0.1
6/21/2006	21FLMANATS7	4	5.5	1.59	0.12
7/11/2006	21FLMANATS7	2.8	6.3	0.69	0.056
8/15/2006	21FLMANATS7	3.2	5.4	0.73	0.056
9/13/2006	21FLMANATS7	2	5.8	1.18	0.056
10/19/2006	21FLMANATS7	2.6	4	1.86	0.056
11/1/2006	21FLMANATS7	2	7.1	0.62	0.056
12/13/2006	21FLMANATS7	2.8	4.5	0.83	0.056
1/17/2007	21FLMANATS7	2.1	5	1.14	1.16
2/6/2007	21FLMANATS7	2	8.4	0.2	0.056
3/22/2007	21FLMANATS7	3.4	7.1	1.27	0.056
4/12/2007	21FLMANATS7	6.5	5.5	1.14	0.11
5/3/2007	21FLMANATS7	5.1	3.1	1.34	0.056
6/6/2007	21FLMANATS7	2	3.2	1.46	
7/25/2007	21FLMANATS7	2	5.3	1.12	0.15
8/22/2007	21FLMANATS7	2	3.4		
9/25/2007	21FLMANATS7	2.2	5	0.76	0.056
10/17/2007	21FLMANATS7	2	2.9	1.54	0.28
11/14/2007	21FLMANATS7	3	4.5	1.98	0.12
12/5/2007	21FLMANATS7	2	4.2	1.52	0.056
1/16/2008	21FLMANATS7	3.2	5.8	1.73	0.056
2/7/2008	21FLMANATS7	2.1	4.2	1.41	0.056

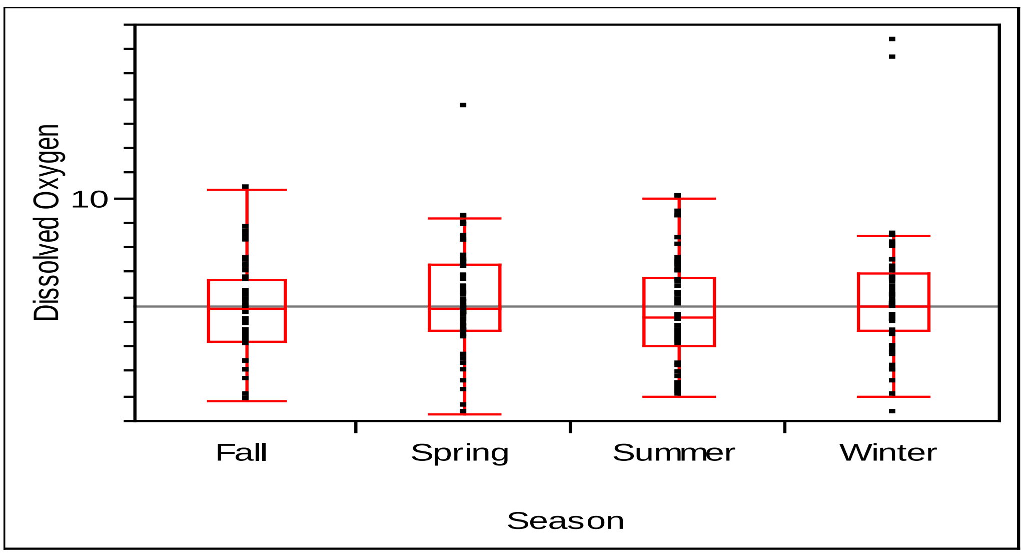
Appendix C: Chart of BOD_5, DO, TN, and TP Observations by Season, Month, and Year in Nonsense Creek

Seasonal Charts



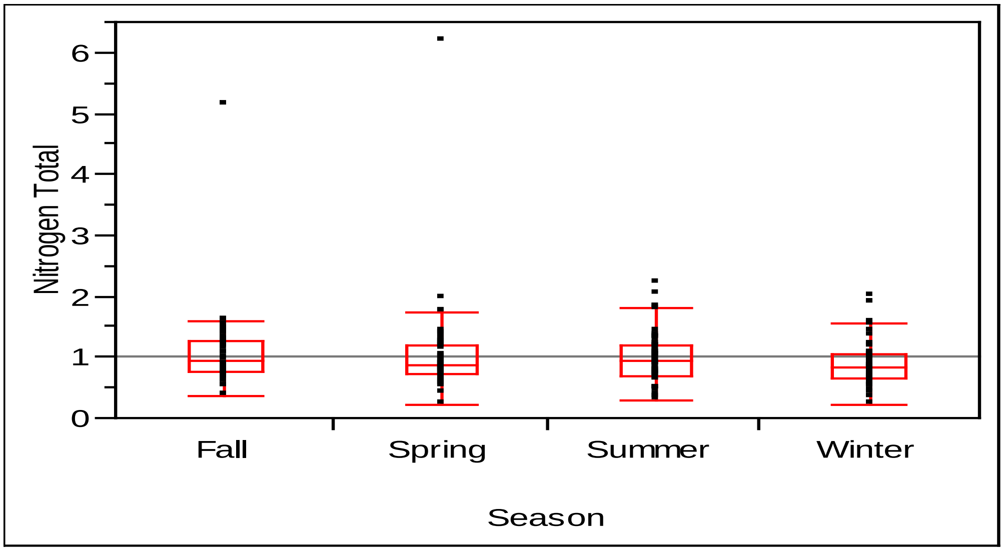
BOD_5 Quantiles

Level	Minimum	10%	25%	Median	75%	90%	Maximum
Fall	1.1	1.56	2	2.5	2.875	4.62	11.1
Spring	0.5	0.93	2.2	3.35	4.975	6.05	6.5
Summer	1.4	1.78	2	2.8	3.55	4.4	9
Winter	1.2	1.76	2	2.5	3.475	4.48	9



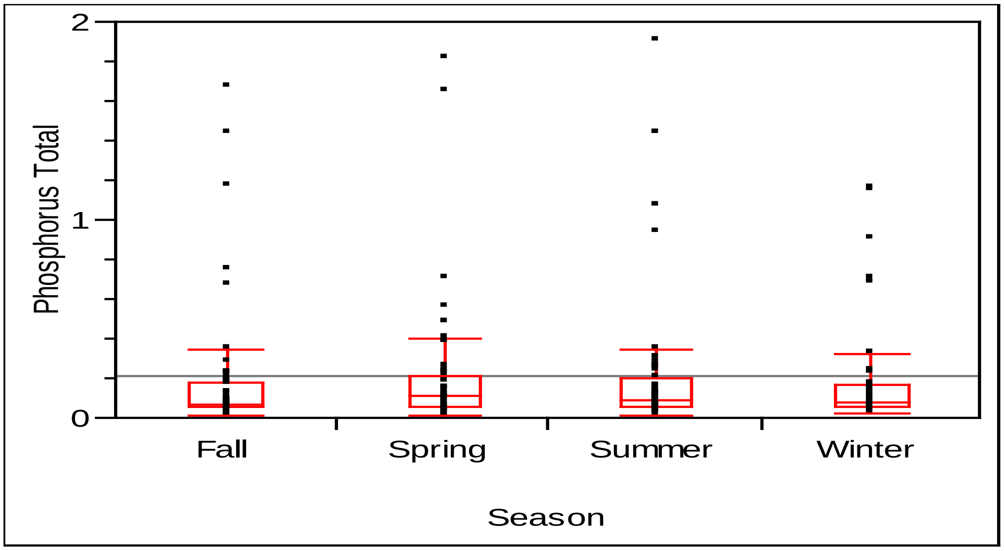
Dissolved Oxygen Quantiles

Level	Minimum	10%	25%	Median	75%	90%	Maximum
Fall	1.8	3	4.2	5.5	6.7	7.5	10.3
Spring	1.3	3.14	4.625	5.5	7.275	8.83	13.6
Summer	2	2.3	4.05	5.2	6.8	8.48	10
Winter	1.3	3.07	4.675	5.6	6.925	8.045	16.3



Total Nitrogen Quantiles

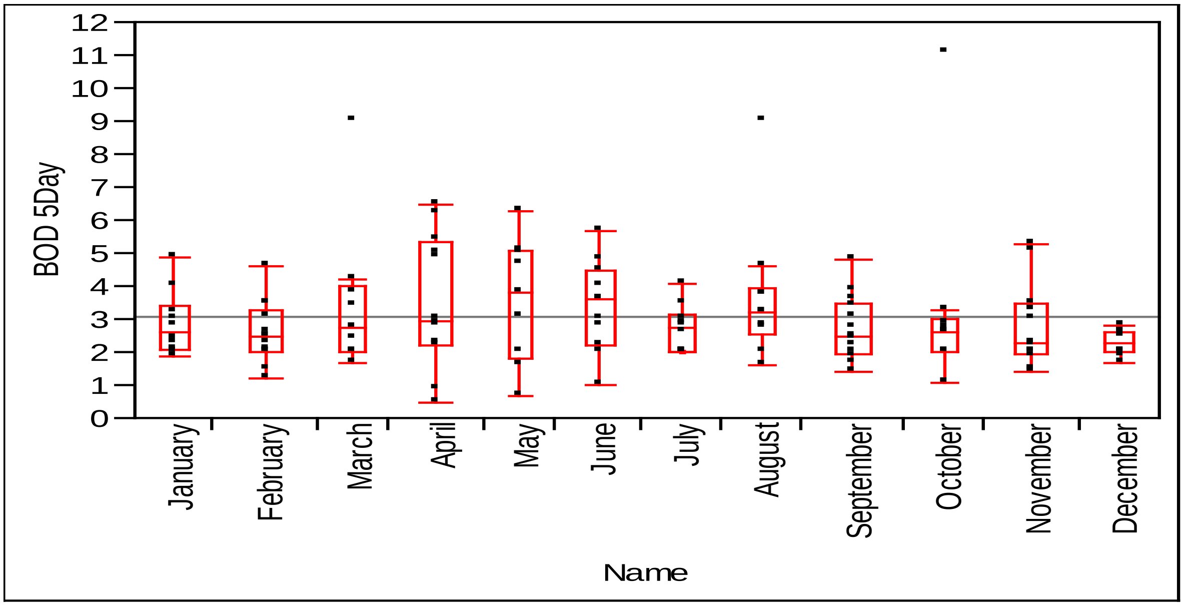
Level	Minimum	10%	25%	Median	75%	90%	Maximum
Fall	0.37	0.6391	0.758	0.9495	1.26275	1.478	5.133
Spring	0.2	0.545	0.736	0.875	1.19	1.383	6.172
Summer	0.282	0.46	0.69875	0.942	1.208	1.594	2.197
Winter	0.211	0.496	0.65125	0.83	1.046	1.526	1.98



Total Phosphorus Quantiles

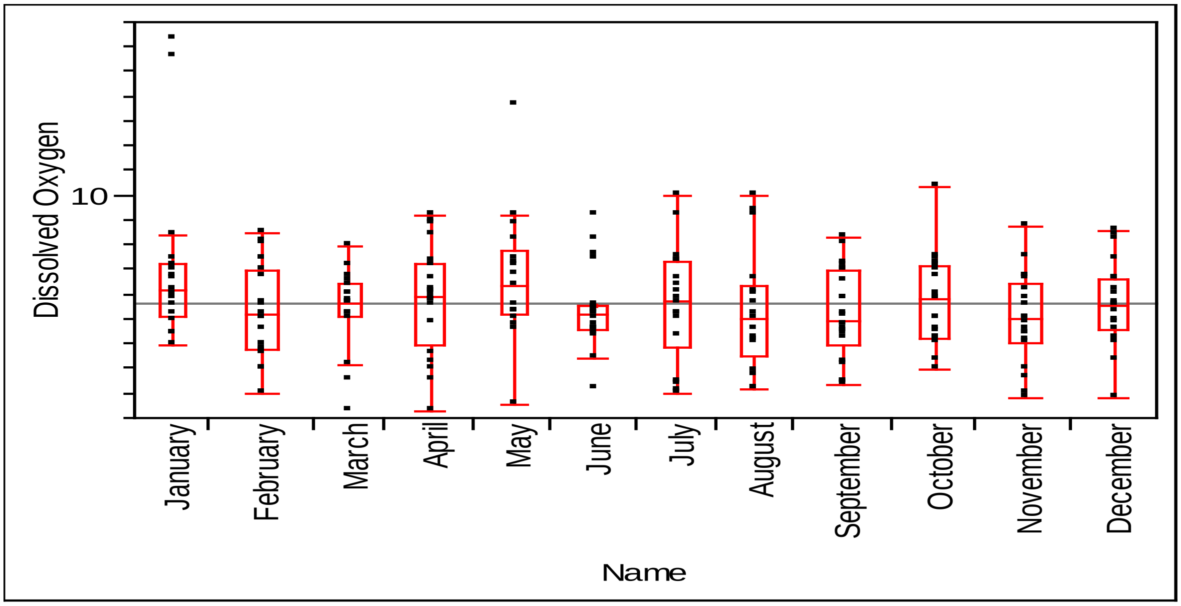
Level	Minimum	10%	25%	Median	75%	90%	Maximum
Fall	0.01	0.0428	0.056	0.071	0.175	0.446	1.662
Spring	0.01	0.0294	0.056	0.11	0.2145	0.475	1.81
Summer	0.01	0.035	0.056	0.0915	0.2045	1.002	1.9
Winter	0.02	0.031	0.0555	0.082	0.16175	0.674	1.16

Monthly Charts



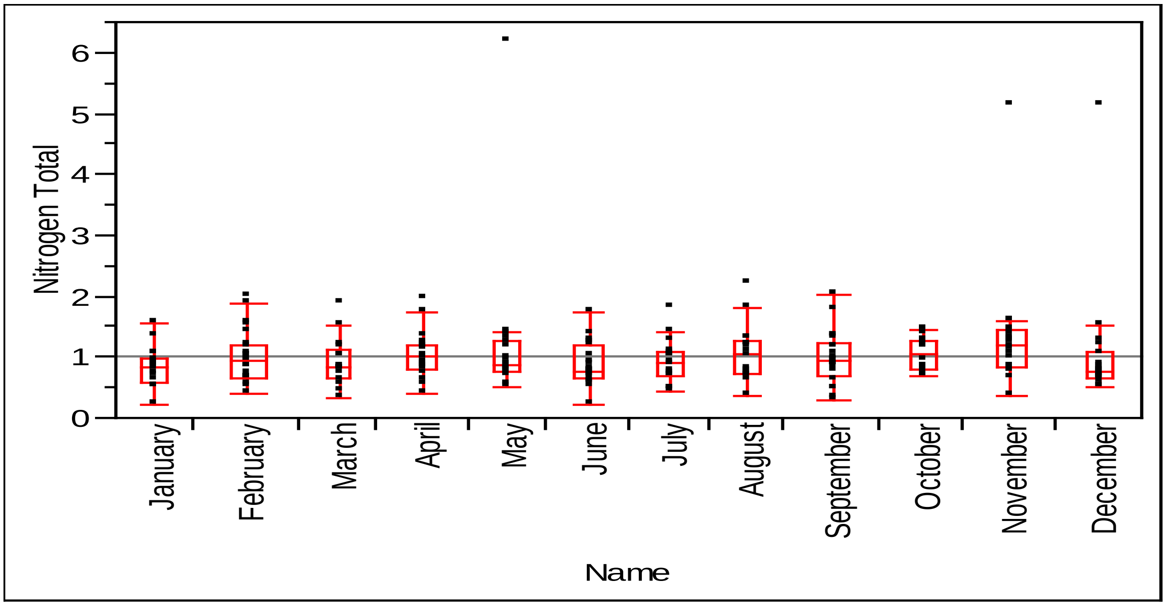
BOD_5 Quantiles

Level	Minimum	10%	25%	Median	75%	90%	Maximum
January	1.9	1.91	2.075	2.6	3.4	4.81	4.9
February	1.2	1.32	2	2.5	3.3	4.16	4.6
March	1.7	1.7	2	2.7	4	9	9
April	0.5	0.62	2.225	2.95	5.3	6.41	6.5
May	0.7	0.7	1.8	3.8	5.05	6.3	6.3
June	1	1.2	2.2	3.6	4.5	5.52	5.7
July	2	2	2	2.7	3.125	4.04	4.1
August	1.6	1.64	2.525	3.2	3.925	8.56	9
September	1.4	1.52	1.95	2.5	3.5	4.44	4.8
October	1.1	1.19	2	2.6	3	10.32	11.1
November	1.4	1.43	1.925	2.25	3.45	5.24	5.3
December	1.7	1.72	1.975	2.25	2.6	2.78	2.8



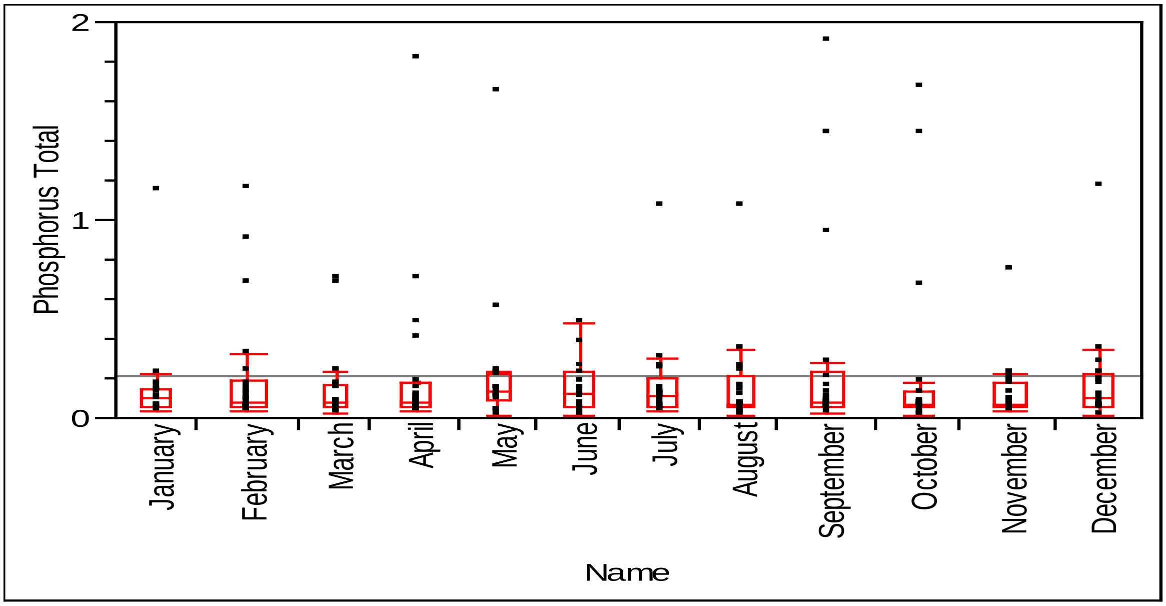
Dissolved Oxygen Quantiles

Level	Minimum	10%	25%	Median	75%	90%	Maximum
January	3.9	4.3	5.05	6.2	7.25	15.74	16.3
February	2	3	3.8	5.2	7	8.09	8.5
March	1.3	2.14	5.05	5.65	6.45	7.34	7.9
April	1.3	2.55	3.9	5.9	7.25	8.89	9.2
May	1.5	3.98	5.15	6.3	7.8	10.08	13.6
June	2.2	3.4	4.6	5.2	5.5	8.2	9.2
July	2	2.09	3.825	5.7	7.3	9.28	10
August	2.2	2.2	3.45	5	6.35	9.52	10
September	2.3	2.4	3.95	4.9	7	7.76	8.3
October	3	3.3	4.2	5.8	7.1	7.5	10.3
November	1.8	2.12	4.05	5	6.4	7.34	8.7
December	1.8	3.3	4.6	5.5	6.6	8.4	8.6



Total Nitrogen Quantiles

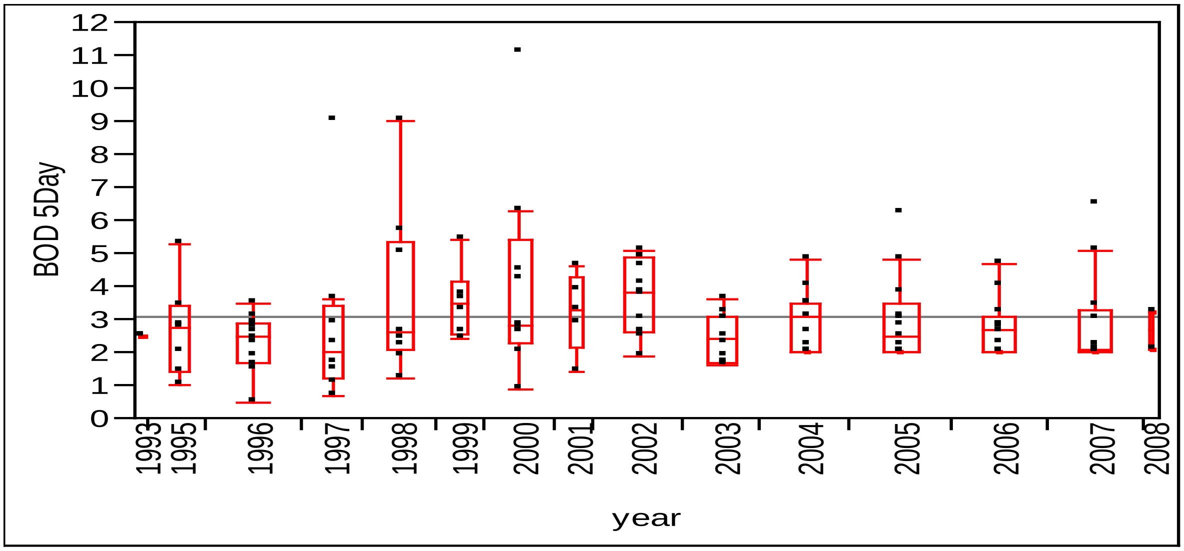
Level	Minimum	10%	25%	Median	75%	90%	Maximum
January	0.211	0.439	0.571	0.823	0.9915	1.3784	1.54
February	0.381	0.5136	0.667	0.94	1.18	1.732	1.98
March	0.339	0.4027	0.64725	0.8205	1.1185	1.622	1.86
April	0.396	0.5621	0.79925	1.0005	1.18275	1.6896	1.94
May	0.515	0.527	0.7465	0.875	1.261	2.3624	6.172
June	0.2	0.479	0.638	0.7745	1.202	1.4001	1.716
July	0.43	0.454	0.6875	0.916	1.067	1.5026	1.809
August	0.36	0.549	0.7075	1.0395	1.271	1.9254	2.197
September	0.282	0.364	0.701	0.93	1.2345	1.6776	2.03
October	0.684	0.6939	0.793	1.041	1.26375	1.4447	1.46
November	0.37	0.6689	0.8325	1.1815	1.4265	1.599	5.133
December	0.493	0.5083	0.63925	0.759	1.0885	1.8813	5.133



Total Phosphorus Quantiles

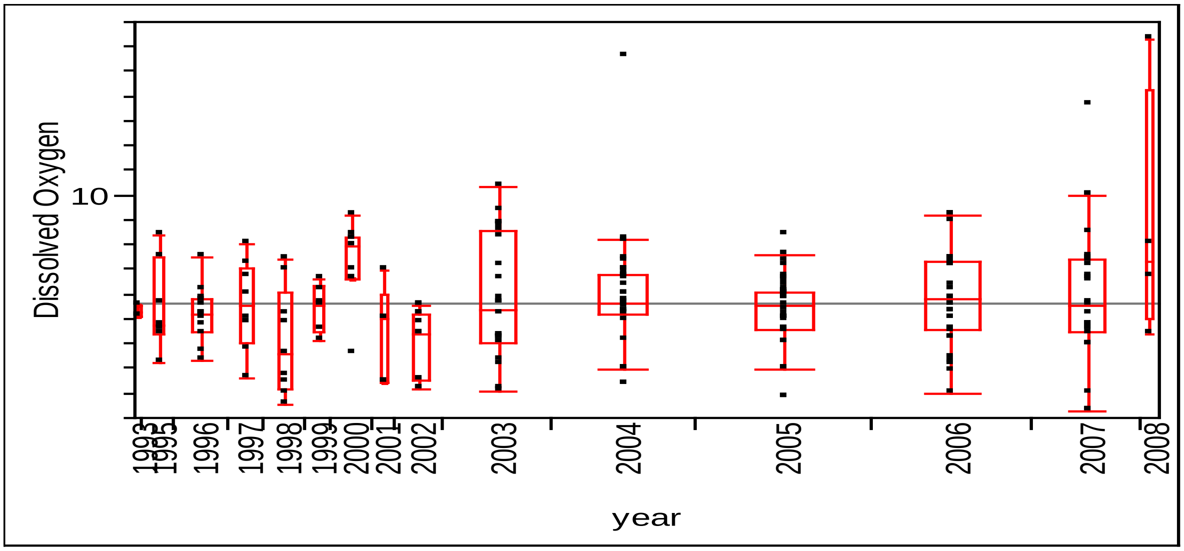
Level	Minimum	10%	25%	Median	75%	90%	Maximum
January	0.031	0.0334	0.052	0.098	0.1475	0.404	1.14
February	0.03	0.03	0.0555	0.08	0.185	0.8294	1.16
March	0.02	0.0308	0.056	0.078	0.168	0.686	0.704
April	0.029	0.03	0.056	0.08	0.18	0.704	1.81
May	0.016	0.0251	0.0925	0.1345	0.21875	0.887	1.65
June	0.01	0.0145	0.052	0.12	0.23075	0.385	0.475
July	0.03	0.034	0.058	0.11	0.1965	0.454	1.07
August	0.01	0.017	0.056	0.0695	0.2125	0.5639	1.07
September	0.02	0.0436	0.056	0.08	0.238	1.4316	1.9
October	0.01	0.0154	0.056	0.065	0.13375	1.4532	1.662
November	0.033	0.0506	0.056	0.067	0.17325	0.2263	0.749
December	0.016	0.0439	0.056	0.099	0.22175	0.432	1.17

Yearly Charts



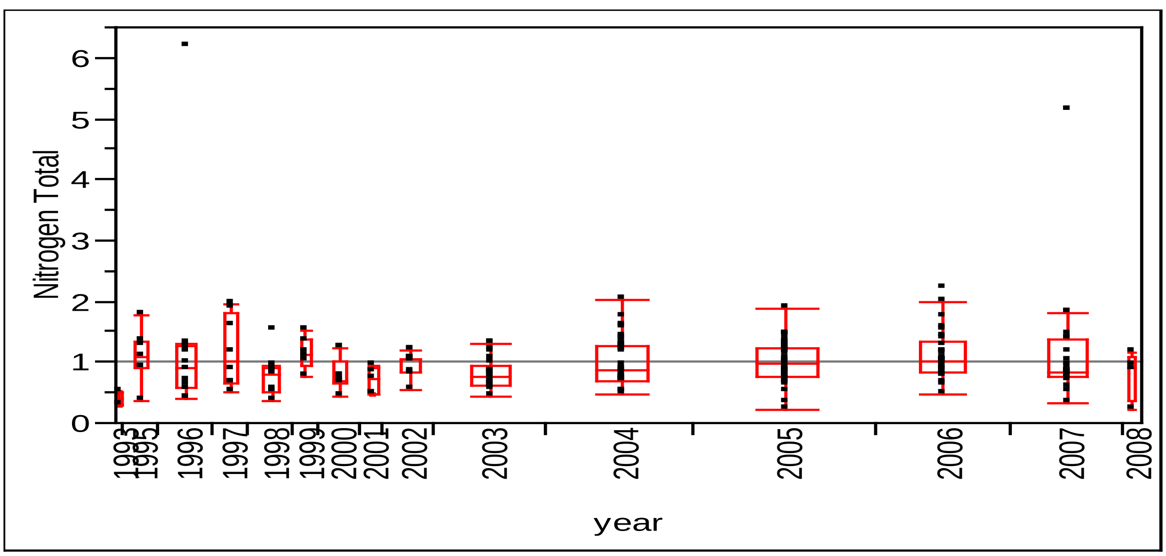
BOD_5 Quantiles

Level	Minimum	10%	25%	Median	75%	90%	Maximum
1993	2.5	2.5	2.5	2.5	2.5	2.5	2.5
1995	1	1	1.4	2.7	3.4	5.3	5.3
1996	0.5	0.8	1.675	2.5	2.875	3.38	3.5
1997	0.7	0.7	1.2	2	3.425	9	9
1998	1.2	1.2	2.05	2.6	5.35	9	9
1999	2.4	2.4	2.55	3.45	4.125	5.4	5.4
2000	0.9	0.9	2.3	2.8	5.4	11.1	11.1
2001	1.4	1.4	2.15	3.3	4.25	4.6	4.6
2002	1.9	2.02	2.6	3.8	4.9	5.06	5.1
2003	1.6	1.61	1.7	2.4	3.05	3.56	3.6
2004	2	2	2	3.1	3.5	4.64	4.8
2005	2	2	2	2.5	3.45	5.64	6.2
2006	2	2	2	2.65	3.1	4.49	4.7
2007	2	2	2	2.05	3.3	6.08	6.5
2008	2.1	2.1	2.1	2.65	3.2	3.2	3.2



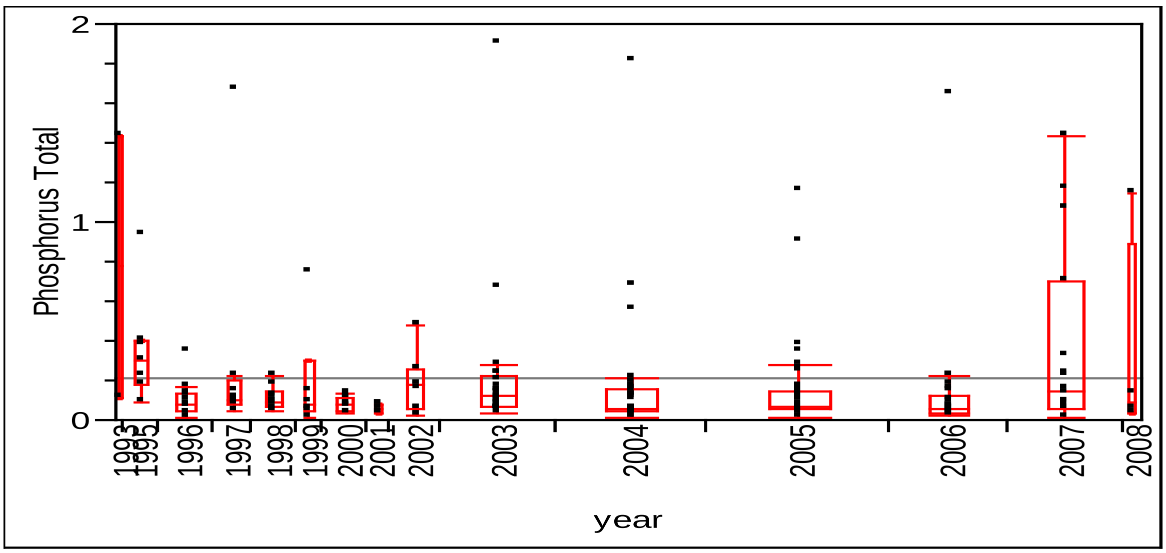
Dissolved Oxygen Quantiles

Level	Minimum	10%	25%	Median	75%	90%	Maximum
1993	5.1	5.1	5.1	5.3	5.5	5.5	5.5
1995	3.2	3.2	4.4	4.7	7.5	8.4	8.4
1996	3.3	3.42	4.475	5.2	5.775	7.11	7.5
1997	2.6	2.6	4.05	5.5	7.075	8	8
1998	1.5	1.5	2.2	3.6	6.1	7.4	7.4
1999	4.1	4.1	4.475	5.55	6.3	6.6	6.6
2000	3.6	3.6	6.6	7.9	8.3	9.2	9.2
2001	2.4	2.4	2.4	5	6	7	7
2002	2.2	2.2	2.5	4.4	5.2	5.5	5.5
2003	2.1	2.65	4.05	5.4	8.525	9.1	10.3
2004	2.3	3	5.2	5.65	6.775	7.925	15.6
2005	1.8	3	4.6	5.5	6.1	7.1	8.4
2006	2	3.17	4.6	5.8	7.35	9.2	9.2
2007	1.3	1.65	4.45	5.55	7.375	10	13.6
2008	4.4	4.4	4.975	7.35	14.225	16.3	16.3



Total Nitrogen Quantiles

Level	Minimum	10%	25%	Median	75%	90%	Maximum
1993	0.282	0.282	0.282	0.3875	0.493	0.493	0.493
1995	0.37	0.37	0.9	1.101	1.32	1.762	1.762
1996	0.381	0.3855	0.56425	0.9085	1.2535	4.708	6.172
1997	0.515	0.515	0.6415	1.001	1.795	1.94	1.94
1998	0.36	0.36	0.515	0.8	0.89	1.52	1.52
1999	0.752	0.752	0.953	1.1135	1.3835	1.52	1.52
2000	0.43	0.43	0.665	0.7	0.995	1.22	1.22
2001	0.46	0.46	0.46	0.72	0.885	0.94	0.94
2002	0.555	0.602	0.823	1.03	1.034	1.208	1.208
2003	0.43	0.555	0.63175	0.7695	0.947	1.238	1.302
2004	0.46	0.5512	0.702	0.85	1.262	1.575	2.03
2005	0.2	0.62	0.76	0.981	1.238	1.443	1.86
2006	0.465	0.654	0.832	1.003	1.3215	1.73	2.197
2007	0.34	0.55	0.772	0.83	1.365	3.471	5.133
2008	0.211	0.211	0.37075	0.895	1.09225	1.143	1.143



Total Phosphorus Quantiles

Level	Minimum	10%	25%	Median	75%	90%	Maximum
1993	0.114	0.114	0.114	0.773	1.432	1.432	1.432
1995	0.091	0.091	0.175	0.3	0.4	0.934	0.934
1996	0.01	0.0118	0.04175	0.074	0.13175	0.2954	0.35
1997	0.041	0.041	0.0795	0.105	0.2025	1.662	1.662
1998	0.05	0.05	0.07	0.09	0.1485	0.22	0.22
1999	0.01	0.01	0.04	0.0725	0.29975	0.749	0.749
2000	0.03	0.03	0.05	0.08	0.11	0.129	0.129
2001	0.03	0.03	0.03	0.06	0.08	0.08	0.08
2002	0.02	0.02	0.054	0.175	0.256	0.475	0.475
2003	0.03	0.056	0.06225	0.1255	0.223	0.476	1.9
2004	0.01	0.029	0.0455	0.056	0.1575	0.6398	1.81
2005	0.016	0.042	0.056	0.069	0.15	0.347	1.16
2006	0.02	0.035	0.038	0.056	0.119	0.227	1.65
2007	0.016	0.056	0.056	0.145	0.704	1.3	1.43
2008	0.03	0.03	0.0365	0.094	0.888	1.14	1.14

Appendix D: Reference Sampling Stations BOD_5, DO, TN, and TP Observations From Unimpaired WBIDs in the Manatee River Planning Unit

WBID	Class Description	Station	Date	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1807A	Potable Water Supply	21FLMANAUM1	1/24/1996		7.6	0.571	0.423
1807A	Potable Water Supply	21FLMANAUM1	2/13/1996		7.8	0.744	
1807A	Potable Water Supply	21FLMANAUM1	4/11/1996		7.1	1.197	0.277
1807A	Potable Water Supply	21FLMANAUM1	4/11/1996		7.1	1.197	0.277
1807A	Potable Water Supply	21FLMANAUM1	5/13/1996		7.8	0.656	0.529
1807A	Potable Water Supply	21FLMANAUM1	5/13/1996		7.8	0.656	0.529
1807A	Potable Water Supply	21FLMANAUM1	6/17/1996		7.5	0.391	0.536
1807A	Potable Water Supply	21FLMANAUM1	6/17/1996		7.5	0.391	0.536
1807A	Potable Water Supply	21FLMANAUM1	7/8/1996		7.6	0.954	0.631
1807A	Potable Water Supply	21FLMANAUM1	7/8/1996		7.6	0.954	0.631
1807A	Potable Water Supply	21FLMANAUM1	8/5/1996		7.2	1.032	0.32
1807A	Potable Water Supply	21FLMANAUM1	8/5/1996		7.2	1.032	0.32
1807A	Potable Water Supply	21FLMANAUM1	9/3/1996		6.7	0.729	0.355
1807A	Potable Water Supply	21FLMANAUM1	9/3/1996		6.7	0.729	0.355
1807A	Potable Water Supply	21FLMANAUM1	10/9/1996	2.8	6.3	1.199	
1807A	Potable Water Supply	21FLMANAUM1	10/9/1996		6.3	1.199	
1807A	Potable Water Supply	21FLMANAUM1	3/17/1997	1.2	6.1	0.508	0.551
1807A	Potable Water Supply	21FLMANAUM1	3/17/1997		6.1	0.508	0.551
1807A	Potable Water Supply	21FLMANAUM1	4/7/1997	2.3	6.7	0.492	0.524
1807A	Potable Water Supply	21FLMANAUM1	6/3/1997	1.2	2.8	0.7	0.37
1807A	Potable Water Supply	21FLMANAUM1	6/3/1997		2.8	0.7	0.37
1807A	Potable Water Supply	21FLMANAUM1	7/7/1997		6.6		
1807A	Potable Water Supply	21FLMANAUM1	1/21/1998	1	10	1.268	0.295
1807A	Potable Water Supply	21FLMANAUM1	1/21/1998		10	1.268	0.295
1807A	Potable Water Supply	21FLMANAUM1	2/17/1998	1.1	9.5	0.598	
1807A	Potable Water Supply	21FLMANAUM1	2/17/1998		9.5	0.598	0
1807A	Potable Water Supply	21FLMANAUM1	3/31/1998	1.9	6.6	1.064	0.37
1807A	Potable Water Supply	21FLMANAUM1	3/31/1998		6.6	1.064	0.37
1807A	Potable Water Supply	21FLMANAUM1	4/20/1998	1.4	8.7	0.505	0.51
1807A	Potable Water Supply	21FLMANAUM1	4/20/1998		8.7	0.505	0.51
1807A	Potable Water Supply	21FLMANAUM1	5/4/1998	1.4	7.3	0.535	0.496
1807A	Potable Water Supply	21FLMANAUM1	5/4/1998		7.3	0.535	0.496
1807A	Potable Water Supply	21FLMANAUM1	6/15/1998	2	6.5	0.728	0.547

WBID	Class Description	Station	Date	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1807A	Potable Water Supply	21FLMANAUM1	6/15/1998		6.5	0.728	0.547
1807A	Potable Water Supply	21FLMANAUM1	7/6/1998	1.5	5.9	0.801	0.46
1807A	Potable Water Supply	21FLMANAUM1	8/17/1998	1.4	5	0.9	0.388
1807A	Potable Water Supply	21FLMANAUM1	8/17/1998		5	0.9	0.388
1807A	Potable Water Supply	21FLMANAUM1	8/31/1998		5.8	0.867	0.283
1807A	Potable Water Supply	21FLMANAUM1	10/19/1998	0.6	5.55	1.134	0.395
1807A	Potable Water Supply	21FLMANAUM1	10/19/1998		7.1	1.134	0.395
1807A	Potable Water Supply	21FLMANAUM1	11/3/1998	0.7	6.2	1.012	0.569
1807A	Potable Water Supply	21FLMANAUM1	11/3/1998		6.2	1.012	0.569
1807A	Potable Water Supply	21FLMANAUM1	1/4/1999	1.4	7.8	0.865	0.368
1807A	Potable Water Supply	21FLMANAUM1	2/1/1999	1.4	6.4	0.8	0.266
1807A	Potable Water Supply	21FLMANAUM1	3/1/1999	1.5	8.7	0.624	0.228
1807A	Potable Water Supply	21FLMANAUM1	4/19/1999	1.6	7.6	0.901	0.356
1807A	Potable Water Supply	21FLMANAUM1	5/3/1999	1.6	6.6	0.601	
1807A	Potable Water Supply	21FLMANAUM1	6/21/1999	2.4	5.3	0.748	0.366
1807A	Potable Water Supply	21FLMANAUM1	7/19/1999	1.3	4.21	1.643	0.338
1807A	Potable Water Supply	21FLMANAUM1	8/16/1999	3.1	4.87	1.348	0.412
1807A	Potable Water Supply	21FLMANAUM1	9/13/1999	2.3	5.85	1.269	0.418
1807A	Potable Water Supply	21FLMANAUM1	10/4/1999	1.9	5.8	1.093	0.282
1807A	Potable Water Supply	21FLMANAUM1	11/8/1999	2.3	6.15	0.908	0.577
1807A	Potable Water Supply	21FLMANAUM1	12/6/1999	1.4	8.49	0.562	
1807A	Potable Water Supply	21FLMANAUM1	1/4/2000	2.2	8.2	1.093	0.433
1807A	Potable Water Supply	21FLMANAUM1	2/22/2000	2.1	5.6	0.958	
1807A	Potable Water Supply	21FLMANAUM1	3/20/2000		4.86	1.476	0.263
1807A	Potable Water Supply	21FLMANAUM1	4/4/2000	2.4	7.3	0.677	0.387
1807A	Potable Water Supply	21FLMANAUM1	5/1/2000		6.73	1.561	0.291
1807A	Potable Water Supply	21FLMANAUM1	6/5/2000	0.5			0.541
1807A	Potable Water Supply	21FLMANAUM1	7/10/2000	2.5	6.6	1.103	0.422
1807A	Potable Water Supply	21FLMANAUM1	8/14/2000	1.6	6.16	1.229	0.349
1807A	Potable Water Supply	21FLMANAUM1	9/5/2000	3.5	6.52		
1807A	Potable Water Supply	21FLMANAUM1	10/2/2000	3.1	6.8	0.57	
1807A	Potable Water Supply	21FLMANAUM1	11/7/2000		6.5	0.824	0.399
1807A	Potable Water Supply	21FLMANAUM1	12/4/2000		8.5		0.407
1807A	Potable Water Supply	21FLMANAUM1	1/2/2001	1.5	9.6	0.885	0.365
1807A	Potable Water Supply	21FLMANAUM1	2/12/2001		6.2	0.874	0.423
1807A	Potable Water Supply	21FLMANAUM1	3/5/2001	2	5.8	0.722	0.441

WBID	Class Description	Station	Date	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1807A	Potable Water Supply	21FLMANAUM1	4/9/2001	1.4	8.9		0.321
1807A	Potable Water Supply	21FLMANAUM1	5/8/2001	2	8.8	0.427	0.349
1807A	Potable Water Supply	21FLMANAUM1	6/26/2001		5.9	0.797	
1807A	Potable Water Supply	21FLMANAUM1	7/10/2001	2.1	5.6	1.081	0.34
1807A	Potable Water Supply	21FLMANAUM1	8/13/2001	3.8	5.6	2.206	0.486
1807A	Potable Water Supply	21FLMANAUM1	9/10/2001		6	1.412	0.389
1807A	Potable Water Supply	21FLMANAUM1	10/8/2001	0.5	6.9	0.628	0.473
1807A	Potable Water Supply	21FLMANAUM1	11/6/2001	1.2	5.7	1.333	0.26
1807A	Potable Water Supply	21FLMANAUM1	12/11/2001	2.6	6.8	0.947	0.422
1807A	Potable Water Supply	21FLMANAUM1	1/7/2002	1	8.8		0.254
1807A	Potable Water Supply	21FLMANAUM1	2/4/2002	1.9	7.2	0.663	0.475
1807A	Potable Water Supply	21FLMANAUM1	3/5/2002	1.2	6.9	1.54	0.19
1807A	Potable Water Supply	21FLMANAUM1	4/22/2002	3	8		0.208
1807A	Potable Water Supply	21FLMANAUM1	5/15/2002	2.1	6.4	0.43	0.487
1807A	Potable Water Supply	21FLMANAUM1	6/19/2002	1.9	6.7	1.579	0.228
1807A	Potable Water Supply	21FLMANAUM1	7/17/2002	5.4	5.7		0.452
1807A	Potable Water Supply	21FLMANAUM1	8/7/2002	1.5	4.25	0.908	0.374
1807A	Potable Water Supply	21FLMANAUM1	9/4/2002	1.2	6.76	0.813	
1807A	Potable Water Supply	21FLMANAUM1	10/2/2002		6.1	1.321	0.237
1807A	Potable Water Supply	21FLMANAUM1	11/13/2002	3.2	7.2	1.056	0.202
1807A	Potable Water Supply	21FLMANAUM1	12/4/2002	2.3	8.9		0.177
1807A	Potable Water Supply	21FLMANAUM1	1/22/2003	1	10.4	0.705	0.287
1807A	Potable Water Supply	21FLMANAUM1	2/5/2003	2.3	8.1	0.682	
1807A	Potable Water Supply	21FLMANAUM1	3/19/2003	1.9	6.6	0.804	0.436
1807A	Potable Water Supply	21FLMANAUM1	4/9/2003	1.3	7.3	0.964	0.319
1807A	Potable Water Supply	21FLMANAUM1	5/28/2003	2.9	5	0.946	0.334
1807A	Potable Water Supply	21FLMANAUM1	6/25/2003	2.7	7.1	0.758	0.353
1807A	Potable Water Supply	21FLMANAUM1	7/23/2003	3.2	6.4	1.895	0.502
1807A	Potable Water Supply	21FLMANAUM1	8/20/2003	2.7	7.9	1.355	0.362
1807A	Potable Water Supply	21FLMANAUM1	9/24/2003		5.7	1.013	0.335
1807A	Potable Water Supply	21FLMANAUM1	10/22/2003	1.1	8.2	0.776	0.328
1807A	Potable Water Supply	21FLMANAUM1	11/5/2003	3.2	7.7	0.851	0.272
1807A	Potable Water Supply	21FLMANAUM1	12/3/2003	1	7.6	0.514	0.337
1807A	Potable Water Supply	21FLMANAUM1	1/7/2004	3.3	9.5	1.07	0.34
1807A	Potable Water Supply	21FLMANAUM1	2/25/2004	2	8.1	0.78	0.28
1807A	Potable Water Supply	21FLMANAUM1	3/10/2004	2	8.4	0.59	0.28

WBID	Class Description	Station	Date	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1807A	Potable Water Supply	21FLMANAUM1	4/7/2004	2.7	9.7	0.36	0.34
1807A	Potable Water Supply	21FLMANAUM1	5/5/2004	2.1	7	0.68	0.32
1807A	Potable Water Supply	21FLMANAUM1	6/9/2004	2.1	6.3	0.93	0.48
1807A	Potable Water Supply	21FLMANAUM1	7/14/2004	2.9	7	0.36	0.32
1807A	Potable Water Supply	21FLMANAUM1	8/4/2004	2.1	6.7	0.68	0.45
1807A	Potable Water Supply	21FLMANAUM1	9/29/2004	2.5	6.8	1.12	0.31
1807A	Potable Water Supply	21FLMANAUM1	10/13/2004	2	6.05	0.625	0.365
1807A	Potable Water Supply	21FLMANAUM1	11/17/2004	2	8.9	0.47	0.18
1807A	Potable Water Supply	21FLMANAUM1	12/1/2004	2	8.6	1	0.53
1807A	Potable Water Supply	21FLMANAUM1	1/5/2005	2	8.8	0.69	0.32
1807A	Potable Water Supply	21FLMANAUM1	2/2/2005	2.5	6.4	0.84	
1807A	Potable Water Supply	21FLMANAUM1	3/9/2005	2	7.65	0.78	0.48
1807A	Potable Water Supply	21FLMANAUM1	4/6/2005	2	6.9	0.59	0.33
1807A	Potable Water Supply	21FLMANAUM1	5/4/2005	2	9.2	1.23	0.31
1807A	Potable Water Supply	21FLMANAUM1	6/22/2005	2	7.85	1.42	0.315
1807A	Potable Water Supply	21FLMANAUM1	7/6/2005	2	5.7	1	0.2
1807A	Potable Water Supply	21FLMANAUM1	8/10/2005	2	5.1	0.71	0.13
1807A	Potable Water Supply	21FLMANAUM1	9/7/2005	2.1	4.7	0.7	0.59
1807A	Potable Water Supply	21FLMANAUM1	10/6/2005	2	7.3	1.4	0.5
1807A	Potable Water Supply	21FLMANAUM1	11/9/2005	2	6.4	1.19	0.25
1807A	Potable Water Supply	21FLMANAUM1	12/14/2005	2	9	0.94	0.32
1807A	Potable Water Supply	21FLMANAUM1	1/4/2006	2	9.4	0.98	0.43
1807A	Potable Water Supply	21FLMANAUM1	2/8/2006	2	8	0.66	0.42
1807A	Potable Water Supply	21FLMANAUM1	3/9/2006	2	8.8	0.19	0.26
1807A	Potable Water Supply	21FLMANAUM1	4/19/2006	2	7.6	0.43	0.28
1807A	Potable Water Supply	21FLMANAUM1	5/3/2006	2	7.4	0.72	0.26
1807A	Potable Water Supply	21FLMANAUM1	6/14/2006	2.8	6.3	1.78	0.47
1807A	Potable Water Supply	21FLMANAUM1	7/6/2006	2.2	7.5	1.57	0.28
1807A	Potable Water Supply	21FLMANAUM1	8/9/2006	2.4	7.2	1.02	0.36
1807A	Potable Water Supply	21FLMANAUM1	9/6/2006	2.9	6.3	1.44	0.31
1807A	Potable Water Supply	21FLMANAUM1	10/11/2006	2.1	6.2	1.02	0.36
1807A	Potable Water Supply	21FLMANAUM1	11/8/2006	2.6	10.1	1.42	0.56
1807A	Potable Water Supply	21FLMANAUM1	12/6/2006	2.7	8	0.78	0.43
1807A	Potable Water Supply	21FLMANAUM1	1/10/2007	2	0.7	0.76	0.55
1807A	Potable Water Supply	21FLMANAUM1	2/13/2007	2	8.6	0.7	0.48
1807A	Potable Water Supply	21FLMANAUM1	3/20/2007	2.2	7.8	0.37	0.38

WBID	Class Description	Station	Date	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1807A	Potable Water Supply	21FLMANAUM1	4/25/2007	2	4.2	0.69	0.44
1807A	Potable Water Supply	21FLMANAUM1	5/9/2007	2.2	3.9	0.35	0.4
1807A	Potable Water Supply	21FLMANAUM1	6/20/2007	2.3	3.5		0.46
1807A	Potable Water Supply	21FLMANAUM1	7/10/2007	2.5	3.4	0.78	0.36
1807A	Potable Water Supply	21FLMANAUM1	8/1/2007	2.7	3.4	1.01	0.36
1807A	Potable Water Supply	21FLMANAUM1	9/12/2007	3.2	4.4	0.88	0.32
1807A	Potable Water Supply	21FLMANAUM1	10/3/2007	2	4.6	0.52	0.5
1807A	Potable Water Supply	21FLMANAUM1	11/27/2007	2.7	8.5	1.13	0.43
1807A	Potable Water Supply	21FLMANAUM1	12/19/2007	2	5.7	0.61	0.46
1807A	Potable Water Supply	21FLMANAUM1	1/24/2008	2.5	4.3	1.09	0.44
1807A	Potable Water Supply	21FLMANAUM1	2/13/2008	3.9	5.4	0.77	0.53
1807C	Potable Water Supply	112WRD 02299950	8/27/1996	0.8	8.6	0.492	0.52
1807C	Potable Water Supply	112WRD 02299950	9/25/1996	0.8		0.5945	0.4
1807C	Potable Water Supply	112WRD 02299950	9/10/1997	0.8	7.6	0.4715	0.41
1807C	Potable Water Supply	112WRD 02299950	12/17/1997		9.2	1.0045	0.21855
1807C	Potable Water Supply	112WRD 02299950	5/6/1998	0.8	9.9	0.3895	0.37
1807C	Potable Water Supply	112WRD 02299950	9/21/1998	1.5	7	1.066	0.26
1807C	Potable Water Supply	112WRD 02299950	8/10/1999	1	7.3	0.738	0.35
1807C	Potable Water Supply	112WRD 02299950	9/28/1999	1.5	6.1	0.533	0.2
1807C	Potable Water Supply	112WRD 02299950	8/14/2000	0.4	5.1	1.0045	0.34
1807C	Potable Water Supply	112WRD 02299950	9/19/2000	1.6	6.1	1.066	0.26
1807C	Potable Water Supply	112WRD 02299950	7/9/2001	1.1	7.5	0.738	0.66
1807C	Potable Water Supply	112WRD 02299950	9/20/2001	1.5	6	1.2095	0.5
1807C	Potable Water Supply	112WRD 02299950	3/27/2002	0.2	9.3	0.451	0.6
1807C	Potable Water Supply	112WRD 02299950	9/4/2002	0.5	6.4	1.189	0.36
1807C	Potable Water Supply	112WRD 02299950	4/22/2003	0.3	9.3	0.3075	0.55
1807C	Potable Water Supply	112WRD 02299950	9/8/2003	1	5	1.0865	0.37
1807C	Potable Water Supply	112WRD 02299950	6/7/2004	0.1	7.8	0.3075	0.53
1807C	Potable Water Supply	112WRD 02299950	9/1/2004		5.5		0.43
1807C	Potable Water Supply	112WRD 02299950	4/12/2005		7.9		0.47
1807C	Potable Water Supply	112WRD 02299950	8/31/2005		6.7		0.46
1807C	Potable Water Supply	112WRD 02299950	3/22/2006		7.6		0.52
1807C	Potable Water Supply	112WRD 02299950	8/24/2006		6.6	1.25	0.53
1807C	Potable Water Supply	112WRD 02299950	3/8/2007		9.8		0.58
1807C	Potable Water Supply	112WRD 02299950	3/22/2007		7.9		0.66
1807C	Potable Water Supply	112WRD 02299950	6/7/2007		6.6		0.75

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1807C	Potable Water Supply	112WRD 02299950	7/19/2007		6.8	0.87	0.8
1807C	Potable Water Supply	112WRD 02299950	8/16/2007		6.4		0.43
1807C	Potable Water Supply	112WRD 02299950	9/26/2007		6.5		0.41
1807C	Potable Water Supply	112WRD 02299950	10/18/2007		6.5	0.908	0.61
1807C	Potable Water Supply	112WRD 02299950	1/10/2008		9.3		0.54
1807C	Potable Water Supply	112WRD 02299950	2/21/2008		9.1		0.62
1807C	Potable Water Supply	112WRD 02299950	5/1/2008		8		0.67
1807C	Potable Water Supply	21FLTPA 24010002	12/14/1999		7.92		
1807C	Potable Water Supply	21FLTPA 24010002	11/21/2000	2	8.98		
1807C	Potable Water Supply	21FLTPA 24010002	3/22/2006		8.65		
1807C	Potable Water Supply	21FLTPA 24010002	1/16/2007	0.41		0.524	0.49
1807C	Potable Water Supply	21FLTPA 24010002	1/17/2007		9.13		
1807C	Potable Water Supply	21FLTPA 24010002	1/22/2007	0.68	9.7	0.511	0.67
1807C	Potable Water Supply	21FLTPA 24010002	2/5/2007	0.83	10.16	0.88	0.31
1807C	Potable Water Supply	21FLTPA 24010002	2/27/2007	1.1	12.33	0.394	0.49
1807C	Potable Water Supply	21FLTPA 24010002	3/13/2007		10.08		
1807C	Potable Water Supply	21FLTPA 24010002	3/20/2007	0.45	11.81	0.454	0.49
1807C	Potable Water Supply	21FLTPA 24010002	3/27/2007		8.52		
1807C	Potable Water Supply	21FLTPA 24010002	4/9/2007	0.88	9.04	0.254	0.71
1807C	Potable Water Supply	21FLTPA 24010002	5/1/2007	0.52	8.13	0.249	0.52
1807C	Potable Water Supply	21FLTPA 24010002	5/21/2007	0.75	10.77	0.277	0.56
1807C	Potable Water Supply	21FLTPA 24010002	6/4/2007	3.3	7.62	1.43	0.37
1807C	Potable Water Supply	21FLTPA 24010002	6/18/2007	0.46	6.65	0.61	1.2
1807C	Potable Water Supply	21FLTPA 24010002	7/16/2007	0.57	6.14	1.17	0.82
1807C	Potable Water Supply	21FLTPA 24010002	7/24/2007	1.3	7.57	1.392	0.4
1807C	Potable Water Supply	21FLTPA 24010002	8/21/2007	0.72	6.8	1.097	0.61
1807C	Potable Water Supply	21FLTPA 24010002	9/11/2007	1.1	8.37	0.675	0.75
1807C	Potable Water Supply	21FLTPA 24010002	10/9/2007	3.7	6.54	1.5	0.49
1807C	Potable Water Supply	21FLTPA 24010002	10/30/2007	0.57	7.1	1.14	0.52
1807C	Potable Water Supply	21FLTPA 24010002	11/6/2007	0.64	8.49	0.92	0.52
1807C	Potable Water Supply	21FLTPA 24010002	11/27/2007	0.8	8.27	0.573	0.65
1807D	Potable Water Supply	21FLMANAD3	1/4/2000	1.5	7.5		0.569
1807D	Potable Water Supply	21FLMANAD3	2/22/2000	1.9	5.6	0.268	0.284
1807D	Potable Water Supply	21FLMANAD3	3/20/2000			1.082	0.337
1807D	Potable Water Supply	21FLMANAD3	4/4/2000	3.5	9.9	0.934	0.401
1807D	Potable Water Supply	21FLMANAD3	5/1/2000		6.4	0.843	

WBID	Class Description	Station	Date	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1807D	Potable Water Supply	21FLMANAD3	6/5/2000	0.5			0.353
1807D	Potable Water Supply	21FLMANAD3	7/10/2000	2	6.6	2.171	0.628
1807D	Potable Water Supply	21FLMANAD3	8/14/2000	1.6	6.3	1.651	
1807D	Potable Water Supply	21FLMANAD3	9/4/2000	1.8			
1807D	Potable Water Supply	21FLMANAD3	10/2/2000	1.4	6	0.44	
1807D	Potable Water Supply	21FLMANAD3	11/7/2000		7.9	1.158	0.277
1807D	Potable Water Supply	21FLMANAD3	12/4/2000		9.1		0.322
1807D	Potable Water Supply	21FLMANAD3	1/2/2001	1.6	9	3.271	
1807D	Potable Water Supply	21FLMANAD3	2/12/2001		6.3	0.86	0.379
1807D	Potable Water Supply	21FLMANAD3	3/5/2001	2.9	6.4	0.836	0.451
1807D	Potable Water Supply	21FLMANAD3	4/9/2001	1	9.1		0.434
1807D	Potable Water Supply	21FLMANAD3	5/8/2001	1.8	8.6	0.838	0.217
1807D	Potable Water Supply	21FLMANAD3	6/26/2001	1.8	7.4	1.609	0.494
1807D	Potable Water Supply	21FLMANAD3	7/10/2001	1.1	7.4	1.029	0.488
1807D	Potable Water Supply	21FLMANAD3	8/13/2001	2.6	5.2	1.876	0.534
1807D	Potable Water Supply	21FLMANAD3	9/10/2001		7.3	1.675	0.442
1807D	Potable Water Supply	21FLMANAD3	10/8/2001	0.5	7.4	0.828	0.344
1807D	Potable Water Supply	21FLMANAD3	11/6/2001	1.6	5.4	0.98	0.265
1807D	Potable Water Supply	21FLMANAD3	12/11/2001	1.1	6	0.715	0.386
1807D	Potable Water Supply	21FLMANAD3	1/7/2002	1.3	10.25		0.332
1807D	Potable Water Supply	21FLMANAD3	2/4/2002	1.3	8.9	0.719	0.469
1807D	Potable Water Supply	21FLMANAD3	3/5/2002	2.2	10.9	1.28	0.296
1807D	Potable Water Supply	21FLMANAD3	4/22/2002	1.9	6.47	1.52	0.562
1807D	Potable Water Supply	21FLMANAD3	5/15/2002	1.8	6.8	0.285	0.212
1807D	Potable Water Supply	21FLMANAD3	6/19/2002	0.6	6.6	1.164	0.331
1807D	Potable Water Supply	21FLMANAD3	7/17/2002	2.3	5.1		0.645
1807D	Potable Water Supply	21FLMANAD3	8/7/2002	1	6.4	1.664	0.421
1807D	Potable Water Supply	21FLMANAD3	9/4/2002		6.6	1.034	
1807D	Potable Water Supply	21FLMANAD3	10/2/2002	0.35	5.7	1.419	0.708
1807D	Potable Water Supply	21FLMANAD3	11/13/2002	1.3	8	1.164	0.196
1807D	Potable Water Supply	21FLMANAD3	12/4/2002	1.9	10.6		0.334
1807D	Potable Water Supply	21FLMANAD3	1/22/2003	1.8	10.7	1.273	0.424
1807D	Potable Water Supply	21FLMANAD3	2/5/2003	1	8.7	0.755	
1807D	Potable Water Supply	21FLMANAD3	3/19/2003	2.15	6.375	1.532	0.4275
1807D	Potable Water Supply	21FLMANAD3	4/9/2003	1	7.6	0.734	0.352
1807D	Potable Water Supply	21FLMANAD3	5/28/2003		6.7	1.462	0.522

WBID	Class Description	Station	Date	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1807D	Potable Water Supply	21FLMANAD3	6/25/2003	2	5.2	2.006	0.517
1807D	Potable Water Supply	21FLMANAD3	7/23/2003	1.8	5.7	1.302	0.502
1807D	Potable Water Supply	21FLMANAD3	8/20/2003	1.2	6.4	1.409	0.396
1807D	Potable Water Supply	21FLMANAD3	9/24/2003		6.7	0.983	0.303
1807D	Potable Water Supply	21FLMANAD3	10/22/2003	1	8.5	0.582	0.252
1807D	Potable Water Supply	21FLMANAD3	11/5/2003	1.4	7.1	1.322	0.312
1807D	Potable Water Supply	21FLMANAD3	12/3/2003	1.55	8.4	0.618	0.156
1807D	Potable Water Supply	21FLMANAD3	1/7/2004	1.3	7.8	0.67	0.44
1807D	Potable Water Supply	21FLMANAD3	2/25/2004	3.6	10.2	1.15	0.46
1807D	Potable Water Supply	21FLMANAD3	3/10/2004	2	9.1	0.54	0.29
1807D	Potable Water Supply	21FLMANAD3	4/7/2004	2	9.2	0.34	0.27
1807D	Potable Water Supply	21FLMANAD3	5/5/2004	2	8.1	0.54	0.37
1807D	Potable Water Supply	21FLMANAD3	6/9/2004	2.5	7.8	0.67	0.53
1807D	Potable Water Supply	21FLMANAD3	7/14/2004	2	7.1	0.57	0.56
1807D	Potable Water Supply	21FLMANAD3	8/4/2004	2	6.2	0.89	0.47
1807D	Potable Water Supply	21FLMANAD3	9/29/2004	2.45	5	0.84	0.42
1807D	Potable Water Supply	21FLMANAD3	10/13/2004	2.1	5.3	0.51	0.39
1807D	Potable Water Supply	21FLMANAD3	11/17/2004	2	8.3	0.64	0.056
1807D	Potable Water Supply	21FLMANAD3	12/1/2004	2	7	0.565	0.335
1807D	Potable Water Supply	21FLMANAD3	1/5/2005	2	9.8	0.82	0.38
1807D	Potable Water Supply	21FLMANAD3	2/2/2005	2	6.2	0.68	
1807D	Potable Water Supply	21FLMANAD3	3/9/2005	2	6.8	0.76	0.44
1807D	Potable Water Supply	21FLMANAD3	4/6/2005	2	5.9	0.67	0.25
1807D	Potable Water Supply	21FLMANAD3	5/4/2005	2	8.2	1.13	0.34
1807D	Potable Water Supply	21FLMANAD3	6/22/2005	2	8.4	1.46	0.42
1807D	Potable Water Supply	21FLMANAD3	7/6/2005	2	5.3	1.82	0.36
1807D	Potable Water Supply	21FLMANAD3	8/10/2005	2	4.9	1.18	0.4
1807D	Potable Water Supply	21FLMANAD3	9/7/2005	2	5.6	1	0.35
1807D	Potable Water Supply	21FLMANAD3	10/6/2005	2	6.5	1.88	0.35
1807D	Potable Water Supply	21FLMANAD3	11/9/2005	2	7.9	1.5	0.39
1807D	Potable Water Supply	21FLMANAD3	12/14/2005	2		1.62	0.31
1807D	Potable Water Supply	21FLMANAD3	1/4/2006	2	6.2	0.64	0.32
1807D	Potable Water Supply	21FLMANAD3	2/8/2006	2	8.1	1.15	0.3
1807D	Potable Water Supply	21FLMANAD3	3/9/2006	2	7.2	0.46	0.28
1807D	Potable Water Supply	21FLMANAD3	4/19/2006	2	5.8		0.4
1807D	Potable Water Supply	21FLMANAD3	5/3/2006	2	6.6	0.64	0.35

WBID	Class Description	Station	Date	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1807D	Potable Water Supply	21FLMANAD3	6/14/2006	2.8	5.6	1.74	0.65
1807D	Potable Water Supply	21FLMANAD3	7/6/2006	2	5.8	1.82	0.3
1807D	Potable Water Supply	21FLMANAD3	8/9/2006	2	5.9	1.37	0.38
1807D	Potable Water Supply	21FLMANAD3	9/6/2006	2	6	1.57	0.32
1807D	Potable Water Supply	21FLMANAD3	10/11/2006	2	7.1	1.07	0.3
1807D	Potable Water Supply	21FLMANAD3	11/8/2006	2	7.2	0.78	0.46
1807D	Potable Water Supply	21FLMANAD3	12/6/2006	2	8.5	0.47	0.45
1807D	Potable Water Supply	21FLMANAD3	1/10/2007	2	8.9	0.91	0.43
1807D	Potable Water Supply	21FLMANAD3	2/13/2007	2	7.7	0.63	0.425
1807D	Potable Water Supply	21FLMANAD3	3/20/2007	2.5	8	0.67	0.31
1807D	Potable Water Supply	21FLMANAD3	4/25/2007	2	3.9	0.75	0.49
1807D	Potable Water Supply	21FLMANAD3	5/9/2007	2.65	4.9	0.44	0.445
1807D	Potable Water Supply	21FLMANAD3	6/20/2007	2	3.8		0.35
1807D	Potable Water Supply	21FLMANAD3	7/10/2007	2	5.7	1.44	0.5
1807D	Potable Water Supply	21FLMANAD3	8/1/2007	2	6	0.96	0.36
1807D	Potable Water Supply	21FLMANAD3	9/12/2007	2	4.1	1.03	0.37
1807D	Potable Water Supply	21FLMANAD3	10/3/2007	2	6.1	0.66	0.32
1807D	Potable Water Supply	21FLMANAD3	11/27/2007	2	6.6	0.78	0.41
1807D	Potable Water Supply	21FLMANAD3	12/19/2007	2	5.8	0.46	0.42
1807D	Potable Water Supply	21FLMANAD3	1/24/2008	2	7	1.16	0.33
1807D	Potable Water Supply	21FLMANAD3	2/13/2008	2	6.5	1.06	0.44
1819	Predominantly Fresh Waters	21FLMANAGC2	1/4/2000	1.8	8.1	1.092	0.432
1819	Predominantly Fresh Waters	21FLMANAGC2	2/22/2000	3	5.7	0.387	0.338
1819	Predominantly Fresh Waters	21FLMANAGC2	3/20/2000		7	4.96	0.721
1819	Predominantly Fresh Waters	21FLMANAGC2	4/4/2000	3.9	8.7	1.095	0.319
1819	Predominantly Fresh Waters	21FLMANAGC2	5/1/2000		7.3	1.148	0.242
1819	Predominantly Fresh Waters	21FLMANAGC2	6/5/2000	1.4			0.494
1819	Predominantly Fresh Waters	21FLMANAGC2	7/10/2000	2.2	6	1.709	0.757
1819	Predominantly Fresh Waters	21FLMANAGC2	8/14/2000	2.4	5.4	2.053	0.768
1819	Predominantly Fresh Waters	21FLMANAGC2	9/4/2000	2.5	6.7		
1819	Predominantly Fresh Waters	21FLMANAGC2	10/2/2000	3.1	7.6	1.153	
1819	Predominantly Fresh Waters	21FLMANAGC2	11/7/2000		7	0.841	0.409
1819	Predominantly Fresh Waters	21FLMANAGC2	12/4/2000		9		0.236
1819	Predominantly Fresh Waters	21FLMANAGC2	1/2/2001	2	9	0.622	0.194
1819	Predominantly Fresh Waters	21FLMANAGC2	3/5/2001	3.2	6.9	0.524	0.283
1819	Predominantly Fresh Waters	21FLMANAGC2	4/9/2001	1.6	10.1		0.439

WBID	Class Description	Station	Date	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1819	Predominantly Fresh Waters	21FLMANAGC2	5/8/2001	4.6	10	0.854	0.24
1819	Predominantly Fresh Waters	21FLMANAGC2	6/26/2001	1.6	6.3	1.388	0.332
1819	Predominantly Fresh Waters	21FLMANAGC2	7/10/2001	2.1	6.5	2.736	0.757
1819	Predominantly Fresh Waters	21FLMANAGC2	8/13/2001	2.6	6	1.882	0.731
1819	Predominantly Fresh Waters	21FLMANAGC2	10/8/2001	0.8	6.3	1.216	0.51
1819	Predominantly Fresh Waters	21FLMANAGC2	11/6/2001	1	6.3	1.137	0.543
1819	Predominantly Fresh Waters	21FLMANAGC2	12/11/2001	2.1	7.1	1.29	0.309
1819	Predominantly Fresh Waters	21FLMANAGC2	1/7/2002	1.6	8.94		
1819	Predominantly Fresh Waters	21FLMANAGC2	2/4/2002	1.2	8.2	0.421	0.316
1819	Predominantly Fresh Waters	21FLMANAGC2	3/5/2002	2.6	9.9	1.21	0.198
1819	Predominantly Fresh Waters	21FLMANAGC2	5/15/2002	2	8.1		0.362
1819	Predominantly Fresh Waters	21FLMANAGC2	6/19/2002	3.3	4.1	2.669	0.859
1819	Predominantly Fresh Waters	21FLMANAGC2	7/17/2002	3.5	4.6		1.06
1819	Predominantly Fresh Waters	21FLMANAGC2	8/7/2002	1.6	5	1.606	0.907
1819	Predominantly Fresh Waters	21FLMANAGC2	9/4/2002	1.1	5.2	1.117	
1819	Predominantly Fresh Waters	21FLMANAGC2	10/2/2002		5.6	1.85	0.778
1819	Predominantly Fresh Waters	21FLMANAGC2	11/13/2002	2.6	7.7	1.232	0.267
1819	Predominantly Fresh Waters	21FLMANAGC2	12/4/2002	2.7	10.3		0.256
1819	Predominantly Fresh Waters	21FLMANAGC2	1/22/2003	1.2	10.3		0.285
1819	Predominantly Fresh Waters	21FLMANAGC2	2/5/2003	1	8.4	0.924	
1819	Predominantly Fresh Waters	21FLMANAGC2	3/19/2003	1.8	6.2	1.649	0.685
1819	Predominantly Fresh Waters	21FLMANAGC2	4/9/2003	2.3	8.9	1.069	0.338
1819	Predominantly Fresh Waters	21FLMANAGC2	5/28/2003	1.7	7.1	1.156	0.442
1819	Predominantly Fresh Waters	21FLMANAGC2	6/25/2003	2.9	3.2	1.234	0.759
1819	Predominantly Fresh Waters	21FLMANAGC2	7/23/2003	3.5	5.1	1.768	0.706
1819	Predominantly Fresh Waters	21FLMANAGC2	8/20/2003	1.3	5.1	1.326	0.62
1819	Predominantly Fresh Waters	21FLMANAGC2	9/24/2003		6.7	1.02	0.382
1819	Predominantly Fresh Waters	21FLMANAGC2	10/22/2003	1.4	8.3	1.072	0.246
1819	Predominantly Fresh Waters	21FLMANAGC2	11/5/2003	1.4	7.7	1.434	0.21
1819	Predominantly Fresh Waters	21FLMANAGC2	12/3/2003	1	9.4	0.859	0.16
1819	Predominantly Fresh Waters	21FLMANAGC2	1/7/2004	2	9.9	1.15	0.23
1819	Predominantly Fresh Waters	21FLMANAGC2	2/25/2004	6.8	9.6	4.09	1.33
1819	Predominantly Fresh Waters	21FLMANAGC2	3/10/2004	2	9.4	0.76	0.27
1819	Predominantly Fresh Waters	21FLMANAGC2	4/7/2004	2	9.2	0.75	0.31
1819	Predominantly Fresh Waters	21FLMANAGC2	5/5/2004	2.3	8	1.05	0.2
1819	Predominantly Fresh Waters	21FLMANAGC2	6/9/2004	2.3	6	0.84	0.43

WBID	Class Description	Station	Date	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1819	Predominantly Fresh Waters	21FLMANAGC2	7/14/2004	2	6.9	0.75	0.35
1819	Predominantly Fresh Waters	21FLMANAGC2	8/4/2004	3.5	4.8	1.2	0.77
1819	Predominantly Fresh Waters	21FLMANAGC2	9/29/2004	2.4	5	1.18	0.53
1819	Predominantly Fresh Waters	21FLMANAGC2	10/13/2004	2.2	6.3	0.92	0.48
1819	Predominantly Fresh Waters	21FLMANAGC2	11/17/2004	2	8	0.9	0.19
1819	Predominantly Fresh Waters	21FLMANAGC2	12/1/2004	2	7.7	1	0.72
1819	Predominantly Fresh Waters	21FLMANAGC2	1/5/2005	2	8.45	0.855	0.29
1819	Predominantly Fresh Waters	21FLMANAGC2	2/2/2005	2	6.7	1.44	
1819	Predominantly Fresh Waters	21FLMANAGC2	3/9/2005	2	7.3	0.97	0.45
1819	Predominantly Fresh Waters	21FLMANAGC2	4/6/2005	2	6.1	1.2	0.25
1819	Predominantly Fresh Waters	21FLMANAGC2	5/4/2005	2.7	8.5	1.84	0.29
1819	Predominantly Fresh Waters	21FLMANAGC2	6/22/2005	4.3	8.6	1.94	0.52
1819	Predominantly Fresh Waters	21FLMANAGC2	7/6/2005	2	5	1.67	0.83
1819	Predominantly Fresh Waters	21FLMANAGC2	8/10/2005	2.6	4.95	1.275	0.365
1819	Predominantly Fresh Waters	21FLMANAGC2	9/7/2005	2	6.4	0.85	0.54
1819	Predominantly Fresh Waters	21FLMANAGC2	10/6/2005	2	6.5	1.04	0.38
1819	Predominantly Fresh Waters	21FLMANAGC2	11/9/2005	2	7.9	2.1	0.45
1819	Predominantly Fresh Waters	21FLMANAGC2	12/14/2005	2		0.93	0.32
1819	Predominantly Fresh Waters	21FLMANAGC2	1/4/2006	2	7.8	0.7	0.24
1819	Predominantly Fresh Waters	21FLMANAGC2	2/8/2006	2	8.35	2.81	0.3
1819	Predominantly Fresh Waters	21FLMANAGC2	3/9/2006	2	8	0.395	0.056
1819	Predominantly Fresh Waters	21FLMANAGC2	4/19/2006	2.3	7.3		0.11
1819	Predominantly Fresh Waters	21FLMANAGC2	5/3/2006	2	8	0.42	0.11
1819	Predominantly Fresh Waters	21FLMANAGC2	6/14/2006	3.5	5.7	1.86	0.45
1819	Predominantly Fresh Waters	21FLMANAGC2	7/6/2006	2	5	1.79	0.56
1819	Predominantly Fresh Waters	21FLMANAGC2	8/9/2006	2	5.7	1.82	0.55
1819	Predominantly Fresh Waters	21FLMANAGC2	9/6/2006	2	5.8	1.7	0.76
1819	Predominantly Fresh Waters	21FLMANAGC2	10/11/2006	2	7.4	1.12	0.2
1819	Predominantly Fresh Waters	21FLMANAGC2	11/8/2006	2	6.8	1.64	0.46
1819	Predominantly Fresh Waters	21FLMANAGC2	12/6/2006	2	8.9	0.51	0.16
1819	Predominantly Fresh Waters	21FLMANAGC2	1/10/2007	2	8.5	1.18	0.29
1819	Predominantly Fresh Waters	21FLMANAGC2	2/13/2007	2	8.4	0.73	0.26
1819	Predominantly Fresh Waters	21FLMANAGC2	3/20/2007	2	6.9	0.6	0.2
1819	Predominantly Fresh Waters	21FLMANAGC2	4/25/2007	2	6.2	0.96	0.22
1819	Predominantly Fresh Waters	21FLMANAGC2	5/9/2007	2	5.7	0.3	0.28
1819	Predominantly Fresh Waters	21FLMANAGC2	7/10/2007	2	6.6	0.93	0.18

WBID	Class Description	Station	Date	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1819	Predominantly Fresh Waters	21FLMANAGC2	8/1/2007	2	6.8	1.11	0.22
1819	Predominantly Fresh Waters	21FLMANAGC2	9/12/2007	2	4.4	0.96	0.31
1819	Predominantly Fresh Waters	21FLMANAGC2	10/3/2007	4.1	6.2	1.48	0.63
1819	Predominantly Fresh Waters	21FLMANAGC2	11/27/2007	2	8.8	0.56	0.16
1819	Predominantly Fresh Waters	21FLMANAGC2	12/19/2007	2	6.7	0.41	0.12
1819	Predominantly Fresh Waters	21FLMANAGC2	1/24/2008	2.1	7.1	1.56	0.48
1819	Predominantly Fresh Waters	21FLMANAGC2	2/13/2008	2	7.8	0.86	0.37
1819	Predominantly Fresh Waters	21FLTPA 24010063	3/27/2002	2	7.39	2.11	0.32
1819	Predominantly Fresh Waters	21FLTPA 24010063	5/22/2002	2	8.08	1.79	0.48
1819	Predominantly Fresh Waters	21FLTPA 24010063	8/12/2002	2	5.47	1.73	0.89
1819	Predominantly Fresh Waters	21FLTPA 24010063	9/9/2002	2	5	1.77	0.76
1819	Predominantly Fresh Waters	21FLTPA 24010063	10/15/2002	2	8.84	0.95	0.42
1819	Predominantly Fresh Waters	21FLTPA 24010063	11/5/2002	2	8.36	0.91	0.38
1819	Predominantly Fresh Waters	21FLTPA 273206982240096	3/27/2002	2	6.7	0.94	0.23
1819	Predominantly Fresh Waters	21FLTPA 273206982240096	5/22/2002	2	6.42	2.52	0.5
1819	Predominantly Fresh Waters	21FLTPA 273206982240096	8/12/2002	2	3.66	1.78	0.87
1819	Predominantly Fresh Waters	21FLTPA 273206982240096	9/9/2002	2	2.73	2.03	0.85
1819	Predominantly Fresh Waters	21FLTPA 273206982240096	10/15/2002	2	8.68	1.06	0.52
1819	Predominantly Fresh Waters	21FLTPA 273206982240096	11/5/2002	2	8	1.5	0.59
1912	Potable Water Supply	21FLMANATS5	1/29/1996	1.7	7	0.832	0.157
1912	Potable Water Supply	21FLMANATS5	1/29/1996		7	0.832	0.157
1912	Potable Water Supply	21FLMANATS5	2/20/1996	3.6	9	1.196	0.197
1912	Potable Water Supply	21FLMANATS5	2/20/1996		9	1.196	0.197
1912	Potable Water Supply	21FLMANATS5	4/10/1996			0.649	0.36
1912	Potable Water Supply	21FLMANATS5	5/15/1996	0.9	6.8	0.931	0.156
1912	Potable Water Supply	21FLMANATS5	5/15/1996		6.8	0.931	0.156
1912	Potable Water Supply	21FLMANATS5	6/18/1996	3.3	6.4	1.041	0.181
1912	Potable Water Supply	21FLMANATS5	6/18/1996		6.4	1.041	0.181
1912	Potable Water Supply	21FLMANATS5	7/9/1996	1.8	6.5	1.13	0.596
1912	Potable Water Supply	21FLMANATS5	7/9/1996		6.5	1.13	0.596
1912	Potable Water Supply	21FLMANATS5	8/19/1996	1.5	3.9	0.567	0.086
1912	Potable Water Supply	21FLMANATS5	8/19/1996		3.9	0.567	0.086
1912	Potable Water Supply	21FLMANATS5	9/16/1996	1.2	5.9	0.724	0.071
1912	Potable Water Supply	21FLMANATS5	9/16/1996		5.9	0.724	0.071
1912	Potable Water Supply	21FLMANATS5	10/28/1996	2.6	5.9	0.503	
1912	Potable Water Supply	21FLMANATS5	10/28/1996		5.9	0.503	

WBID	Class Description	Station	Date	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1912	Potable Water Supply	21FLMANATS5	11/12/1996	0.9	9	0.228	0.083
1912	Potable Water Supply	21FLMANATS5	11/12/1996		9	0.228	0.083
1912	Potable Water Supply	21FLMANATS5	12/16/1996	1.9	8.7	2.039	1.89
1912	Potable Water Supply	21FLMANATS5	12/16/1996		8.7	2.039	1.89
1912	Potable Water Supply	21FLMANATS5	2/24/1997	0.6	8.1	0.623	0.246
1912	Potable Water Supply	21FLMANATS5	2/24/1997		8.1	0.623	0.246
1912	Potable Water Supply	21FLMANATS5	3/24/1997	1.5	6.6	0.56	0.146
1912	Potable Water Supply	21FLMANATS5	3/24/1997		6.6	0.56	0.146
1912	Potable Water Supply	21FLMANATS5	4/29/1997	3.8	6	2.082	0.404
1912	Potable Water Supply	21FLMANATS5	4/29/1997		6	2.082	0.404
1912	Potable Water Supply	21FLMANATS5	5/27/1997		6.9	0.583	0.088
1912	Potable Water Supply	21FLMANATS5	5/27/1997		6.9	0.583	0.088
1912	Potable Water Supply	21FLMANATS5	6/30/1997		5.6	1.037	0.225
1912	Potable Water Supply	21FLMANATS5	6/30/1997		5.6	1.037	0.225
1912	Potable Water Supply	21FLMANATS5	7/21/1997	1.7	4.7	1.416	0.38
1912	Potable Water Supply	21FLMANATS5	7/21/1997		4.7	1.416	0.38
1912	Potable Water Supply	21FLMANATS5	8/11/1997	2.4	5.4	1.416	0.483
1912	Potable Water Supply	21FLMANATS5	8/11/1997		5.4	1.416	0.483
1912	Potable Water Supply	21FLMANATS5	9/22/1997	2.4	5.1	0.939	0.13
1912	Potable Water Supply	21FLMANATS5	9/22/1997		5.1	0.939	0.13
1912	Potable Water Supply	21FLMANATS5	10/6/1997	0.6	7.9	1.097	0.13
1912	Potable Water Supply	21FLMANATS5	10/6/1997		7.9	1.097	0.13
1912	Potable Water Supply	21FLMANATS5	11/3/1997	3.5	7.2	2.593	0.906
1912	Potable Water Supply	21FLMANATS5	11/3/1997		7.2	2.593	0.906
1912	Potable Water Supply	21FLMANATS5	12/22/1997	1.8	8.2	0.905	
1912	Potable Water Supply	21FLMANATS5	12/22/1997		8.2	0.905	
1912	Potable Water Supply	21FLMANATS5	1/12/1998	2.9	9	1.131	0.995
1912	Potable Water Supply	21FLMANATS5	1/12/1998		9	1.131	0.995
1912	Potable Water Supply	21FLMANATS5	2/23/1998	1.5	7.7	0.795	0.107
1912	Potable Water Supply	21FLMANATS5	2/23/1998		7.7	0.795	0.107
1912	Potable Water Supply	21FLMANATS5	3/9/1998	4.7	7.2	1.801	0.403
1912	Potable Water Supply	21FLMANATS5	3/9/1998		7.2	1.801	0.403
1912	Potable Water Supply	21FLMANATS5	4/27/1998	1.2	7.3	0.427	
1912	Potable Water Supply	21FLMANATS5	4/27/1998		7.3	0.427	0
1912	Potable Water Supply	21FLMANATS5	5/11/1998	2.3	6.3	0.879	0.153
1912	Potable Water Supply	21FLMANATS5	5/11/1998		6.3	0.879	0.153

WBID	Class Description	Station	Date	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1912	Potable Water Supply	21FLMANATS5	6/1/1998	2	5.6	0.841	0.117
1912	Potable Water Supply	21FLMANATS5	6/1/1998		5.6	0.841	0.117
1912	Potable Water Supply	21FLMANATS5	7/13/1998		5.1	1.485	0.459
1912	Potable Water Supply	21FLMANATS5	7/13/1998		5.1	1.485	0.459
1912	Potable Water Supply	21FLMANATS5	8/11/1998	3.5	6.6	0.996	0.147
1912	Potable Water Supply	21FLMANATS5	8/11/1998		6.6	0.996	0.147
1912	Potable Water Supply	21FLMANATS5	9/14/1998	1.9	6.5	0.867	0.042
1912	Potable Water Supply	21FLMANATS5	9/14/1998		6.5	0.867	0.042
1912	Potable Water Supply	21FLMANATS5	10/27/1998	1.3	6.4	1.174	0.152
1912	Potable Water Supply	21FLMANATS5	12/7/1998	0.8	7.2	0.686	0.056
1912	Potable Water Supply	21FLMANATS5	1/12/1999	3.6	9.4	0.786	0.047
1912	Potable Water Supply	21FLMANATS5	2/16/1999		8.6	0.507	0.046
1912	Potable Water Supply	21FLMANATS5	3/9/1999		7.4		0.133
1912	Potable Water Supply	21FLMANATS5	4/12/1999	2	5.2		0.23
1912	Potable Water Supply	21FLMANATS5	5/11/1999	2.6	6	0.819	0.243
1912	Potable Water Supply	21FLMANATS5	6/7/1999	2.9	5.9	0.906	0.089
1912	Potable Water Supply	21FLMANATS5	7/26/1999		6.12	1.248	0.091
1912	Potable Water Supply	21FLMANATS5	8/9/1999	5.3		1.433	0.569
1912	Potable Water Supply	21FLMANATS5	9/20/1999	2	6.1	1.923	0.196
1912	Potable Water Supply	21FLMANATS5	10/26/1999	2.5	7.65		0.527
1912	Potable Water Supply	21FLMANATS5	11/29/1999	1.6	7.6	1.002	0.22
1912	Potable Water Supply	21FLMANATS5	12/13/1999	1.5	7.8	0.465	
1912	Potable Water Supply	21FLMANATS5	1/11/2000	2.4	7.4	1.204	0.112
1912	Potable Water Supply	21FLMANATS5	2/14/2000	1.5	7.8		0.156
1912	Potable Water Supply	21FLMANATS5	3/27/2000	2.7	8.45	0.945	0.176
1912	Potable Water Supply	21FLMANATS5	4/10/2000	1.8	8.4	0.646	0.246
1912	Potable Water Supply	21FLMANATS5	5/16/2000	1.6	7.5	0.964	0.36
1912	Potable Water Supply	21FLMANATS5	6/26/2000	2.4	6.5		0.378
1912	Potable Water Supply	21FLMANATS5	7/17/2000	2.5	7	1.973	0.264
1912	Potable Water Supply	21FLMANATS5	8/28/2000	2.5	8.2		
1912	Potable Water Supply	21FLMANATS5	9/18/2000		9	1.212	0.416
1912	Potable Water Supply	21FLMANATS5	10/30/2000	2	7.4		
1912	Potable Water Supply	21FLMANATS5	11/27/2000		8.1	1.334	0.094
1912	Potable Water Supply	21FLMANATS5	12/18/2000		3.6	0.714	0.055
1912	Potable Water Supply	21FLMANATS5	1/23/2001	1.8	9.3	0.674	0.064
1912	Potable Water Supply	21FLMANATS5	2/20/2001	1.9	7.6		0.105

WBID	Class Description	Station	Date	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1912	Potable Water Supply	21FLMANATS5	3/12/2001	1.5	7.97	0.872	
1912	Potable Water Supply	21FLMANATS5	4/23/2001		8	1.003	0.214
1912	Potable Water Supply	21FLMANATS5	5/21/2001	5.4	7.7		0.311
1912	Potable Water Supply	21FLMANATS5	6/4/2001	2.9	6.8	0.716	0.466
1912	Potable Water Supply	21FLMANATS5	7/24/2001	2.4	5.2	1.556	0.471
1912	Potable Water Supply	21FLMANATS5	8/27/2001	2.2	6.5		0.302
1912	Potable Water Supply	21FLMANATS5	9/18/2001	3.7	5	1.342	0.362
1912	Potable Water Supply	21FLMANATS5	10/30/2001	1	7.7	0.824	
1912	Potable Water Supply	21FLMANATS5	11/13/2001	1.1	8.2	1.229	
1912	Potable Water Supply	21FLMANATS5	12/17/2001	2.4	8.19	0.752	0.356
1912	Potable Water Supply	21FLMANATS5	1/28/2002	2.6	8.45	0.707	0.08
1912	Potable Water Supply	21FLMANATS5	2/9/2002	0.6	8.9	0.398	0.065
1912	Potable Water Supply	21FLMANATS5	3/12/2002	1	7.8	0.723	0.078
1912	Potable Water Supply	21FLMANATS5	4/29/2002	1.8	5		
1912	Potable Water Supply	21FLMANATS5	5/29/2002	2	7		
1912	Potable Water Supply	21FLMANATS5	6/26/2002	3.4	6.5	1.194	0.319
1912	Potable Water Supply	21FLMANATS5	7/24/2002	3.5	5.2	1.668	0.147
1912	Potable Water Supply	21FLMANATS5	8/27/2002	3.8	6.02	1.38	
1912	Potable Water Supply	21FLMANATS5	10/23/2002		6.7	1.437	
1912	Potable Water Supply	21FLMANATS5	11/20/2002	3.8	7.4	0.474	0.352
1912	Potable Water Supply	21FLMANATS5	12/11/2002	4.3	7	1.117	0.134
1912	Potable Water Supply	21FLMANATS5	1/29/2003		9.7	0.976	0.021
1912	Potable Water Supply	21FLMANATS5	2/12/2003	1.8	9.6	1.177	0.034
1912	Potable Water Supply	21FLMANATS5	3/5/2003	2.4	7.5	1.31	0.061
1912	Potable Water Supply	21FLMANATS5	4/16/2003	1.5	7.2	1.034	0.062
1912	Potable Water Supply	21FLMANATS5	5/7/2003	2.1	6.4	1.109	0.099
1912	Potable Water Supply	21FLMANATS5	6/18/2003	2.9	6.6	1.467	0.294
1912	Potable Water Supply	21FLMANATS5	7/9/2003	1.7	5.9	1.071	0.389
1912	Potable Water Supply	21FLMANATS5	8/6/2003	1.5	5.6	0.922	0.277
1912	Potable Water Supply	21FLMANATS5	10/29/2003		7.2	1.074	0.127
1912	Potable Water Supply	21FLMANATS5	11/24/2003	1.1		0.809	0.02
1912	Potable Water Supply	21FLMANATS5	12/10/2003	3.2	7	0.705	
1912	Potable Water Supply	21FLMANATS5	1/14/2004	2.1	9.4	0.8	0.056
1912	Potable Water Supply	21FLMANATS5	2/11/2004	2	9	0.72	0.1
1912	Potable Water Supply	21FLMANATS5	3/31/2004	2	7.7	0.62	0.056
1912	Potable Water Supply	21FLMANATS5	4/14/2004	2	7.9		0.056

WBID	Class Description	Station	Date	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1912	Potable Water Supply	21FLMANATS5	5/12/2004	3.1	5.4	0.85	0.28
1912	Potable Water Supply	21FLMANATS5	6/16/2004	2	5.4	0.66	0.14
1912	Potable Water Supply	21FLMANATS5	7/21/2004	2.5	5.2	0.71	0.3
1912	Potable Water Supply	21FLMANATS5	9/2/2004		6.7		
1912	Potable Water Supply	21FLMANATS5	9/30/2004	2.1	5.95		0.155
1912	Potable Water Supply	21FLMANATS5	10/6/2004	2.05	6.4	0.71	0.128
1912	Potable Water Supply	21FLMANATS5	11/17/2004	2.1	7.7	0.75	0.13
1912	Potable Water Supply	21FLMANATS5	12/8/2004	2	9.6	0.75	0.11
1912	Potable Water Supply	21FLMANATS5	1/12/2005	2	8.3	0.4	0.14
1912	Potable Water Supply	21FLMANATS5	2/9/2005	2	11.4	0.57	0.056
1912	Potable Water Supply	21FLMANATS5	3/24/2005	2	7.2	1.33	0.056
1912	Potable Water Supply	21FLMANATS5	4/27/2005	4	7.4	1.13	0.1
1912	Potable Water Supply	21FLMANATS5	5/25/2005	2.25	5.6	1.01	0.108
1912	Potable Water Supply	21FLMANATS5	6/8/2005	2	6.6	1.02	0.21
1912	Potable Water Supply	21FLMANATS5	7/27/2005	2	5.1	0.83	0.18
1912	Potable Water Supply	21FLMANATS5	8/24/2005	4.2	5	1	0.12
1912	Potable Water Supply	21FLMANATS5	9/22/2005	2.2	5.1	1.06	0.056
1912	Potable Water Supply	21FLMANATS5	10/27/2005	2.1	7.2	1.81	0.18
1912	Potable Water Supply	21FLMANATS5	11/22/2005	2	6.05	1.645	0.09
1912	Potable Water Supply	21FLMANATS5	12/7/2005	2	6.5	0.99	0.056
1912	Potable Water Supply	21FLMANATS5	1/24/2006	2.3	6.4	1.32	0.056
1912	Potable Water Supply	21FLMANATS5	2/16/2006	2	9.1		0.056
1912	Potable Water Supply	21FLMANATS5	3/22/2006	2.2	6.4	0.76	0.056
1912	Potable Water Supply	21FLMANATS5	4/12/2006	2	6.2	1.145	0.083
1912	Potable Water Supply	21FLMANATS5	5/11/2006	2	6	1.01	0.056
1912	Potable Water Supply	21FLMANATS5	6/21/2006	2	6.5	0.9	0.056
1912	Potable Water Supply	21FLMANATS5	7/11/2006	2.1	5.6	1.4	0.15
1912	Potable Water Supply	21FLMANATS5	8/15/2006	3.4	6	1.26	0.1
1912	Potable Water Supply	21FLMANATS5	9/13/2006	2	6.1	1.31	0.16
1912	Potable Water Supply	21FLMANATS5	10/19/2006	2	6.2	1.3	0.056
1912	Potable Water Supply	21FLMANATS5	11/1/2006	2	7.6	0.46	0.056
1912	Potable Water Supply	21FLMANATS5	12/13/2006	2	4.6	0.59	0.24
1912	Potable Water Supply	21FLMANATS5	1/17/2007	2	6.9	0.98	0.056
1912	Potable Water Supply	21FLMANATS5	2/6/2007	2	8.7	0.42	0.056
1912	Potable Water Supply	21FLMANATS5	3/22/2007	2	7.1	0.5	0.056
1912	Potable Water Supply	21FLMANATS5	4/12/2007	2	5.6	0.87	0.056

WBID	Class Description	Station	Date	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
1912	Potable Water Supply	21FLMANATS5	5/3/2007	2	6.1	0.56	0.056
1912	Potable Water Supply	21FLMANATS5	6/6/2007	2	5.1	0.87	0.15
1912	Potable Water Supply	21FLMANATS5	7/25/2007	2	6.4	1.58	0.056
1912	Potable Water Supply	21FLMANATS5	8/22/2007	2	6		
1912	Potable Water Supply	21FLMANATS5	9/25/2007	2	6.4	0.72	0.056
1912	Potable Water Supply	21FLMANATS5	10/17/2007	2	6.2	1.04	0.056
1912	Potable Water Supply	21FLMANATS5	11/14/2007	2	7	0.95	0.056
1912	Potable Water Supply	21FLMANATS5	12/5/2007	2	7.7	0.51	0.056
1912	Potable Water Supply	21FLMANATS5	1/16/2008	2	7.3	1.19	0.056
1912	Potable Water Supply	21FLMANATS5	2/7/2008	2	7.6	0.73	0.056

Appendix E: Spearman Correlation Matrix Analysis for Water Quality Parameters in Nonsense Creek

Nonparametric: Spearman's ρ

Variable	by Variable	Spearman ρ	Prob>|ρ|	Plot
Chlorophyll	BOD 5Day	0.3064	0.0027	
Dissolved Oxygen	BOD 5Day	-0.0426	0.6369	
Dissolved Oxygen	Chlorophyll	-0.1327	0.0757	
Nitrate Nitrite	BOD 5Day	-0.0552	0.5531	
Nitrate Nitrite	Chlorophyll	-0.0789	0.2963	
Nitrate Nitrite	Dissolved Oxygen	0.0822	0.2334	
Nitrogen Ammonia	BOD 5Day	0.1024	0.2873	
Nitrogen Ammonia	Chlorophyll	0.0463	0.5396	
Nitrogen Ammonia	Dissolved Oxygen	-0.0165	0.8148	
Nitrogen Ammonia	Nitrate Nitrite	0.1531	0.0272	
Nitrogen Kjeldahl	BOD 5Day	0.2795	0.0019	
Nitrogen Kjeldahl	Chlorophyll	-0.0350	0.6446	
Nitrogen Kjeldahl	Dissolved Oxygen	-0.0614	0.3702	
Nitrogen Kjeldahl	Nitrate Nitrite	0.2241	0.0008	
Nitrogen Kjeldahl	Nitrogen Ammonia	0.2077	0.0024	
Nitrogen Organic	BOD 5Day	.	.	
Nitrogen Organic	Chlorophyll	.	.	
Nitrogen Organic	Dissolved Oxygen	-0.8000	0.2000	
Nitrogen Organic	Nitrate Nitrite	0.3444	0.2279	
Nitrogen Organic	Nitrogen Ammonia	0.0339	0.9084	
Nitrogen Organic	Nitrogen Kjeldahl	0.9978	<.0001	
Nitrogen Total	BOD 5Day	0.2266	0.0163	
Nitrogen Total	Chlorophyll	-0.0686	0.3772	
Nitrogen Total	Dissolved Oxygen	-0.0440	0.5318	
Nitrogen Total	Nitrate Nitrite	0.4062	<.0001	
Nitrogen Total	Nitrogen Ammonia	0.2184	0.0019	
Nitrogen Total	Nitrogen Kjeldahl	0.9716	<.0001	
Nitrogen Total	Nitrogen Organic	0.9978	<.0001	
Phosphorus Total	BOD 5Day	0.2781	0.0029	
Phosphorus Total	Chlorophyll	0.2656	0.0006	
Phosphorus Total	Dissolved Oxygen	-0.1146	0.1053	
Phosphorus Total	Nitrate Nitrite	0.1641	0.0184	
Phosphorus Total	Nitrogen Ammonia	0.0611	0.3928	
Phosphorus Total	Nitrogen Kjeldahl	0.1625	0.0190	
Phosphorus Total	Nitrogen Organic	0.5982	0.0238	
Phosphorus Total	Nitrogen Total	0.1524	0.0316	
TemperatureC	BOD 5Day	0.1617	0.0739	
TemperatureC	Chlorophyll	0.1399	0.0625	
TemperatureC	Dissolved Oxygen	-0.1847	0.0059	
TemperatureC	Nitrate Nitrite	0.1050	0.1231	
TemperatureC	Nitrogen Ammonia	0.0442	0.5258	
TemperatureC	Nitrogen Kjeldahl	0.1985	0.0033	
TemperatureC	Nitrogen Organic	0.4600	0.1546	
TemperatureC	Nitrogen Total	0.1791	0.0098	
TemperatureC	Phosphorus Total	0.1918	0.0060	
Unionized Ammonia	BOD 5Day	0.1735	0.0796	
Unionized Ammonia	Chlorophyll	0.0755	0.3353	
Unionized Ammonia	Dissolved Oxygen	-0.0959	0.1881	
Unionized Ammonia	Nitrate Nitrite	0.1995	0.0074	
Unionized Ammonia	Nitrogen Ammonia	0.7621	<.0001	
Unionized Ammonia	Nitrogen Kjeldahl	0.1467	0.0481	
Unionized Ammonia	Nitrogen Organic	.	.	
Unionized Ammonia	Nitrogen Total	0.1572	0.0401	
Unionized Ammonia	Phosphorus Total	0.0843	0.2731	
Unionized Ammonia	TemperatureC	0.1266	0.0793	

Appendix F: Kurskal-Wallis Analysis of BOD_5, DO, TN, and TP Observations

Seasonal Analysis

BOD_5

Wilcoxon / Kruskal-Wallis Tests (Rank Sums)

Level	Count	Score Sum	Score Mean	(Mean-Mean0)/Std0
Fall	32	1720.50	53.7656	-1.962
Spring	32	2506.50	78.3281	2.328
Summer	33	2175.50	65.9242	0.162
Winter	32	1982.50	61.9531	-0.530

1-way Test, ChiSquare Approximation

ChiSquare	DF	Prob>ChiSq
7.2216	3	0.0652

Dissolved Oxygen

Wilcoxon / Kruskal-Wallis Tests (Rank Sums)

Level	Count	Score Sum	Score Mean	(Mean-Mean0)/Std0
Fall	59	6469.00	109.644	-0.656
Spring	56	6895.50	123.134	1.127
Summer	57	6029.00	105.772	-1.153
Winter	56	6712.50	119.866	0.700

1-way Test, ChiSquare Approximation

ChiSquare	DF	Prob>ChiSq
2.6496	3	0.4489

Total Nitrogen

Wilcoxon / Kruskal-Wallis Tests (Rank Sums)

Level	Count	Score Sum	Score Mean	(Mean-Mean0)/Std0
Fall	56	6765.50	120.813	1.328
Spring	55	6139.00	111.618	0.082
Summer	54	6030.00	111.667	0.087
Winter	56	5596.50	99.938	-1.497

1-way Test, ChiSquare Approximation

ChiSquare	DF	Prob>ChiSq
3.0062	3	0.3907

Total Phosphorus

Wilcoxon / Kruskal-Wallis Tests (Rank Sums)

Level	Count	Score Sum	Score Mean	(Mean-Mean0)/Std0
Fall	56	5848.00	104.429	-0.632
Spring	53	6160.00	116.226	0.964
Summer	54	6080.50	112.602	0.486
Winter	54	5564.50	103.046	-0.804

1-way Test, ChiSquare Approximation

ChiSquare	DF	Prob>ChiSq
1.6683	3	0.6440

Monthly Analysis

BOD_5
Wilcoxon / Kruskal-Wallis Tests (Rank Sums)

Level	Count	Score Sum	Score Mean	(Mean-Mean0)/Std0
January	10	645.500	64.5500	-0.035
February	13	717.000	55.1538	-1.000
March	9	620.000	68.8889	0.320
April	12	927.500	77.2917	1.195
May	9	703.500	78.1667	1.093
June	11	875.500	79.5909	1.352
July	10	608.000	60.8000	-0.366
August	10	792.000	79.2000	1.249
September	13	775.500	59.6538	-0.541
October	10	608.000	60.8000	-0.366
November	12	689.000	57.4167	-0.735
December	10	423.500	42.3500	-1.995

1-way Test, ChiSquare Approximation

ChiSquare	DF	Prob>ChiSq
11.2650	11	0.4213

Dissolved Oxygen
Wilcoxon / Kruskal-Wallis Tests (Rank Sums)

Level	Count	Score Sum	Score Mean	(Mean-Mean0)/Std0
January	17	2411.00	141.824	1.774
February	23	2451.50	106.587	-0.605
March	16	1850.00	115.625	0.069
April	20	2521.50	126.075	0.820
May	17	2408.00	141.647	1.763
June	19	1966.00	103.474	-0.759
July	18	2115.50	117.528	0.201
August	17	1692.00	99.529	-0.971
September	22	2221.50	100.977	-1.010
October	19	2228.00	117.263	0.189
November	21	1996.00	95.048	-1.417
December	19	2245.00	118.158	0.251

1-way Test, ChiSquare Approximation

ChiSquare	DF	Prob>ChiSq
11.0429	11	0.4397

Total Nitrogen
Wilcoxon / Kruskal-Wallis Tests (Rank Sums)

Level	Count	Score Sum	Score Mean	(Mean-Mean0)/Std0
January	17	1494.00	87.882	-1.550
February	23	2534.00	110.174	-0.064
March	16	1568.50	98.031	-0.840
April	20	2442.50	122.125	0.814
May	17	1969.50	115.853	0.324
June	18	1727.00	95.944	-1.040
July	17	1762.50	103.676	-0.490
August	16	1902.00	118.875	0.509
September	21	2365.50	112.643	0.122
October	18	2285.50	126.972	1.104
November	20	2868.50	143.425	2.376
December	18	1611.50	89.528	-1.485

1-way Test, ChiSquare Approximation

ChiSquare	DF	Prob>ChiSq
13.3618	11	0.2703

Total Phosphorus
Wilcoxon / Kruskal-Wallis Tests (Rank Sums)

Level	Count	Score Sum	Score Mean	(Mean-Mean0)/Std0
January	17	1741.00	102.412	-0.449
February	22	2253.50	102.432	-0.517
March	15	1570.00	104.667	-0.275
April	19	2005.00	105.526	-0.251
May	16	2041.00	127.563	1.229
June	18	2114.00	117.444	0.595
July	17	1964.00	115.529	0.445
August	16	1674.50	104.656	-0.286
September	21	2442.00	116.286	0.559
October	18	1727.00	95.944	-0.921
November	20	2054.00	102.700	-0.470
December	18	2067.00	114.833	0.410

1-way Test, ChiSquare Approximation

ChiSquare	DF	Prob>ChiSq
3.9743	11	0.9707

Yearly Analysis

BOD_5

Wilcoxon / Kruskal-Wallis Tests (Rank Sums)

Level	Count	Score Sum	Score Mean	(Mean-Mean0)/Std0
1993	2	110.000	55.0000	-0.373
1995	7	391.500	55.9286	-0.656
1996	12	591.500	49.2917	-1.528
1997	8	379.500	47.4375	-1.370
1998	9	664.500	73.8333	0.732
1999	6	522.000	87.0000	1.474
2000	9	702.500	78.0556	1.084
2001	5	387.500	77.5000	0.758
2002	11	984.500	89.5000	2.273
2003	10	504.500	50.4500	-1.280
2004	11	779.500	70.8636	0.541
2005	13	821.500	63.1923	-0.180
2006	12	740.500	61.7083	-0.317
2007	12	678.000	56.5000	-0.825
2008	2	127.500	63.7500	-0.038

1-way Test, ChiSquare Approximation

ChiSquare	DF	Prob>ChiSq
16.0026	14	0.3132

Dissolved Oxygen

Wilcoxon / Kruskal-Wallis Tests (Rank Sums)

Level	Count	Score Sum	Score Mean	(Mean-Mean0)/Std0
1993	2	208.500	104.250	-0.215
1995	7	757.000	108.143	-0.256
1996	12	1209.50	100.792	-0.738
1997	8	916.500	114.563	0.000
1998	9	624.000	69.333	-2.094
1999	6	663.000	110.500	-0.147
2000	9	1569.50	174.389	2.778
2001	5	379.000	75.800	-1.324
2002	11	677.000	61.545	-2.728
2003	24	2747.50	114.479	0.000
2004	32	3940.50	123.141	0.798
2005	39	4302.50	110.321	-0.433
2006	36	4570.50	126.958	1.234
2007	24	2887.50	120.313	0.455
2008	4	653.500	163.375	1.492

1-way Test, ChiSquare Approximation

ChiSquare	DF	Prob>ChiSq
25.4932	14	0.0300

Total Nitrogen
Wilcoxon / Kruskal-Wallis Tests (Rank Sums)

Level	Count	Score Sum	Score Mean	(Mean-Mean0)/Std0
1993	2	19.000	9.500	-2.250
1995	7	954.500	136.357	1.063
1996	12	1259.50	104.958	-0.334
1997	8	991.500	123.938	0.580
1998	9	677.500	75.278	-1.709
1999	6	890.000	148.333	1.447
2000	9	689.500	76.611	-1.645
2001	5	296.000	59.200	-1.829
2002	11	1366.50	124.227	0.701
2003	24	1970.50	82.104	-2.343
2004	32	3689.50	115.297	0.410
2005	39	4713.00	120.846	1.058
2006	29	3829.00	132.034	1.899
2007	24	2808.00	117.000	0.485
2008	4	377.000	94.250	-0.525

1-way Test, ChiSquare Approximation

ChiSquare	DF	Prob>ChiSq
27.3812	14	0.0172

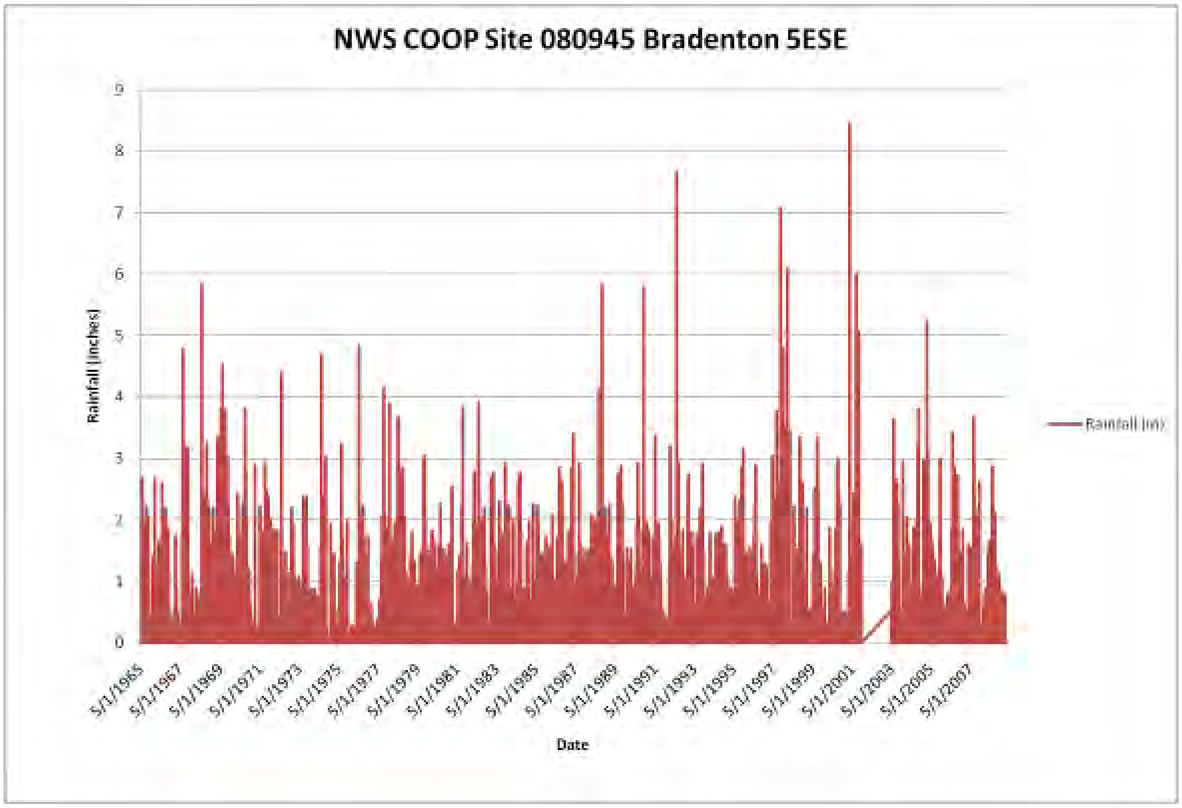
Total Phosphorus
Wilcoxon / Kruskal-Wallis Tests (Rank Sums)

Level	Count	Score Sum	Score Mean	(Mean-Mean0)/Std0
1993	2	342.000	171.000	1.400
1995	7	1228.00	175.429	2.848
1996	12	1132.50	94.375	-0.829
1997	8	1020.00	127.500	0.848
1998	9	1032.00	114.667	0.274
1999	6	580.500	96.750	-0.482
2000	9	805.000	89.444	-0.953
2001	5	312.000	62.400	-1.679
2002	11	1339.50	121.773	0.691
2003	24	3074.00	128.083	1.580
2004	32	2950.50	92.203	-1.640
2005	39	4073.00	104.436	-0.501
2006	25	2082.00	83.280	-2.180
2007	24	3259.50	135.813	2.221
2008	4	422.500	105.625	-0.105

1-way Test, ChiSquare Approximation

ChiSquare	DF	Prob>ChiSq
28.9180	14	0.0107

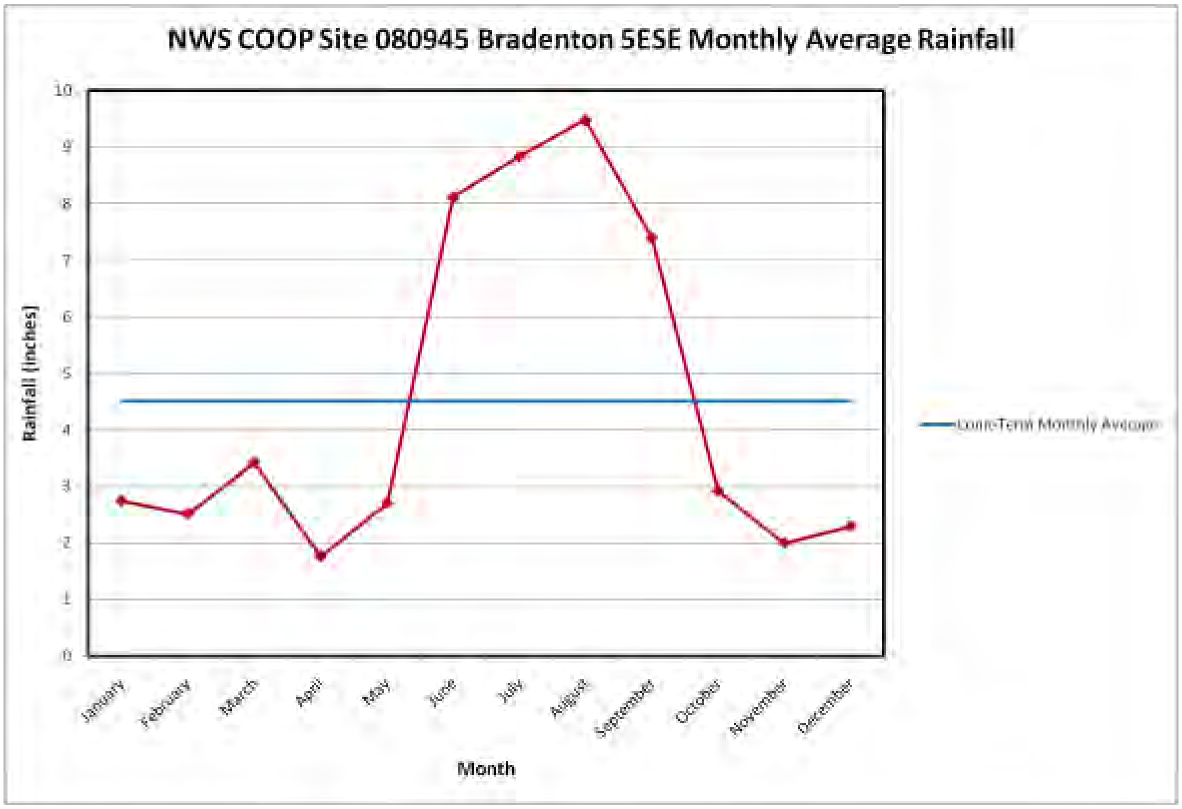
Appendix G: Daily, Monthly, and Annual precipitation at Bradenton 5ESE, 1965-2009

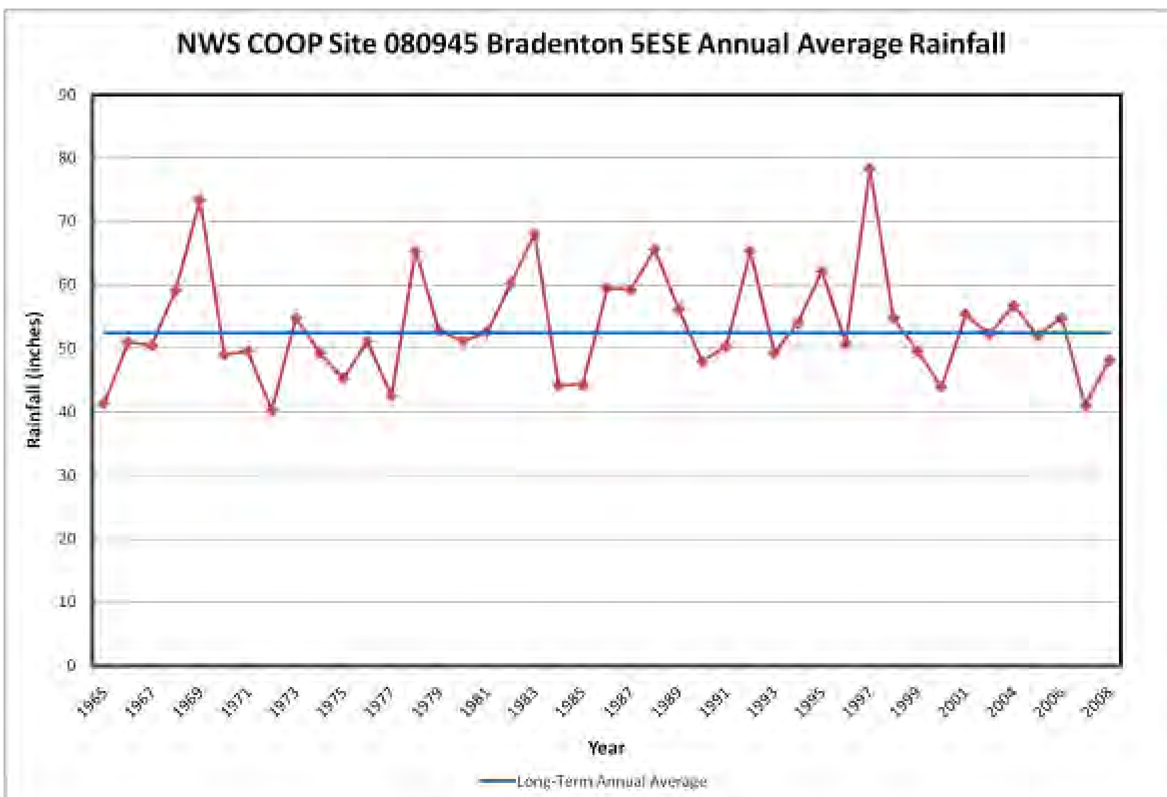


Monthly and Annual Precipitation at Bradenton 5ESE, 1965-2009

Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
1965					0.21	9.85	11.37	6.15	9.3	1.68	0.86	1.89	41.31
1966	6.43	1.65	0.96	2.79	2.57	9.43	7.23	10.68	6.48	1.54	0.43	0.8	50.99
1967	1.48	3.99	0.53	0	0.28	10.45	6.11	13.52	10.17	1.16	0.81	2.03	50.53
1968		1.6	1.56	0.06	3.85	16.46	12.74	8.68	5.98	5.03	2.24	0.91	59.11
1969	3.29	1.61	8.43	0.9	7.52	9.76	9.75	11.21	8.92	5.23	1.15	5.62	73.39
1970	2.22	2.33	7.29	0.12	4.29	4.96	2.39	11.7	8.04	3.61	1.41	0.66	49.02
1971	0.28	5.02	0.8	0.21	2.87	3.15	7.19	11.97	8.88	4.77	2.47	2	49.61
1972	1.96	5.35	3.71	0.18	0.81	6.83	4.51	7.43	1.96	1.36	3.58	2.55	40.23
1973	6.35	2.42	1.73	2.99	0.98	1.18	12.08	10.81	10.39	1.65	1.4	2.79	54.77
1974	0	1.54	0.78	0.79	1.07	17.33	8.48	10.29	4.5	0.06	0.21	4.23	49.28
1975	0.95	2.66	0.74	0.5	1.93	8.71	7.4	5.7	7.44	8.5	0.17	0.54	45.24
1976	0.55	0.29	0.22	1.55	7.64	9.29	8.23	10.01	7.27	1.6	2.86	1.64	51.15
1977	2.12	1.14	0.52	0.55	1	3.28	9.26	8.53	5.57	1.21	2.61	6.71	42.5
1978	3.38	4.29	3.08	0.19	9.34	8.94	13.87	8.61	7.81	3.07	0.21	2.61	65.4
1979	5.92	1.07	1.83	0.4	4.29	4.7	5.96	10.4	14.5	0.53	0.58	2.63	52.81
1980	3.73	2.59	2.1	3.7	4.1	3.11	10.26	10.23	5.23	2.06	3.58	0.5	51.19
1981	0.95	3.27	0.91	0.03	1.67	7.19	3.51	24.42	5.01	0.67	2.61	2.36	52.6

Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
1982	1.23	2.79	7.42	2.32	1.13	9.79	7.36	9.35	11.88	4.96	1.19	0.86	60.28
1983	2.34	10.16	8.63	2.42	1.17	6.84	7.43	7.01	6.45	4.91	4.43	6.23	68.02
1984	1.45	2.27	3.65	2.15	2.38	5.46	16.28	3.96	2.33	0.45	3.49	0.24	44.11
1985	3.31	1.04	2.87	2.82	1.34	6.93	6.63	8.04	4.99	2.25	2.6	1.44	44.26
1986	3.06	1.93	4.07	0.93	1.93	10.82	11.18	10.44	6.07	3.36	2.95	2.78	59.52
1987	3.69	2.62	11.1	0.23	2.87	6.18	14.25	4.45	6.55	2.89	3.64	0.75	59.22
1988	3.13	2.34	5.27	0.77	2.55	2.8	12.94	13.63	15.57	0.58	5.15	0.92	65.65
1989	2.66	0.13	2.97	1.38	2.44	9.06	9.82	7.99	13.4	1.26	0.59	4.47	56.17
1990	0.29	4.07	1.09	1.33	1.91	8.7	8.55	6.6	3.39	7.11	2.85	2.05	47.94
1991	3.79	1.2	3.96	4.57	9.39	4.15	10.61	8.18	2.74	1.21	0.06	0.44	50.3
1992	0.98	7.13	4.05	2.93	0.15	22.34	7.07	10.22	3.91	3.19	1.81	1.59	65.37
1993	9.03	2.03	2.16	3.73	1.53	3.66	6.94	7.33	4.08	7.09	0.68	0.99	49.25
1994	3.51	0.75	2.8	2.57	0.18	10.8	8.14	9.45	7.24	3.53	1.65	3.39	54.01
1995	3.09	2.22	2.57	3.41	1.48	8.93	10.67	11.3	8.25	5.12	3.97	1.16	62.17
1996	3.95	1	5.5	1.58	9.52	11.75	3.7	3.2	3.2	4.94	0.65	1.82	50.81
1997	1.92	1.21	4.5	8.78	3.27	7.22	8.77	7.6	11.1	2.62	9.4	11.94	78.33
1998	10.26	5.91	8.16	0.1	3.41	0.64	4.92	5.64	11.1	0.97	2.7	1.03	54.84
1999	3.69	0.5	0.97	0.55	2.05	7.89	6.48	17.63	4.25	2.95	0.69	1.91	49.56
2000	0.64	0.4	2.5	1.21	0.99	4.55	8.85	11.71	10.42	0.23	1.63	0.83	43.96
2001	0.11	0	10.35	0.5	1.72	9.79	15.93	4.74	9.47	2.75			55.36
2003					2.78	16.1	5.43	15.37	7.96	0.88	0.71	3.09	52.32
2004	2.13	4.4	0.5	2.81	0.53	6.81	8.5	12.73	12.04	1.64	1.54	3.13	56.76
2005	1.45	5.3	5.22	3.87	2.71	10.33	7.99	3.57	1.73	6.96	2.27	0.63	52.03
2006	0.32	1.81	0.78	0.89	1.77	8.53	11.97	9.75	14.23	1.48	1.02	2.22	54.77
2007	2.31	1.22	0.48	2.81	0.5	3.58	9.28	7.13	7.28	5.94	0.05	0.47	41.05
2008	2.54	1.47	3.56	2.49	2.09	10.17	9.85	10.03	1.42	2.37	0.79	1.37	48.15
2009	1.74	0.65											2.39
Max Value	10.26	10.16	11.1	8.78	9.52	22.34	16.28	24.42	15.57	8.5	9.4	11.94	78.33
Min Value	0	0	0.22	0	0.15	0.64	2.39	3.2	1.42	0.06	0.05	0.24	2.39
Mean	2.74	2.51	3.42	1.76	2.70	8.10	8.83	9.47	7.41	2.92	1.99	2.29	52.40
Median	2.31	1.98	2.8	1.33	1.93	8.53	8.5	9.45	7.27	2.37	1.585	1.855	51.61


NWS COOP Site 080945 Bradenton 5ESE Monthly Average Rainfall
Rainfall (inches)
Month
January
February
March
April
May
June
July
August
September
October
November
December
Long-Term Monthly Average


NWS COOP Site 080945 Bradenton 5ESE Annual Average Rainfall
Rainfall (inches)
Year
Long-Term Annual Average

Appendix H: Public Comments and FDEP Responses

The below comments were received by email from Mr. Robert C. Brown of the Manatee County Natural Resources Department on July 20, 2009

Comment 1.
The calculation methodology for both the fecal coliform and dissolved oxygen TMDLs utilizes the median of only the target load or concentration exceedances to determine a percentage reduction needed for the TMDL. The load reduction requirement is then assigned to *all* flow into the waterbody, including the significant amount of flow that is well within acceptable ranges.

Manatee County recommends the TMDL calculation methodology be modified to either 1) include a determination of the percentage of flow requiring the specified load reduction, or 2) utilize all data (both above and below the criterion) to determine the percentage reduction on all flow necessary to achieve the water quality criteria.

FDEP response: For clarification, the target load is determined for all flow data available. The allowable loads calculated are then plotted against the target load to determine when exceedances occur. The percent reduction is the relationship between the exceedance load trend and the target load. The percent reductions are calculated from a trend line throughout the entire flow interval regime, which displays the best fit and central tendency of all the exceedances loads. Instead of corresponding to a specific flow interval, the percent reduction median represents a probability distribution of the exceedances load population separating half of the higher values and from half of lesser values. It is “a middle of the road” estimation for the all exceedance loads calculated for all possible flows. The corresponding percentage of flow is only associated with the *one* point where the median occurs.

Since DO exceedances occurred both above and below the target loads or target concentrations for nutrients and BOD_5, the exceedance load calculations were used to determine the percent reductions in order to provide an implicit, conservative, protective margin of safety. The percent reductions are provided as an initial proposal to be utilized during the Basin Management Action Plan and to assist with wasteload allocations between the stakeholders and collaborative parties. Reasonable assurance, meeting the water quality criteria, may be obtainable by applying both the target concentrations and target loads, where utilizing both may provide more management opportunities.

Comment 2.
The draft TMDLs for both Nonsense Creek (WBID 1913) and Braden River (WBID 1914) do not acknowledge the Tara, Lakewood Ranch, and University Place Community Development Districts (CDDs) that lie within these watersheds (see Figure 1). These CDDs are responsible for discharges from their stormwater collection systems under a Phase II MS4 permit.

FDEP Response: Currently the Lakewood Ranch Community Development District is a regulated Phase II MS4 under the permit, FLR04E107. The Tara and University Place CDDs are presently not designated as a regulated Phase II MS4s. A petition may be submitted to the Department requesting designation as regulated Phase II MS4s under the NPDES stormwater program. See Chapter 62-624, F.A.C. describing the petition and designation requirements.

Comment 4.
Rattlesnake Slough (WBID 1923), Cedar Creek (WBID 1926), Nonsense Creek (WBID 1913) and Braden River (WBID 1914) lie within the Evers Reservoir Watershed Overlay District, and Gilly Creek (WBID 1840) lies within the Lake Manatee Watershed Overlay District. Section 604 of the Manatee County Land Development Code imposes restrictions and requirements designed to be protective of water quality in these potable-source watersheds. Stormwater systems within the overlay districts must meet Outstanding Florida Waters (OFW) design criteria, and septic tank locations are subject to additional setback criteria.

FDEP response: The Department values the expressed efforts by Manatee County to prevent the lowering of existing water quality criteria for the watersheds within the overlay districts. One of the purposes of the TMDL is to provide supportive measures, which will ensure protection for Florida's waters for generations to come. FDEP encourages these efforts to be presented by Manatee County during the Basin Management Action Plan (BMAP) development phase of the TMDL process.

Comment 6.
As reported in the draft TMDLs, average dissolved oxygen (DO) concentrations in the Rattlesnake Slough (WBID 1923) and Nonsense Creek (1913) watersheds for the 7.5 year verified period were 5.5 mg/L and 5.6 mg/L, respectfully. Data from the county's sampling stations in these watersheds indicate that average annual DO values have been generally increasing since 1990 (Figure 3). These data suggest that a DO TMDL for these subwatersheds may not be necessary.

FDEP response: While the data do suggest a DO TMDL may not be warranted for either watershed, the methodology for determining if a watershed is impaired for dissolved oxygen is outlined in Chapter 62-303, F. A. C. Both waters are on the list of water segments submitted to EPA in 1998 and had sufficient quality and quantity of data to be assessed. Each were placed on the planning list to be assessed and then re-evaluated using the data from January 1, 2001 to June 30, 2008. The watersheds were then verified as impaired for DO when 10% or more of the samples did not meet the DO criterion with a 90% confidence level using a binomial distribution. As outlined in Chapter 2 of the TMDLs, 12 exceedances are required, by rule, to be considered verified impaired for DO. Rattlesnake Slough (WBID 1923) had 21 exceedances and Nonsense Creek (WBID 1913) had 14 exceedances. The initial assessment by the Impaired Waters Rule (IWR) suggested the possible causative pollutants to be nutrients (total nitrogen and/or total phosphorus) and BOD_5 as a result of urbanization and related anthropogenic activities.

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