Final TMDL Report
NORTHEAST DISTRICT • UPPER EAST COAST BASIN

Nutrient TMDL for Halifax River, WBID 2363B

Wayne Magley, Ph.D., P.E.

Division of Environmental Assessment and Restoration
Florida Department of Environmental Protection
Tallahassee, FL 32399

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For additional information on the watershed management approach and impaired waters in the Upper East Coast Basin, contact:

Charles Gauthier
Florida Department of Environmental Protection
Bureau of Watershed Restoration
Watershed Planning and Coordination Section
2600 Blair Stone Road, Mail Station 3565
Tallahassee, FL 32399-2400
Email: charles.gauthier@dep.state.fl.us
Phone: (850) 245–8555
Fax: (850) 245–8434

Access to all data used in the development of this report can be obtained by contacting:

Wayne Magley
Florida Department of Environmental Protection
Bureau of Watershed Restoration
Watershed Evaluation and TMDL Section
2600 Blair Stone Road, Mail Station 3555
Tallahassee, FL 32399-2400
Email: wayne.magley@dep.state.fl.us
Phone: (850) 245–8463
Fax: (850) 245–8444

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Florida Department of Environmental Protection, Bureau of Watershed Restoration

TMDL Program

http://www.dep.state.fl.us/water/tmdl/index.htm

Identification of Impaired Surface Waters Rule

http://www.dep.state.fl.us/legal/Rules/shared/62-303/62-303.pdf

STORET Program

http://www.dep.state.fl.us/water/storet/index.htm

2012 305(b) Report

http://www.dep.state.fl.us/water/docs/2012_integrated_report.pdf

Water Quality Status Report: Upper East Coast Basin

http://www.dep.state.fl.us/water/basin411/uppereast/status.htm

Water Quality Assessment Report: Upper East Coast Basin
http://www.dep.state.fl.us/water/basin411/uppereast/assessment.htm

U.S. Environmental Protection Agency, National STORET Program

http://www.epa.gov/storet/

Chapter 1: INTRODUCTION

1.1 Purpose of Report

This report presents the Total Maximum Daily Load (TMDL) for nutrients for the upper portion of the Halifax River in the Halifax River Planning Unit of the Upper East Coast Basin. The segment was verified as impaired for nutrients based on chlorophyll a (chl*a*) during the second cycle, and was included on the Verified List of impaired waters for the Upper East Coast Basin that was adopted by Secretarial Order on February 7, 2012. Based on the median TN/TP ratio of 6.73, total nitrogen (TN) was identified as the limiting nutrient. This TMDL establishes the allowable loadings to the Halifax River that would restore the waterbody so that it meets its applicable water quality criterion for nutrients.

1.2 Identification of Waterbody

The Halifax River is a 23-mile-long tidal estuary located on the Atlantic coast near Daytona Beach (Volusia County), with its major ocean connection situated at Ponce de Leon Inlet (**Figure 1.1)**. The tidal amplitude is approximately 0.7 meters. Based on tracer work using the RMA2 model (U.S. Army Corps of Engineers), John and Morris (1999) indicated that there is a tidal node point located between south Daytona and Daytona Beach. A second node is located to the east of the lower reach of Bulow Creek and separates the Halifax River and Matanzas River Estuary systems.

For assessment purposes, the Florida Department of Environmental Protection (Department) has divided the Upper East Coast Basin into water assessment polygons with a unique **w**ater**b**ody **id**entification (WBID) number for each watershed or stream reach. The main stem of the Halifax River was divided into two assessment polygons (WBID 2363B and WBID 2363A). The division between the two polygons is near the location of the tidal node. This TMDL report addresses the Halifax River, WBID 2363B, for nutrients (**Figure 1.2)**. References to the Halifax River throughout the remainder of this document will be specifically to WBID 2363B, unless otherwise noted.

The Halifax River is part of the Halifax River Planning Unit. Planning units are groups of smaller watersheds (WBIDs) that are part of a larger basin unit, in this case the Upper East Coast Basin. The Halifax River Planning Unit consists of 56 WBIDs. **Figure 1.3** shows the locations of these WBIDs and the Halifax River'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.

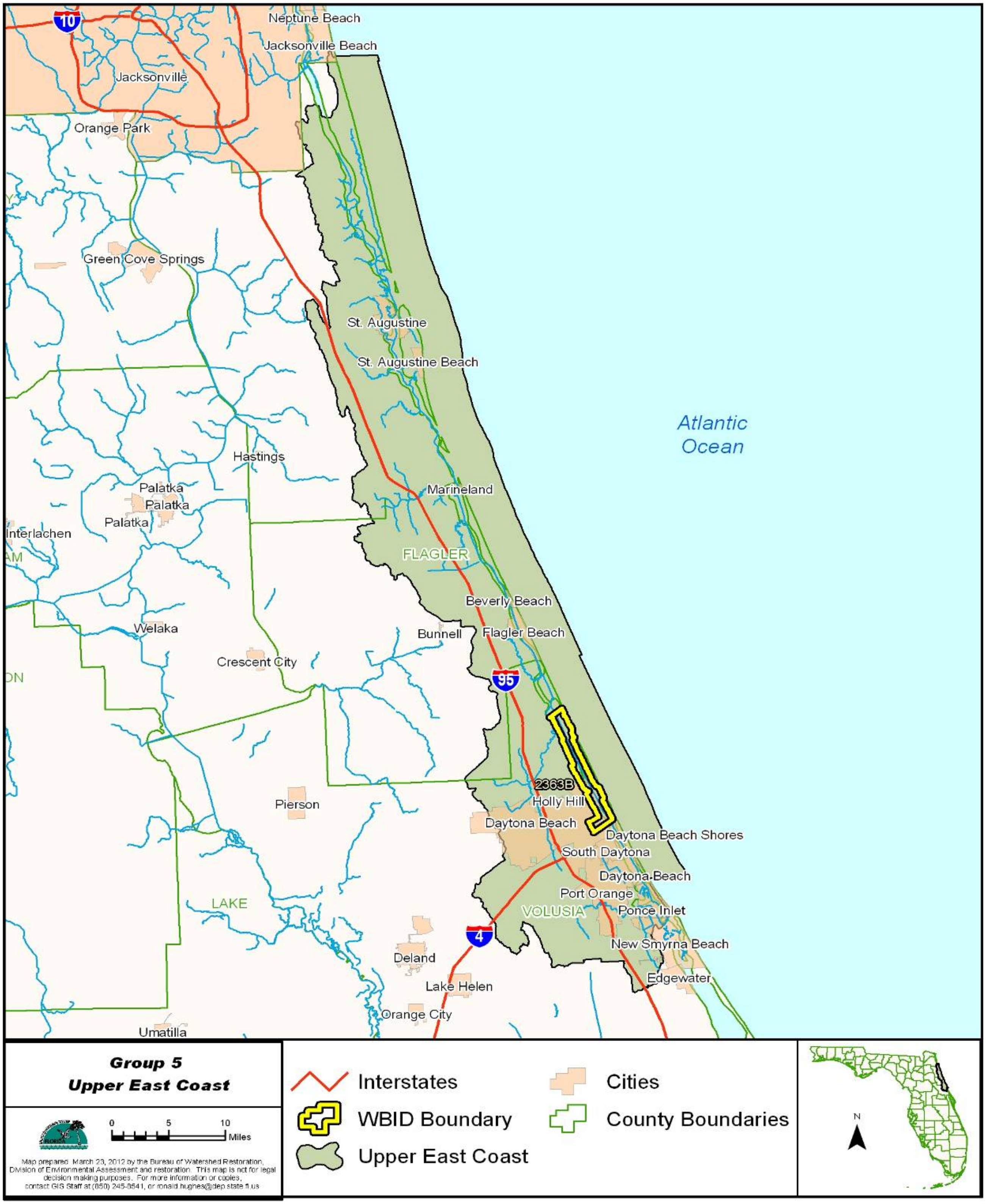

Figure 1.1. Location of the Halifax River Watershed (WBID 2363B) and Major Geopolitical Features in the Upper East Coast Basin

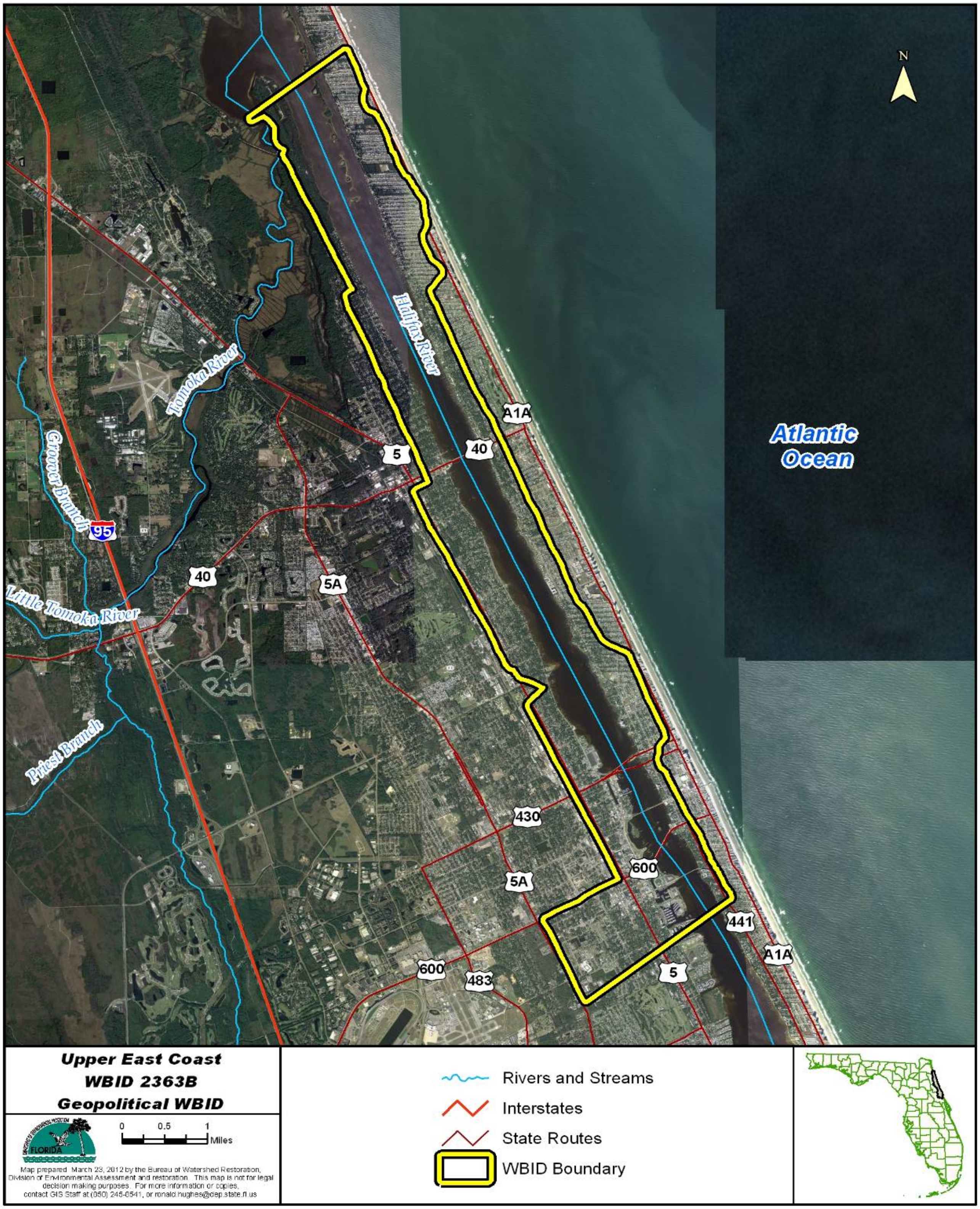

Figure 1.2. Location of the Halifax River Watershed (WBID 2363B) in Volusia County and Major Hydrologic Features in the Area

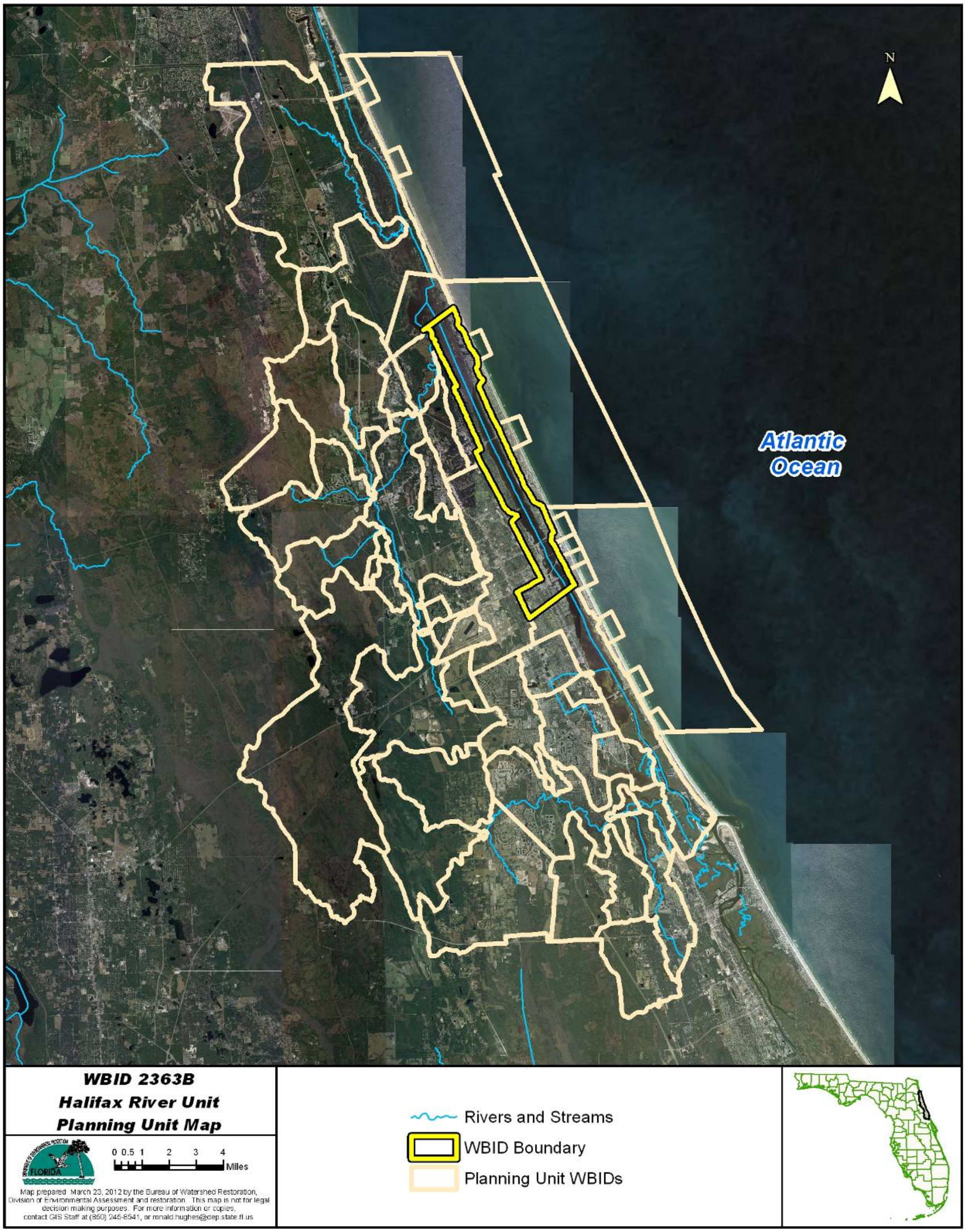

Figure 1.3. WBIDs in the Halifax River Planning Unit

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 15 waterbodies and 50 parameters in the Upper East Coast 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 Halifax River watershed and has verified that this waterbody segment is impaired for nutrients, based on data in the Department's IWR database. **Tables 2.1** and **2.2** summarize the chl*a* data for the verified period, which for Cycle 2 of the Group 5 waters was January 1, 2004, through June 30, 2011. The IWR listing threshold for nutrients in estuaries is based on an annual average chl*a* concentration. Annual average chl*a* in 2010 exceeded the threshold of 11 micrograms per liter (μg/L).

Chapter 5 assesses the possible relationships between chl*a* and other water quality parameters, using the complete historical dataset.

Table 2.1. Summary of Corrected Chlorophyll *a* (CHLAC) Monitoring Data for the Halifax River (WBID 2363B) During the Verified Period (January 1, 2004– June 30, 2011)

Parameter	CHLAC (µg/L)
Total number of samples	303
IWR-annual average threshold for the Verified List	11
Number of observed exceedances (years)	1
Number of observed nonexceedances (years)	6
Number of seasons during which samples were collected	4
Annual average resulting in listing (µg/L)	12
Lowest individual observation (µg/L)	1
Highest individual observation (µg/L)	45
Median TN/TP ratio for 68 observations	6.73
Possible causative pollutant by IWR	TN
FINAL ASSESSMENT	**Impaired**

Table 2.2. Summary of Annual Average CHLAC for the Cycle 2 Verified Period (January 1, 2004–June 30, 2011)

- = Empty cell/no data
CHLAC is in µg/L.
Precipitation based on Daytona Beach International Airport data (**Appendix G**).

Year	Number of Samples	Minimum	Maximum	Annual Mean	Number of Exceedances	Mean Precipitation (inches)
2004	36	1.0	21.0	6	0	62.97
2005	12	1.0	8.7	4	0	65.77
2006	29	1.4	12.4	4	0	31.36
2007	30	1.0	10.7	4	0	45.02
2008	61	2.3	41.1	9	0	42.67
2009	85	1.1	45.1	8	0	50.3
2010	50	3.1	23.9	12	1	39.39
2011	3	3.9	15.6	-	-	48.71

Chapter 3: DESCRIPTION OF APPLICABLE WATER QUALITY STANDARDS AND TARGETS

3.1 Classification of the Waterbody and Criterion 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)**

The Halifax River (WBID 2363B) is a Class III marine waterbody, with a designated use of recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife. The Class III water quality criterion applicable to the impairment addressed by this TMDL is for nutrients.

3.2 Applicable Water Quality Standards and Numeric Water Quality Target

The nutrient criterion in Rule 62-302, F.A.C., is expressed as a narrative, as follows:

> ***Nutrients.***
>
> *In no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna [Note: For Class III waters in the Everglades Protection Area, this criterion has been numerically interpreted for phosphorus in Section 62-302.540, F.A.C.].*

To assess whether this narrative criterion is being exceeded, the IWR provides thresholds for nutrient impairment in estuaries based on annual average chl*a* levels. The following language is found in Rule 62-303, F.A.C.:

Section 62-303.353, Nutrients in Estuaries and Open Coastal Waters.

Estuaries, estuary segments, or open coastal waters shall be included on the planning list for nutrients if their annual mean chlorophyll a for any year is greater than 11 µg/L or if data indicate annual mean chlorophyll a values have increased by more than 50% over historical values for at least two consecutive years.

Section 62-303.450, Interpretation of Narrative Nutrient Criteria.

(1) A water shall be placed on the verified list for impairment due to nutrients if there are sufficient data from the last five years preceding the planning list assessment, combined with historical data (if needed to establish historical chlorophyll a levels or historical TSIs), to meet the data sufficiency requirements of subsection 62-303.350(2), FA.C. If there are insufficient data, additional data shall be collected as needed to meet the requirements. Once these additional data are collected, the Department shall determine if there is sufficient information to develop a site-specific threshold that better reflects conditions beyond which an imbalance in flora or fauna occurs in the water segment. If there is sufficient information, the Department shall re-evaluate the data using the site-specific thresholds. If there is insufficient information, the Department shall re-evaluate the data using the thresholds provided in Rules 62-303.351-.353, F.A.C., for streams, lakes, and estuaries, respectively. In any case, the Department shall limit its analysis to the use of data collected during the five years preceding the planning list assessment and the additional data collected in the second phase. If alternative thresholds are used for the analysis, the Department shall provide the thresholds for the record and document how the alternative threshold better represents conditions beyond which an imbalance in flora or fauna is expected to occur.

The annual average chl*a* concentration in 2010 exceeded the IWR estuarine threshold of 11 µg/L and, based on the total nitrogen/total phosphorus (TN/TP) ratio, nitrogen was identified as the limiting nutrient.

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, such as 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 Halifax River Watershed

4.2.1 Point Sources

In the late 1980s and early 1990s, a number of Water Quality Effluent Limitations (WQBELs) studies were conducted by the Department that established effluent nutrient limits for major domestic wastewater facilities discharging to the Halifax River. There are two NPDES wastewater facilities that discharge directly into this portion of the river, and a third that discharges near the boundary with WBID 2363B (**Figure 4.1)**, as follows:

- *The **Ormond Beach WWTF (FL0020532)** is in Ormond Beach and has a permitted annual average discharge of 6.0 million gallons per day (MGD), with discharge to the Halifax River and reuse. The permitted annual average TN concentration is 6 mg//L, with a maximum discharge of 150 pounds per day (lbs/day). The permitted annual average TP concentration is 1 milligram per liter (mg/L) with a maximum discharge of 50 lbs/day. Based on discharge monitoring reports over the January 1997 to April 2012 period, discharges (181 values) ranged between 0.22 and 6.41 MGD, with a median discharge of 2.16 MGD (mean of 2.31 MGD). TN concentrations (181 values) over this period ranged between 0.32 and 4.97 mg/L, with a median concentration of 2.19 mg/L (mean of 2.29 mg/L). The corresponding TN daily loads ranged between 3.48 and 160.5 lbs/day, with a median of 41.0 lbs/day (mean of 44.0 lbs/day). TP concentrations over the same period (181 values) ranged between 0.07 and 1.72 mg/L, with a median concentration of 0.35 mg/L (mean of 0.40 mg/L). The corresponding TP daily loads ranged between 0.64 and 51.28 lbs/day, with a median of 5.60 lbs/day (mean of 7.49 lbs/day).*
- *The **Holly Hill WWTF (FL0027677)** is located in Holly Hill and has a permitted annual average discharge of 2.4 MGD, with discharge to the Halifax River. The permitted annual average TN concentration is 3 mg//L, with a maximum single sample discharge of 60 lbs/day. The permitted annual average TP concentration is 1 mg/L, with a maximum single sample discharge of 20 lbs/day. Based on discharge monitoring reports over the January 1997 to April 2012 period, discharges (184 values) ranged between 0.08 and 3.88 MGD, with a median discharge of 1.38 MGD (mean of 1.51 MGD). TN concentrations (182 values) over this period ranged between 1.12 and 25.0 mg/L, with a*

median concentration of 2.33 mg/L (mean of 2.61 mg/L). The corresponding TN maximum single sample daily loads ranged between 1.63 and 267.0 lbs/day, with a median of 26.70 lbs/day (mean of 33.20 lbs/day). TP concentrations over the same period (181 values) ranged between 0.0 and 1.14 mg/L, with a median concentration of 0.26 mg/L (mean of 0.30 mg/L). The corresponding TP maximum single sample daily loads ranged between 0.0 and 14.70 lbs/day, with a median of 3.15 lbs/day (mean of 3.75 lbs/day).

- *Although the* **Daytona Beach/Bethune Point WWTF (FL0025984)** *discharges to the lower portion of the Halifax River (WBID 2363A), the outfall is located near the boundary with WBID 2363B and is north of the tidal node. The permitted annual average discharge is 20 MGD with annual average limits for TN and TP of 3 and 1 mg/L, respectively. Maximum single-sample TN and TP loads are 570 and 190 lbs/day, respectively. Based on discharge monitoring reports over the January 1997 to April 2012 period, discharges (183 values) ranged between 1.6 and 18.3 MGD, with a median discharge of 7 MGD (mean of 7.34 MGD). TN concentrations (156 values) over the period from May 1998 to April 2012 ranged between 1.30 and 7.7 mg/L, with a median concentration of 2.65 mg/L (mean of 3.14 mg/L). The corresponding TN monthly average loads ranged between 873.8 and 20,466.9 lbs, with a median of 4,738.2 lbs (mean of 5,815.6 lbs). TP concentrations over the same period (164 values) ranged between 0.1 and 2.157 mg/L, with a median concentration of 0.66 mg/L (mean of 0.74 mg/L). The corresponding TP monthly average loads ranged between 7.43 and 5,222.5 lbs, with a median of 1,052.9 lbs (mean of 1,349.4 lbs).*

Municipal Separate Storm Sewer System Permittees

Portions of the Halifax River fall within the boundaries of several Phase II municipal separate storm sewer system (MS4) permits, including the city of Holly Hill (FLR04E060), the city of Daytona Beach (FLR04E0115), the city of Ormond Beach (FLR04E036), and Volusia County (FLR04E033). The Florida Department of Transportation (FDOT) District 5 is a co-permittee with Volusia County (FLR04E024).

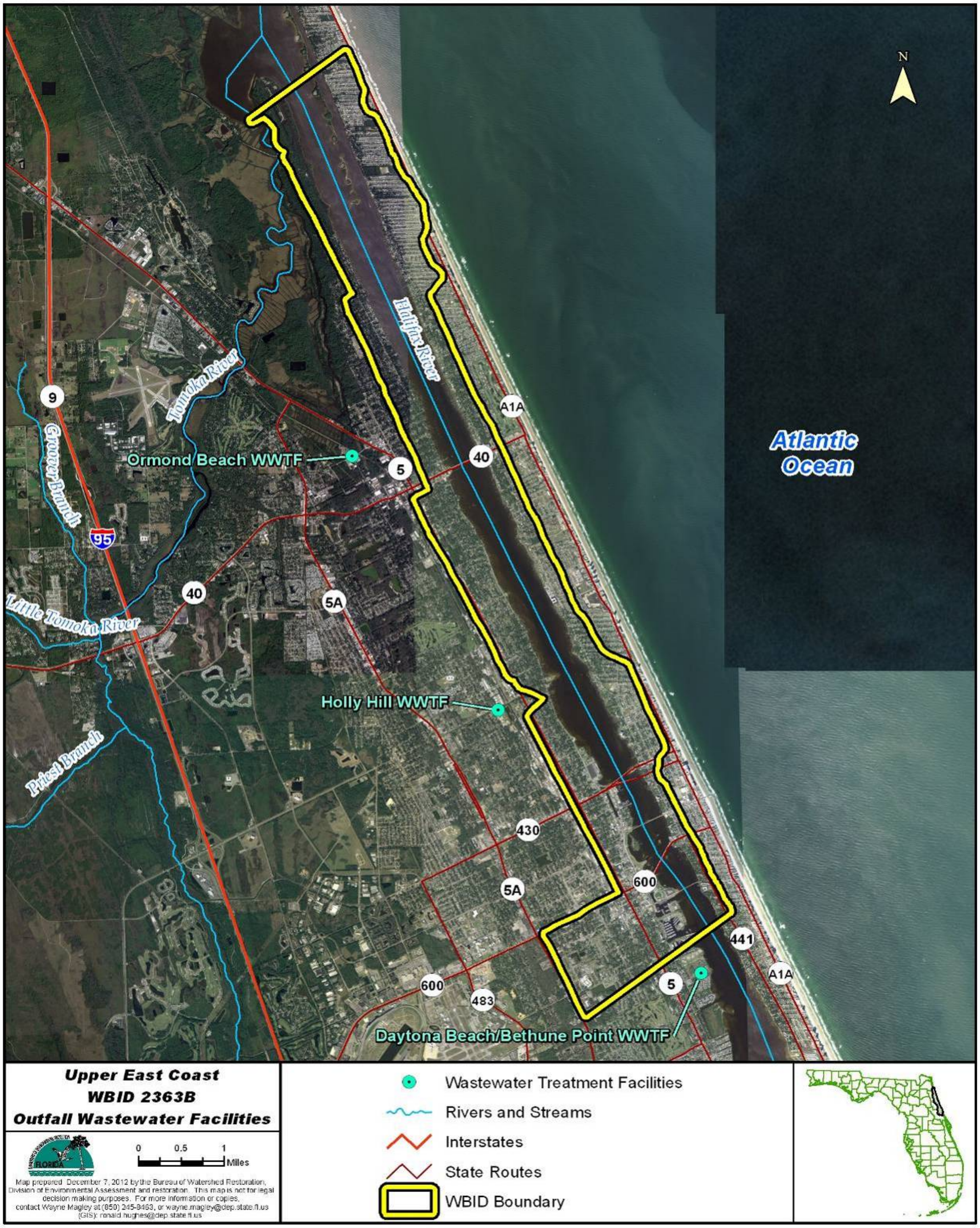

Figure 4.1. NPDES Wastewater Facilities in the Halifax River Watershed, WBID 2363B

4.2.2 Land Uses and Nonpoint Sources

Nutrient loadings to the Halifax River are also 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 St. Johns River Water Management District's (SJRWMD) year 2004 land use coverage 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 4.2** shows the acreage of the principal land uses in the watershed based on Level 1 codes. The SJRWMD's year 2009 land use coverage was also compared with the 2004 coverages, and there were insignificant differences between the two periods.

As shown in **Table 4.1**, the total area of the Halifax River watershed (WBID 2363B) is about 8,202 acres. Bays and estuaries represent nearly 41% of the watershed. Residential land use accounts for approximately 40% of the watershed, with 33% of the watershed classified as medium-density residential. Commercial and institutional property occupies about 11% of the watershed. Agriculture, in the form of rangeland, represents only 1% of the watershed area.

Table 4.1. Classification of Land Use Categories in the Halifax River Watershed in 2004

- = Empty cell/no data

Level 3 Land Use Code	Attribute	Acres	% of Total
1100	Residential, low density - less than 2 dwelling units/acre	118.52	1.44%
1200	Residential, medium density – 2 to 5 dwelling units/acre	2,696.34	32.87%
1300	Residential, high density - 6 or more dwelling units/acre	497.18	6.06%
1400	Commercial and services	710.04	8.66%
1480	Cemeteries	12.06	0.15%
1561	Ship building and repair	5.73	0.07%
1700	Institutional	194.08	2.37%
1820	Golf courses	1.48	0.02%
1840	Marinas and fish camps	39.88	0.49%
1850	Parks and zoos	53.89	0.66%
1860	Community recreational facilities	41.32	0.50%
1890	Other recreational (riding stables, go-cart tracks, skeet ranges, etc.)	6.85	0.08%
1900	Open land	2	0.02%
3100	Herbaceous upland nonforested	25.36	0.31%
3200	Shrub and brushland (wax myrtle or saw palmetto, occasionally scrub)	60.26	0.73%
3300	Mixed upland nonforested/mixed rangeland	7.9	0.10%
4200	Upland hardwood forests	20.06	0.24%
4340	Melaleuca	145.42	1.77%
5100	Streams and waterways	33.69	0.41%
5300	Reservoirs - pits, retention ponds, dams	24.37	0.30%
5400	Bays and estuaries	3,353.63	40.89%
6170	Mixed wetland hardwoods	21.81	0.27%
6420	Saltwater marshes	24.19	0.29%
6430	Wet prairies	0.09	0.00%
6440	Emergent aquatic vegetation	0.53	0.01%
6460	Treeless hydric savanna/mixed scrub-shrub wetland	21.04	0.26%
7430	Spoil areas	10.03	0.12%
8140	Roads and highways (divided 4-lanes with medians)	62.24	0.76%
8180	Auto parking facilities (when not directly related to other land use)	4.67	0.06%
8330	Water supply plants	2.44	0.03%
8340	Sewage treatment	5.38	0.07%
-	**TOTAL**	**8,202.48**	**100.00**

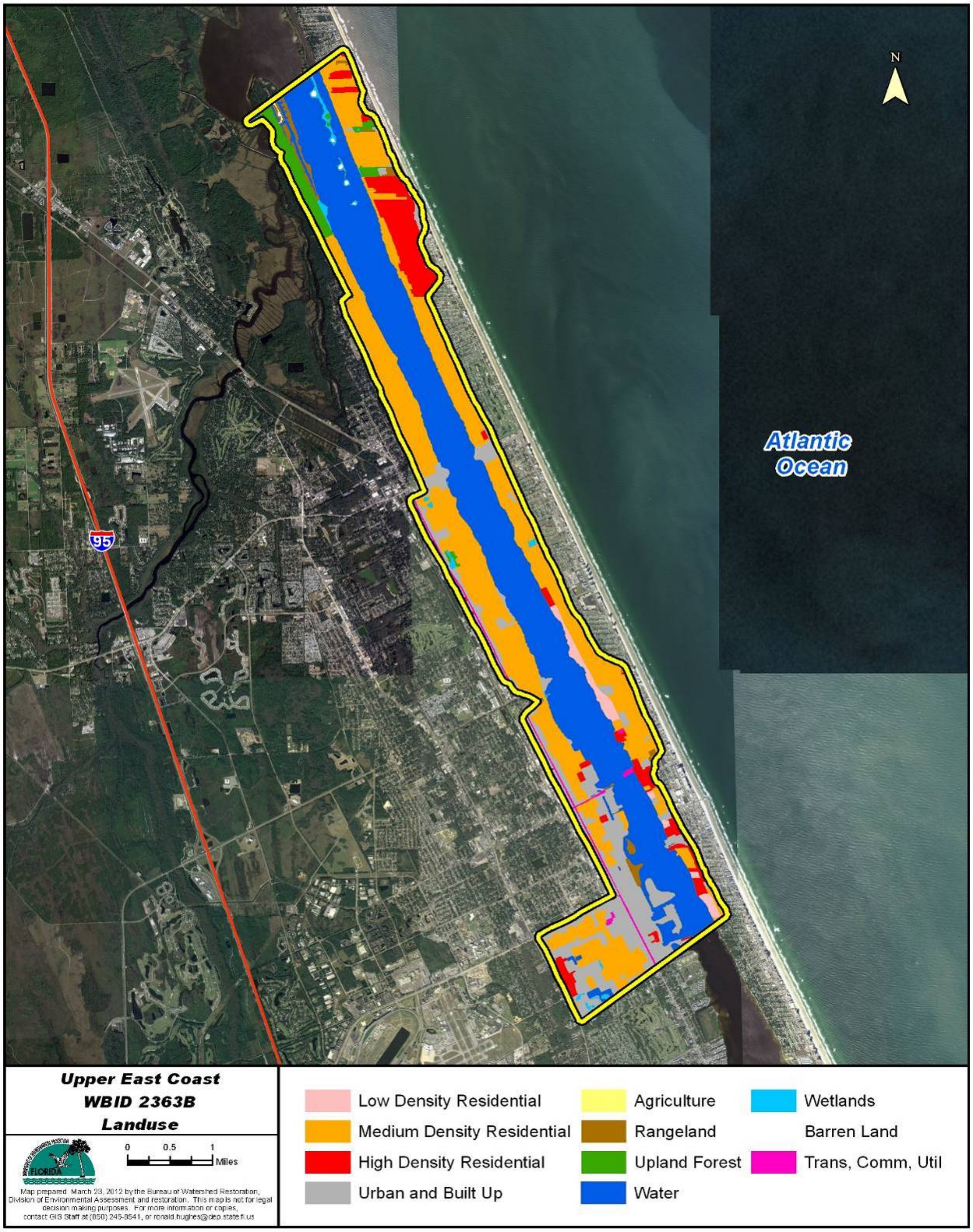

Figure 4.2. Principal Land Uses in the Halifax River Watershed, WBID 2363B, in 2004

Soil Characteristics

The Soil Survey Geographic Database (SSURGO) in the Department's GIS database from the SJRWMD was accessed to provide coverage of hydrologic soil groups in the Halifax River watershed (**Figure 4.3**). **Table 4.2** briefly describes the major hydrologic soil classes. As seen in **Figure 4.3**, Soil Group A was the most common in the watershed

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

Source: U.S. Department of Agriculture–Natural Resources Conservation Service (USDA–NRCS) 2009.

Hydrologic Soil Class	Description
A	Soils in this group have low runoff potential when thoroughly wet. Water is transmitted freely through the soil. Group A soils typically have less than 10% clay and more than 90% sand or gravel and have gravel or sand textures.
B	Soils in this group have moderately low runoff potential when thoroughly wet. Water transmission through the soil is unimpeded. Group B soils typically have between 10% and 20% clay and 50% to 90% sand and have loamy sand or sandy loam textures.
C	Soils in this group have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted. Group C soils typically have between 20% and 40% clay and less than 50% sand, and have loam, silt loam, sandy clay loam, clay loam, and silty clay loam textures.
D	Soils in this group have high runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted. Group D soils typically have greater than 40% clay, less than 50% sand, and clayey textures.
Dual hydrologic soil groups	Certain wet soils are placed in Group D based solely on the presence of a water table within 60 centimeters (24 inches) of the surface even though the saturated hydraulic conductivity may be favorable for water transmission. If these soils can be adequately drained, then they are assigned to dual hydrologic soil groups (A/D, B/D, and C/D) based on their saturated hydraulic conductivity and the water table depth when drained. The first letter applies to the drained condition and the second to the undrained condition. For the purpose of defining the term "hydrologic soil group," adequately drained means that the seasonal high water table is kept at least 60 centimeters (24 inches) below the surface in a soil where it would be higher in a natural state.

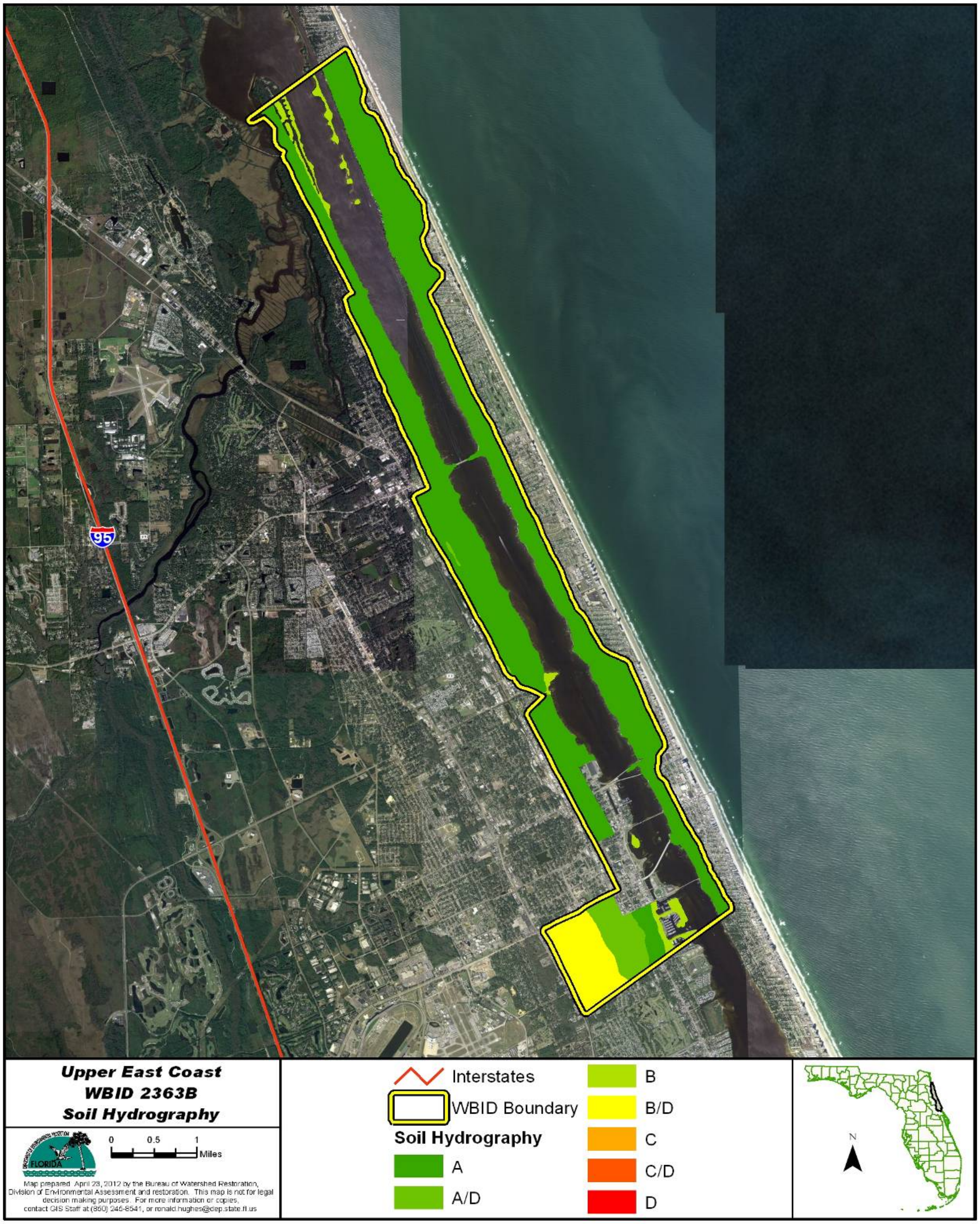

Figure 4.3. Distribution of Hydrologic Soil Groups in the Halifax River Watershed, WBID 2363B

Population

The 2010 U.S. Census block data were used to estimate the human population in the Halifax River watershed. Total population data for census blocks covering the Halifax River watershed were clipped using GIS to estimate the population within the watershed based on the fraction of the block contained within the watershed. This yielded an estimated population of 24,682 in the Halifax River watershed. Based on an average of 2.51 persons per household in Volusia County (U.S. Census Bureau websute 2910) there were an estimated 9,833 occupied residential units within the WBID boundary.

Septic Tanks

Based on the Florida Department of Health's (FDOH) January 2012 GIS coverage of on-site sewage treatment and disposal systems (OSTDS), there were approximately 1,030 septic tanks located in the watershed (**Figure 4.4**). Using an estimate of 70 gallons/day/person (EPA 1999), and drainfield TN and TP concentrations of 36 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 4.3**).

Table 4.3. Estimated Nitrogen and Phosphorus Annual Loading from Septic Tanks in the Halifax River Watershed

[1] U.S. Census Bureau
[2] EPA 1999

Estimated Number of Households on Septic	Estimated Number of People Per Household[1]	Gallons Per Person Per Day[2]	TN in Drainfield (mg/L)	TP in Drainfield (mg/L)	Estimated Annual TN Load (lbs/yr)	Estimated Annual TP Load (lbs/yr)
1,030	2.51	70	36	15	19,845	8,268

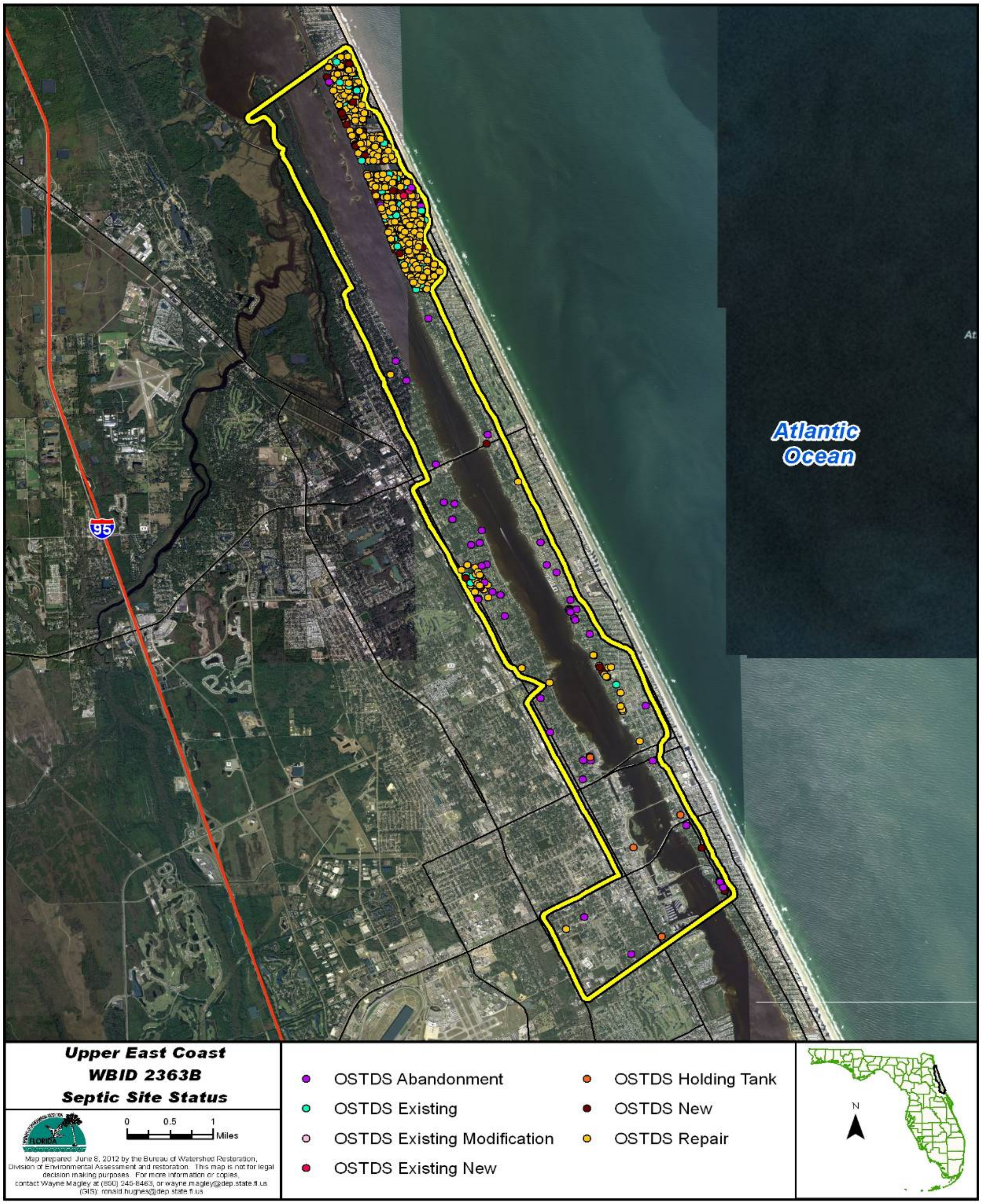

Figure 4.4. OSTDS in the Halifax River Watershed, WBID 2363B, in 2012

4.3 Source Summary

4.3.1 Summary of Nutrient Loadings to the Halifax River from Point Sources

Section 4.2.1 provided information on the three point source discharges in the watershed. A conservative approach was used to estimate annual TN and TP loads based on discharge monitoring reports. For each facility, the annual average discharge volume was used, with the overall median monthly maximum TN and TP concentrations presented in **Section 4.2.1**, to calculate an annual TN and TP contribution from each facility. **Table 4.4** presents the combined estimated annual discharge volumes, TN loads, and TP loads.

Table 4.4. Estimated Annual Average Discharge, TN Loads, and TP Loads from Permitted Point Sources (including Daytona Beach/Bethune Point), 1997–2011

Year	Discharge (mg/acre-ft)	TN Load (lbs/yr)	TP Load (lbs/yr)
1997	4,184/12,837	97,894	23,681
1998	3,582/10,992	104,736	27,109
1999	4,228/12,973	108,763	26,746
2000	3,389/10,397	79,608	24,457
2001	4,262/13,078	96,721	26,310
2002	4,035/12,382	76,595	15,143
2003	5,181/15,898	104,832	14,252
2004	4,859/14,910	114,269	17,144
2005	5,882/18,049	117,947	21,664
2006	3,397/10,422	6,9987	13,997
2007	3,192/9,795	6,5421	15,695
2008	3,712/11,389	108,059	23,167
2009	4,905/15,050	151,642	33,063
2010	3,253/9,982	106,580	15,639
2011	3,021/9,269	64,754	11,858

4.3.2 Summary of Nutrient Loadings to the Halifax River from Nonpoint Sources

As part of the EPA's efforts to establish numeric nutrient criteria for Florida's estuaries, Tetra Tech set up a watershed model, Loading Simulation Program in C++ (LSPC), to estimate nutrient loadings to the Mantanzas and Halifax River Estuaries. The model simulation covered the 1997 to 2009 period. Ms. Erin Lincoln (Tetra Tech, personal communication, May 2, 2012) provided model outputs of daily flow, TN concentrations, TP concentrations, TN loads, and TP loads based on HUC 12 delineations. Daily flows and nutrient loads were summed by year to obtain estimates of annual nitrogen and phosphorus loadings to the Halifax River from contributing watersheds (including the Halifax River, WBID 2363B) (**Table 4.5**). These estimates did not include potential contributions from tidally influenced waters outside the modeled contributing watersheds. **Appendix C** describes the calibration of the LSPC watershed model.

Table 4.5. Estimated Annual Average LSPC-Derived Discharge and TN and TP Loads and Concentrations to the Halifax River, 1997–2009

Precipitation based on Daytona International Airport data (**Appendix G**).

Year	Discharge (acre-ft)	TN Load (lbs/yr)	TP Load (lbs/yr)	Mean TN (mg/L)	Mean TP (mg/L)	Rainfall (inches/yr)
1997	132,016	411,915	33,873	1.15	0.094	54.69
1998	121,409	402,690	28,616	1.22	0.087	40.51
1999	77,404	244,521	26,063	1.16	0.124	46.37
2000	74,077	231,043	21,798	1.15	0.108	40.16
2001	247,467	764,621	49,144	1.14	0.073	58.27
2002	156,949	467,629	32,054	1.10	0.075	59.94
2003	205,108	644,773	38,734	1.16	0.070	57.3
2004	256,294	806,299	51,045	1.16	0.073	62.97
2005	367,700	1,175,757	71,203	1.18	0.071	65.77
2006	85,717	253,852	20,618	1.09	0.089	31.36
2007	81,008	227,022	20,337	1.03	0.092	45.02
2008	167,540	521,907	34,693	1.15	0.076	42.67
2009	151,584	475,261	33,349	1.15	0.081	50.3
AVERAGE	**163,214**	**509,791**	**35,502**	**1.14**	**0.086**	**50.41**

Chapter 5: DETERMINATION OF ASSIMILATIVE CAPACITY

5.1 Determination of Loading Capacity

5.1.1 Data Used in the Determination of the TMDL

There are 78 sampling stations in the Halifax River, of which 44 have historical CHLAC observations (**Figure 5.1**). **Table 5.1** contains summary information on each of the stations (N represents the number of CHLAC observations). **Table 5.2** provides a statistical summary of CHLAC observations at each station, and **Appendix B** contains historical CHLAC, temperature (TEMPC), TN, and TP available observations from sampling sites in WBID 2363B from 1982 to 2011. **Figure 5.2** displays the historical CHLAC observations over time. The simple linear regression of CHLAC versus sampling date in **Figure 5.2** was not significant at an alpha (α) level of 0.05. **Appendix F** contains plots of CHLAC by year, season, and station.

Figures 5.3 through **5.6** present historical TN, TP, COLOR, and total suspended solids (TSS) observations, respectively. Linear regressions of each parameter versus sampling date indicated that the regressions of TP and COLOR were significant at an α level of 0.05. **Appendix F** contains additional plots by year, season, and station. **Table 5.3** presents a statistical summary of major water quality parameters from the available data.

Table 5.1. Sampling Station Summary for the Halifax River Watershed

Station	STORET ID	Station Owner	Years with Data	Number of Samples
HALIFAX R 150YDS S HOLLY HILL ST	21FLA 27010034	Department	2009	3
HALIFAX R 100 FT N SI BCH MEM BR	21FLA 27010037	Department	1982–95	35
HALIFAX R 50 Y N ORMOND BCH STP	21FLA 27010402	Department	1996	1
HALIFAX R A ICWW MARKER 16	21FLA 27010403	Department	1984	5
HALIFAX R 50 Y S ORMOND BCH STP	21FLA 27010404	Department	1996	1
HALIFAX R 50 Y N HOLLY HILL STP	21FLA 27010405	Department	1996	1
HALIFAX R BET ICWW MARKERS 27& 2	21FLA 27010406	Department	1984	5
HALIFAX R 50 Y S HOLLY HILL STP	21FLA 27010407	Department	1996	1
HALIFAX R. AT ICWW CM 9 EAST SIDE OF CHANNEL	21FLA 27010468	Department	1996	1
HALIFAX RIVER SOUTH TIP OF TOMOKA STATE PARK	21FLA 27010567	Department	1985–2009	16
HALIFAX RIVER AT ICW #22	21FLA 27010832	Department	1996	1
HALIFAX RIV 300YD W OF ICWW 11	21FLA 27010940	Department	1983–90	16
HALIFAX RIVER AT ICWW MARKER 19	21FLA 27010942	Department	2009	4
HALIFAX RIVER AT ICWW MARKER 21	21FLA 27010943	Department	1983–90	16
HALIFAX R MIDCHAN ICWW AT MAIN STREET	21FLA 27010946	Department	1984	5
HALIFAX RIVER AT SEABREEZE BRIDGE	21FLA 27010950	Department	1983–90	11
IRL	21FLFMRIFLEALT158	FMRI	2005	1
HALIFAX - INTRACOASTAL WATERWAY	21FLFMRIHAL200107	FMRI	2001	1
HALIFAX - INTRACOASTAL WATERWAY	21FLFMRIHAL200108	FMRI	2001	1
HALIFAX RIVER	21FLFMRISTR200432	FMRI	2004	1
HALIFAX RIVER 100 FT N SI BEACH MEMORIAL BRIDGE	21FLSJWM27010037	SJRWMD	1995–2011	93
HALIFAX RIVER @ CM 29	21FLSJWMHR29	SJRWMD	1993	2
HALIFAX R SOUTH SIDE SR 40 IN ORMOND BEACH	21FLSJWMHR40OB	SJRWMD	1991	1
HALIFAX RIVER @ SR 92 BRIDGE	21FLSJWMHR92B	SJRWMD	1993	2
HALIFAX R NORTH SIDE SR 92 IN DAYTONA BEACH	21FLSJWMHR92DB	SJRWMD	1991	1
HALIFAX RIVER AT ICWW CM 6	21FLVEMDHL04	Volusia County	1993–98	58
HALIFAX RIVER AT ICCW CM 11	21FLVEMDHL05	Volusia County	1991–98	70

Station	STORET ID	Station Owner	Years with Data	Number of Samples
HALIFAX RIVER AT ICCW CM 16	21FLVEMDHL06	Volusia County	1991–98	72
HALIFAX RIVER AT ICCW CM 21	21FLVEMDHL07	Volusia County	1991–98	71
HALIFAX RIVER AT ICWW CM 25	21FLVEMDHL08	Volusia County	1993–98	57
HALIFAX RIVER AT ICCW CM 30	21FLVEMDHL09	Volusia County	1991–98	71
HALIFAX RIVER AT ICWW CM 33	21FLVEMDHL10	Volusia County	1993–98	58
HALIFAX RIVER 100 YDS N. OF ORANGE AVE. BRIDGE	21FLVEMDHL11	Volusia County	1991–98	74
HALIFAX RIVER AT ENTRANCE TO HALIFAX HARBOR	21FLVEMDHL12	Volusia County	1991–98	72
HALIFAX RIVER, AT ICWW CM 6	21FLVEMDVC-004	Volusia County	1999–2011	49
HALIFAX RIVER, AT ICWW CM 11	21FLVEMDVC-005	Volusia County	1999	41
HALIFAX RIVER, AT ICWW CM 16	21FLVEMDVC-006	Volusia County	1999	43
HALIFAX RIVER, AT ICWW CM 21	21FLVEMDVC-007	Volusia County	1999	44
HALIFAX RIVER, AT ICWW CM 25	21FLVEMDVC-008	Volusia County	1999	40
HALIFAX RIVER, AT ICWW CM 30	21FLVEMDVC-009	Volusia County	1999	71
HALIFAX RIVER, AT ICWW CM 33	21FLVEMDVC-010	Volusia County	1999	70
HALIFAX RIVER, AT ICWW CM 36, N OF ORANGE AVE BRIDGE	21FLVEMDVC-011	Volusia County	1999	69
HALIFAX RIVER, AT ENTRANCE TO HALIFAX HARBOR MARINA, CM 11	21FLVEMDVC-012	Volusia County	1999	70
HL11A	21FLVEMDVC-HL11A	Volusia County	2010–11	17

Table 5.2. Statistical Summary of Historical CHLAC Data for the Halifax River

CHLAC concentrations are µg/L.

Station	Number of Samples	Minimum	Maximum	Median	Mean
HALIFAX R 150YDS S HOLLY HILL ST	3	8.40	33.00	15.00	18.80
HALIFAX R 100 FT N SI BCH MEM BR	35	1.00	36.09	9.62	11.99
HALIFAX R 50 Y N ORMOND BCH STP	1	7.36	7.36	7.36	7.36
HALIFAX R AT ICWW MARKER 16	5	4.99	37.90	9.99	13.80
HALIFAX R 50 Y S ORMOND BCH STP	1	9.18	9.18	9.18	9.18
HALIFAX R 50 Y N HOLLY HILL STP	1	15.81	15.81	15.81	15.81
HALIFAX R BET ICWW MARKERS 27& 2	5	4.21	19.65	10.30	11.13
HALIFAX R 50 Y S HOLLY HILL STP	1	17.64	17.64	17.64	17.64
HALIFAX R. AT ICWW CM 9 EAST SIDE OF CHANNEL	1	11.87	11.87	11.87	11.87
HALIFAX RIVER SOUTH TIP OF TOMOKA STATE PARK	16	2.00	34.00	5.63	8.76
HALIFAX RIVER AT ICW #22	1	9.33	9.33	9.33	9.33
HALIFAX RIV 300YD W OF ICWW 11	16	3.42	80.20	8.82	13.92
HALIFAX RIVER AT ICWW MARKER 19	4	3.10	29.00	7.05	11.55
HALIFAX RIVER AT ICWW MARKER 21	16	2.57	49.90	11.09	12.95
HALIFAX R MIDCHAN ICWW AT MAIN ST	5	4.14	21.75	15.00	13.04
HALIFAX RIVER AT SEABREEZE BRIDGE	11	1.28	31.00	11.10	11.62
IRL	1	7.44	7.44	7.44	7.44
HALIFAX	1	21.27	21.27	21.27	21.27
HALIFAX	1	8.18	8.18	8.18	8.18
HALIFAX RIVER	1	3.55	3.55	3.55	3.55
HALIFAX RIVER 100 FT N SI BEACH MEMORIAL BRIDGE	93	1.00	45.06	5.56	7.32
HALIFAX RIVER @ CM 29	2	2.94	20.05	11.49	11.49
HALIFAX R SOUTH SIDE SR 40 IN ORMOND BEACH	1	19.09	19.09	19.09	19.09
HALIFAX RIVER @ SR 92 BRIDGE	2	3.21	25.39	14.30	14.30
HALIFAX R NORTH SIDE SR 92 IN DAYTONA BEACH	1	10.97	10.97	10.97	10.97
HALIFAX RIVER AT ICWW CM 6	58	1.00	16.07	5.35	5.99

Station	Number of Samples	Minimum	Maximum	Median	Mean
HALIFAX RIVER AT ICCW CM 11	70	1.00	25.60	6.02	6.97
HALIFAX RIVER AT ICCW CM 16	72	1.00	35.66	6.56	7.35
HALIFAX RIVER AT ICCW CM 21	71	1.00	26.00	7.18	8.19
HALIFAX RIVER AT ICWW CM 25	57	1.00	21.65	7.18	8.62
HALIFAX RIVER AT ICCW CM 30	71	1.00	34.90	7.78	9.48
HALIFAX RIVER AT ICWW CM 33	58	1.00	35.92	7.22	8.92
HALIFAX RIVER 100 YDS N. OF ORANGE AVE. BRIDGE	74	1.00	38.45	5.82	7.94
HALIFAX RIVER AT ENTRANCE TO HALIFAX HARBOR	72	1.00	29.50	5.05	7.28
HALIFAX RIVER, AT ICWW CM 6	41	1.00	24.74	8.08	9.19
HALIFAX RIVER, AT ICWW CM 11	43	1.00	21.64	9.29	9.05
HALIFAX RIVER, AT ICWW CM 16	44	1.00	43.61	7.60	9.26
HALIFAX RIVER, AT ICWW CM 21	40	1.00	19.29	7.63	8.25
HALIFAX RIVER, AT ICWW CM 25	71	1.00	30.92	7.34	8.72
HALIFAX RIVER, AT ICWW CM 30	70	1.00	38.49	6.81	8.40
HALIFAX RIVER, AT ICWW CM 33	69	1.00	27.38	6.84	7.38
HALIFAX RIVER, AT ICWW CM 36, N OF ORANGE AVE BRIDGE	70	1.00	27.14	6.09	7.46
HALIFAX RIVER, AT ENTRANCE TO HALIFAX HARBOR MARINA, CM 11	70	1.00	27.62	6.86	7.66
HL11A	17	1.98	20.73	9.35	9.08

Table 5.3. Summary Statistics for Major Water Quality Parameters Measured in the Halifax River

BOD = Biochemical oxygen demand; Pt-Co = Platinum cobalt units; COND = Conductivity; µs/cm = micromohs per centimeter; DO = Dissolved oxygen; DOSAT = percent DO saturation; NH4 = Ammonia; NO3O2 = nitrite+nitrate; su = Standard units; ppt = parts per thousand; TEMPC = Water temperature in °C; SD = Secchi depth; INORGN = Inorganic nitrogen; INORGP = Inorganic phosphorus; TURB = Turbidity; NTU = Nephelometric turbidity units

Parameter	Number of Samples	Minimum	25%	Median	Mean	75%	Maximum
BOD (mg/L)	213	0.2	1.4	1.7	1.9	2.3	4.9
CHLAC (µg/L)	1,363	1.0	3.6	6.9	8.4	11.1	80.2
COLOR (PT-CO)	1,517	2	29	41	73	85	568
COND (µS/cm)	1,798	15	24,300	34,600	32,363	42,400	50,318
DO (mg/L)	1,817	0.50	5.60	6.48	7.13	7.46	757.001
DOSAT (%)	960	19.75	71.57	80.00	79.14	86.93	130.671
NH4 (mg/L)	410	0.00	0.02	0.06	0.11	0.15	0.87
NO3O2 (mg/L)	1,434	0.00	0.02	0.05	0.08	0.11	0.65
pH (su)	1,816	6.20	7.54	7.70	7.74	7.86	82.001
SALINITY (ppt)	1,617	0.1	16.2	22.6	21.3	27.7	46.9
SD (m)	1,538	0.0	0.5	0.7	0.8	0.9	18.01
TEMPC (°C)	1,827	9.78	20.00	24.50	23.94	28.40	36.34
INORGN (mg/L)	394	0.003	0.080	0.152	0.226	0.313	1.200
TN (mg/L)	1,299	0.131	0.689	0.883	0.970	1.175	4.030
INORGP (mg/L)	220	0.010	0.067	0.107	0.127	0.170	0.440
TP (mg/L)	1,343	0.017	0.110	0.150	0.166	0.200	1.710
TSS (mg/L)	1,382	0	15	23	28	36	545
TURB (NTU)	1,260	1	6	10	11	14	77
TN/TP RATIO	1,137	0.34	4.26	5.79	6.75	8.11	60.82
INORGN/INORGP	211	0.03	1.29	2.02	2.71	3.51	54.90

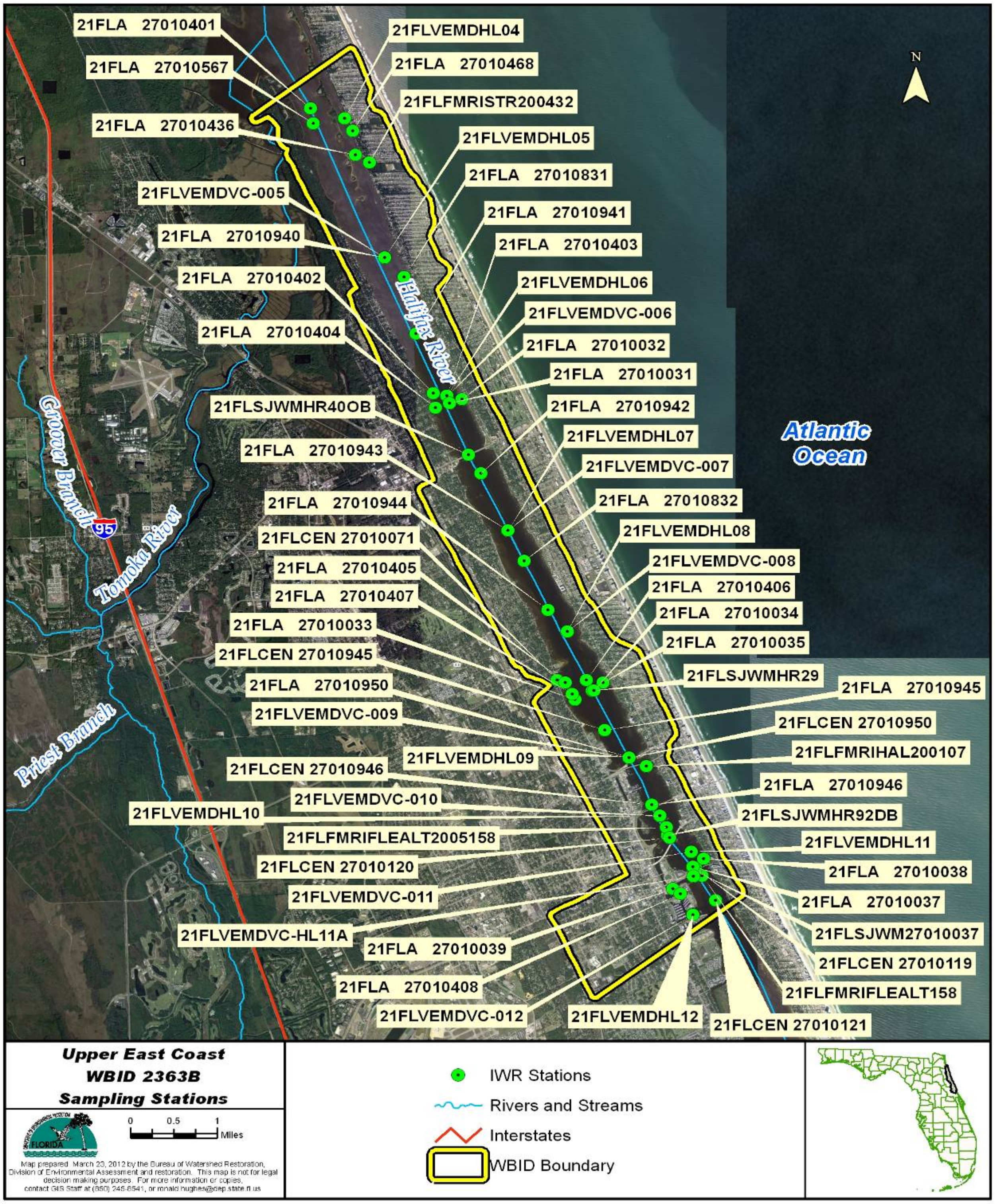

Figure 5.1. Historical Sampling Sites in the Halifax River Watershed, WBID 2363B

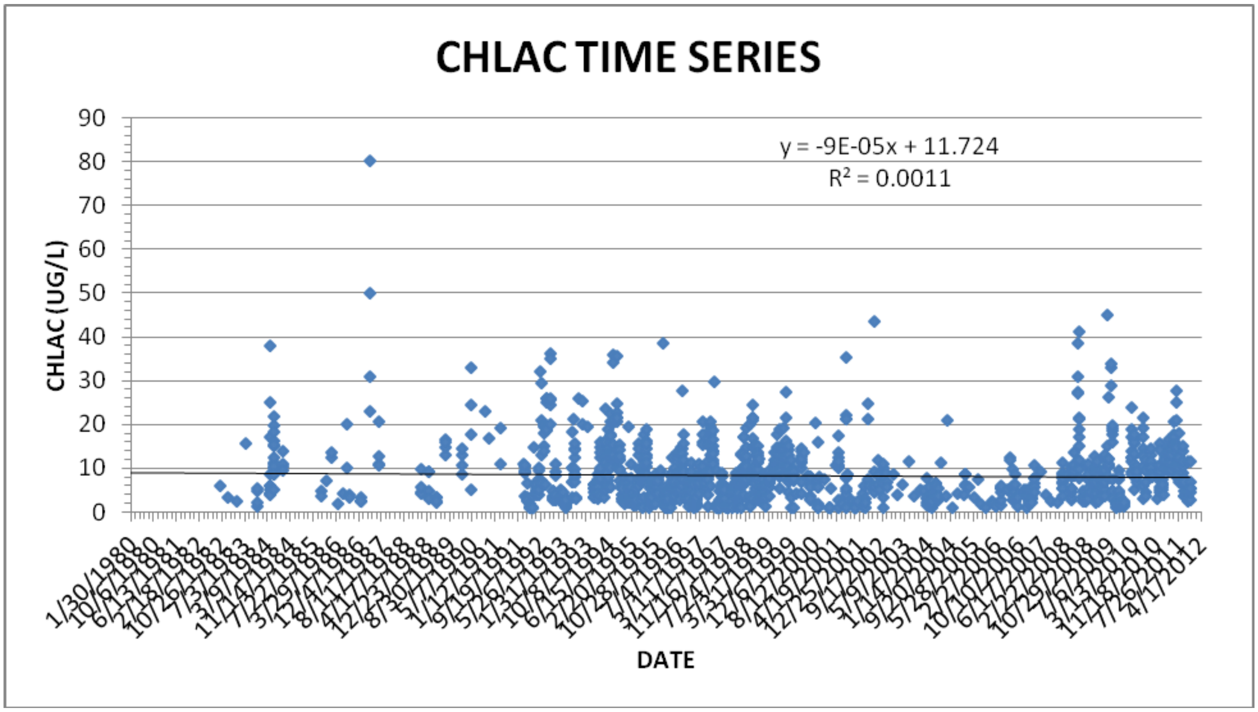

Figure 5.2. Historical CHLAC Observations for the Halifax River, 1980–2012

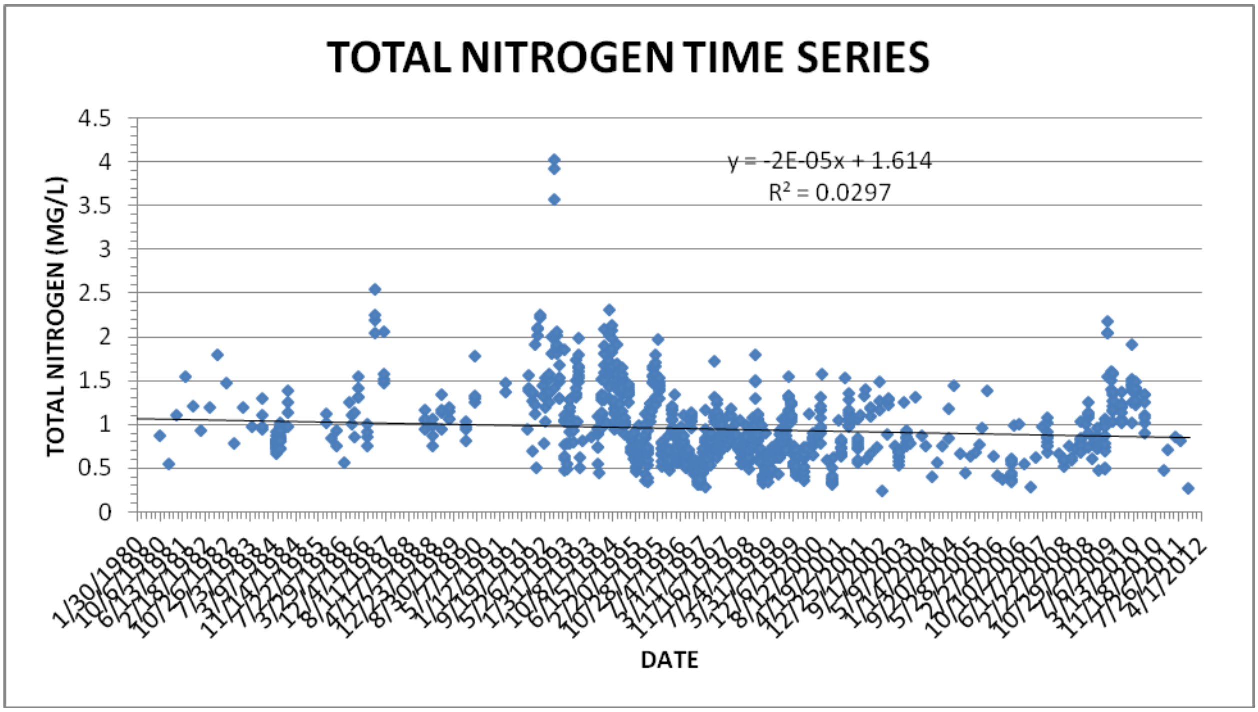

Figure 5.3. Historical TN Observations for the Halifax River, 1980–2012

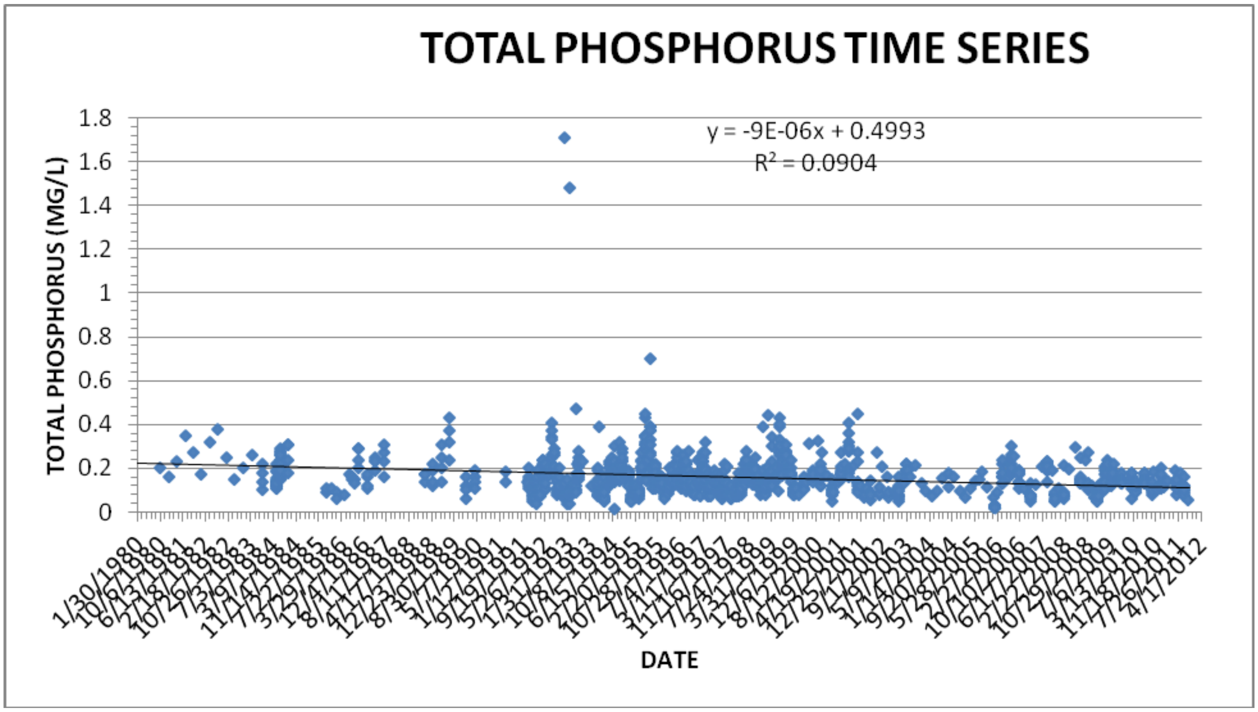

Figure 5.4. **Historical TP Observations for the Halifax River, 1980–2012**

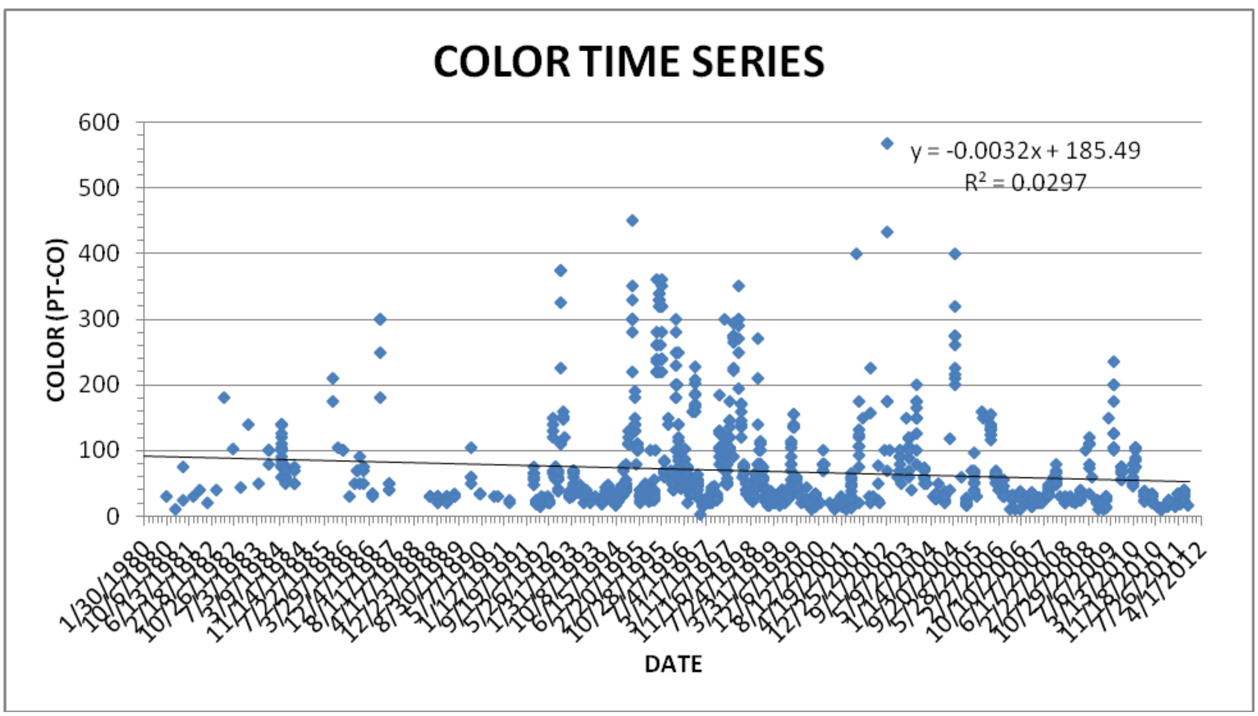

Figure 5.5. **Historical COLOR Observations for the Halifax River, 1980–2012**

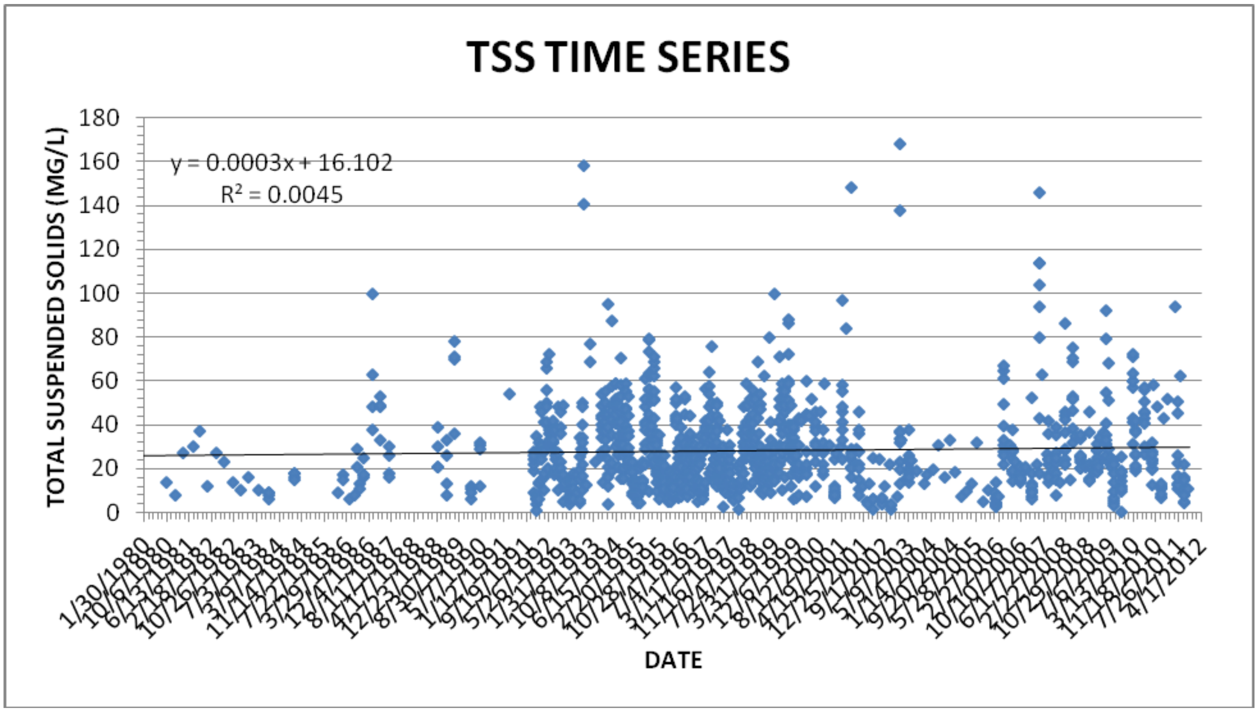

Figure 5.6. Historical TSS Observations for the Halifax River, 1980–2012

Available CHLAC, TN, and TP measurements were also summarized by year (**Tables 5.4** through **5.6**). Annual means in the tables are based on the IWR methodology that requires a sample in each quarter, and quarterly averages are averaged to calculate an annual average concentration. A nonparametric test (Kruskal-Wallis) was applied to the CHLAC, INORGN, TN, INORGP, TP, COND, COLOR, and TSS datasets to determine whether there were significant differences among seasons (**Appendix D**). At an α level of 0.05, differences were significant among seasons for all the parameters. A similar test for differences among years was significant for all the parameters (**Appendix E**).

Table 5.4. Statistical Summary of Historical CHLAC Data by Year for the Halifax River, 1982–2011

CHLAC concentrations are µg/L.
- = Cases where data were not collected in each of the four quarters.

Year	Number of Samples	Minimum	Maximum	Median	Mean
1982	1	6.0	6.0	-	-
1983	7	1.3	15.8	3.4	6.3
1984	29	4.0	37.9	10.3	-
1985	3	3.7	7.3	4.9	-
1986	8	2.0	20.0	7.3	-
1987	12	2.6	80.2	12.0	-
1988	4	4.2	9.7	5.0	-
1989	12	2.3	16.5	7.0	-
1990	10	5.2	33.0	15.6	17.9
1991	9	3.6	19.1	10.3	-
1992	71	1.0	36.1	6.3	9.9
1993	44	1.0	25.8	3.7	14.0
1994	103	2.0	35.9	9.7	10.9
1995	108	1.0	19.4	5.4	6.2
1996	105	1.0	38.5	5.7	6.6
1997	114	1.0	29.7	5.9	7.2
1998	102	1.0	24.6	7.4	7.3
1999	104	1.0	27.3	9.0	9.3
2000	42	1.0	20.4	7.6	7.6
2001	44	1.0	35.4	2.4	6.1
2002	27	1.0	43.6	6.3	8.2
2003	6	3.8	11.5	4.9	5.4
2004	36	1.0	21.0	3.2	5.7
2005	12	1.0	8.7	5.9	4.5
2006	29	1.4	12.4	5.1	4.0
2007	30	1.0	10.7	3.8	4.3
2008	61	2.3	41.1	8.1	9.3
2009	92	1.1	45.1	6.3	8.1
2010	50	3.1	23.9	10.7	11.7
2011	88	2.6	27.6	10.3	10.3

Table 5.5. Statistical Summary of Historical TN Data by Year for the Halifax River, 1968–2011

TN concentrations are mg/L.
- = Cases where data were not collected in each of the four quarters.

Year	Number of Samples	Minimum	Maximum	Median	Mean
1968	62	0.49	2.13	1.04	-
1971	24	0.68	1.38	0.94	-
1973	16	0.44	2.00	0.86	-
1974	12	0.13	2.19	0.90	1.11
1975	17	0.76	2.11	1.19	1.34
1976	10	0.60	2.12	1.02	1.13
1977	12	0.58	1.52	1.38	1.25
1978	12	0.65	1.74	1.12	1.10
1979	11	0.87	1.88	1.08	1.19
1980	2	0.66	0.87	0.77	-
1981	4	0.55	1.54	1.16	1.10
1982	4	0.93	1.80	1.33	1.35
1983	7	0.78	1.29	0.98	1.01
1984	48	0.67	1.39	0.82	-
1985	3	0.84	1.12	1.02	-
1986	12	0.57	1.55	1.12	1.04
1987	12	0.76	2.54	1.55	-
1988	4	0.95	1.17	1.06	-
1989	12	0.76	1.34	1.06	-
1990	8	0.81	1.78	1.14	-
1991	6	0.94	1.56	1.40	-
1992	43	0.51	4.03	1.53	1.67
1993	44	0.47	1.98	1.10	1.01
1994	103	0.44	2.31	1.33	1.36
1995	113	0.34	1.98	0.80	0.95
1996	106	0.43	1.34	0.70	0.75
1997	112	0.29	1.72	0.79	0.77
1998	102	0.49	1.79	0.79	0.83
1999	107	0.32	1.55	0.69	0.73
2000	42	0.36	1.58	0.72	0.75
2001	43	0.32	1.53	0.78	0.79

Year	Number of Samples	Minimum	Maximum	Median	Mean
2002	17	0.24	1.49	1.17	1.05
2003	24	0.53	1.31	0.77	0.91
2004	7	0.40	1.44	0.75	0.78
2005	7	0.45	1.38	0.69	0.75
2006	15	0.34	1.00	0.44	0.53
2007	14	0.28	1.08	0.82	0.65
2008	23	0.52	1.26	0.75	0.76
2009	49	0.48	2.17	1.03	1.10
2010	25	0.90	1.91	1.37	1.36
2011	5	0.27	0.86	0.71	0.59

Table 5.6. Statistical Summary of Historical TP Data by Year for the Halifax River, 1973–2011

TP concentrations are mg/L.
- = Cases where data were not collected in each of the four quarters.

Year	Number of Samples	Minimum	Maximum	Median	Mean
1973	16	0.135	0.530	0.304	-
1974	12	0.200	0.610	0.360	0.358
1975	17	0.130	0.520	0.270	0.300
1976	10	0.070	0.430	0.185	0.203
1977	12	0.130	0.340	0.235	0.232
1978	12	0.060	0.400	0.205	0.203
1979	11	0.160	0.360	0.220	0.244
1980	2	0.180	0.200	0.190	-
1981	4	0.160	0.350	0.250	0.253
1982	4	0.170	0.380	0.285	0.280
1983	7	0.100	0.260	0.180	0.193
1984	54	0.110	0.310	0.175	-
1985	3	0.090	0.110	0.110	-
1986	12	0.060	0.290	0.155	0.151
1987	12	0.110	0.310	0.210	-
1988	4	0.140	0.170	0.170	-
1989	12	0.120	0.430	0.230	-
1990	8	0.060	0.190	0.130	-
1991	9	0.110	0.200	0.140	-
1992	70	0.038	0.410	0.140	0.151
1993	42	0.038	1.710	0.120	0.189
1994	103	0.017	0.390	0.170	0.165
1995	113	0.050	0.700	0.145	0.175
1996	106	0.060	0.280	0.140	0.145
1997	115	0.060	0.320	0.139	0.142
1998	102	0.060	0.280	0.150	0.137
1999	107	0.080	0.440	0.170	0.185
2000	42	0.076	0.328	0.150	0.150
2001	43	0.050	0.450	0.170	0.183
2002	17	0.055	0.274	0.093	0.110
2003	24	0.050	0.220	0.146	0.152
2004	7	0.072	0.177	0.113	0.118

Year	Number of Samples	Minimum	Maximum	Median	Mean
2005	7	0.069	0.183	0.116	0.113
2006	41	0.020	0.300	0.160	0.145
2007	32	0.050	0.230	0.085	0.134
2008	32	0.060	0.298	0.130	0.159
2009	49	0.050	0.236	0.140	0.137
2010	38	0.060	0.182	0.130	0.130
2011	32	0.056	0.200	0.120	0.134

5.1.2 TMDL Development Process

As part of evaluating potential relationships between CHLAC and other variables, rainfall records for the Daytona International Airport were used to determine rainfall amounts associated with individual sampling dates. Rainfall recorded on the day of sampling (PRECIP), the cumulative total for the day of and the previous 2 days (V3DAY), the cumulative total for the day of and the previous 6 days (V7DAY), the cumulative total for the day of and the previous 13 days (V14DAY), and the cumulative total for the day of and the previous 20 days (V21DAY) were all paired with the respective water quality parameter observation.

A Spearman correlation matrix was used to assess potential relationships between CHLAC and other water quality parameters (**Appendix H**). At an alpha (α) level of 0.05, correlations between CHLAC and, COLOR, COND, NH_4, NO3O2, TEMPC, INORGN, TN, TP, TSS, TURB, PRECIP, V3DAY, V14DAY, V21DAY, and INORGP were significant.

As discussed in **Section 4.2.1**, a series of water quality studies conducted in the late 1980s resulted in WQBELs being established for point source dischargers to the Halifax River (the EPA approved the Halifax River Basin TMDL in early 1996). Due to the significant changes in point source loadings to the system in the early 1990s, this analysis considers water quality conditions over the period from 1995 to 2010. **Appendix I** presents the results of simple linear regressions of CHLAC versus key water quality variables. Correlations between CHLAC and, COLOR, NO3O2, TEMPC, INORGN, TN, TP, TSS, TURB, PRECIP, V3DAY, V14DAY, and V21DAY were significant. The regression with TEMPC explained approximately 14% of the variance in CHLAC.

The impairment listing identified TN as the limiting nutrient. **Figure 5.7** illustrates the time series of the TN/TP ratio. Although the R^2 value is very small, the regression was significant at an alpha (α) level of

0.05. A similar plot of the INORGN/INORGP ratio had a slope of 0.00001 with an R^2 value of 0.00032, which was not significant at an alpha (α) level of 0.05. Summary statistics for the ratios can be found in **Table 5.3**. Based on the INORGN/INORGP ratio, it appeared that inorganic forms of nitrogen were typically limiting compared with inorganic phosphorus (75% value was 3.51).

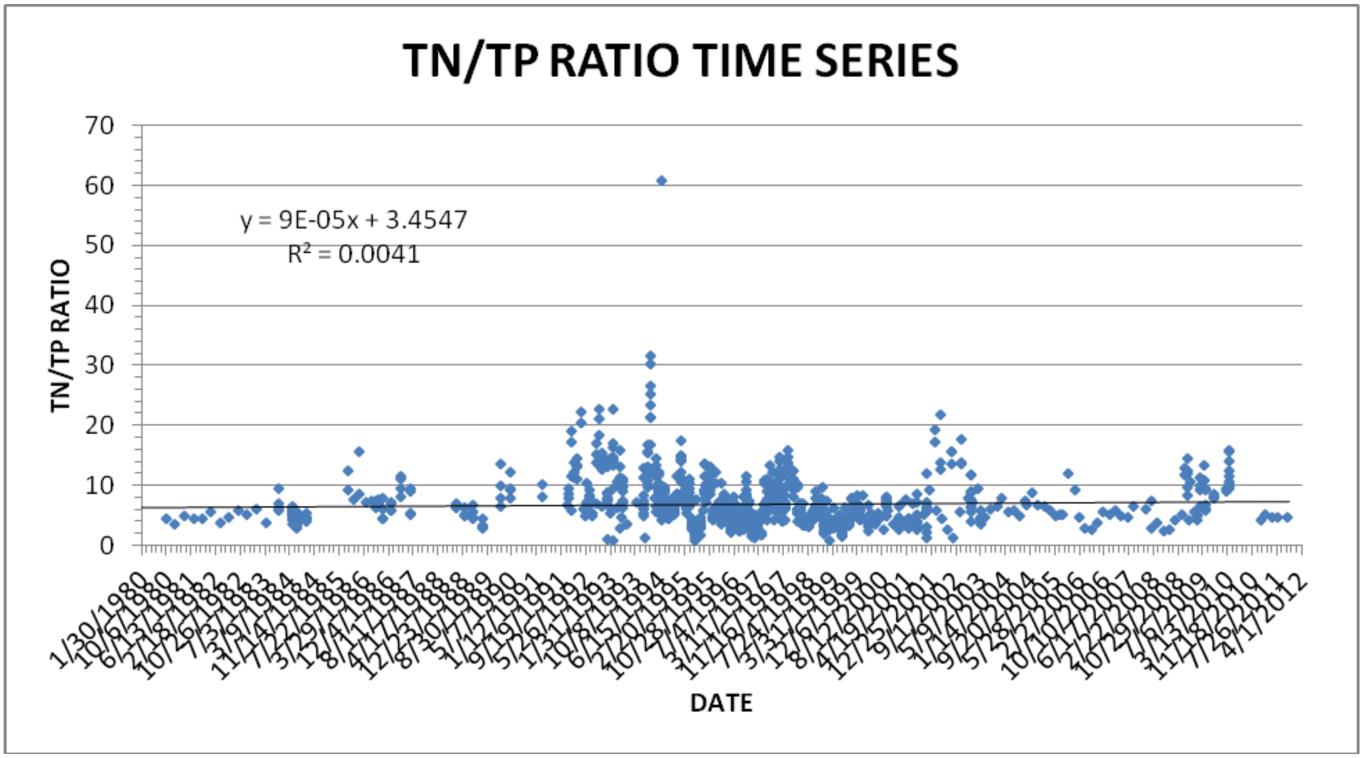

Figure 5.7. Historical Time Series of the TN/TP Ratio for the Halifax River, 1980–2012

As the impairment for nutrients was based on an annual average for CHLAC, annual averages for water quality parameters were also calculated using available data, and linear regressions were performed. The calculations of annual averages followed the methodology described in the IWR for the calculation of annual CHLAC averages.

Based on simple linear regression using annual averages for the 1995 to 2010 period, correlations between CHLAC and INORGN, and CHLAC and TN, were significant at an alpha (α) level of 0.05 (**Appendix J**). Approximately 46% of the variance in the annual average CHLAC was explained with the annual average TN concentration. Individual regressions between COLOR, COND, INORGP, NH4, NO3O2, SALINITY, TEMPC, TP, TSS, TURBIDITY, or annual RAINFALL and CHLAC were not significant at an alpha (α) level of 0.05.

Although the regression between CHLAC and annual rainfall was not significant (r^2=0.074, p=0.307), annual rainfall patterns were examined further to evaluate whether there were cumulative effects due to reduced rainfall. Annual rainfall totals over the period from 1937 to 2011 were ranked (**Appendix K**). With the exception of 2009 (50.3 inches), rainfall totals over the 2008 to 2011 period were below the long-term annual average of 49.63 inches. To evaluate the longer term effects of below-average rainfall years, an annual rainfall deficit was calculated based on the long-term average. The cumulative effect of deficits was calculated by summing over a three-year (current year and two previous years) and a five-year (current year and the four previous years) period. Simple linear regressions of the annual average CHLAC versus the three-year cumulative deficit and the five-year cumulative deficit were significant at an alpha (α) level of 0.05 (**Appendix J**).

Appendix K contains plots of the annual rainfall deficit and cumulative three- and five-year deficits. As seen in the plots, following the high rainfall in 2005 (65.77 inches), the cumulative three- and five-year deficits increased sharply. Correlations between COLOR, TSS, or TURB versus annual rainfall, annual deficit, three-year deficit, and five-year deficit were all significant at an alpha (α) level of 0.05, with the exception of COLOR versus the five-year deficit (p=0.196).

As the nutrient impairment listing was based on exceeding an annual average CHLA concentration of 11 µg/L and a 50% increase of the historical minimum would also be 11 µg/L, an annual average CHLAC concentration of 9 µg/L was used as a target to develop nutrient reductions. Correlations between CHLAC and TN were significant. An annual average TN concentration of 1.13 mg/L would yield a predicted annual average CHLAC concentration of 9 µg/L. Based on the cumulative frequency plot of annual average TN concentrations (**Figure 5.8**), the 91st percentile concentration is 1.13 mg/L. The TMDL requires a 9% reduction in the annual average TN concentration to meet an annual average CHLAC target of 9 µg/L or lower in the Halifax River watershed.

Annual TN and TP loads from the LSPC watershed model simulation (**Table 4.5**) were combined with the annual loads from the three point sources (**Table 4.4**), and the annual summed loads were regressed against the annual average CHLAC concentration. Neither the regression with TN load nor the TP load were significant at an alpha (α) level of 0.05, and so a TMDL-related load associated with a 9% reduction in the annual TN concentration was not calculated from the model.

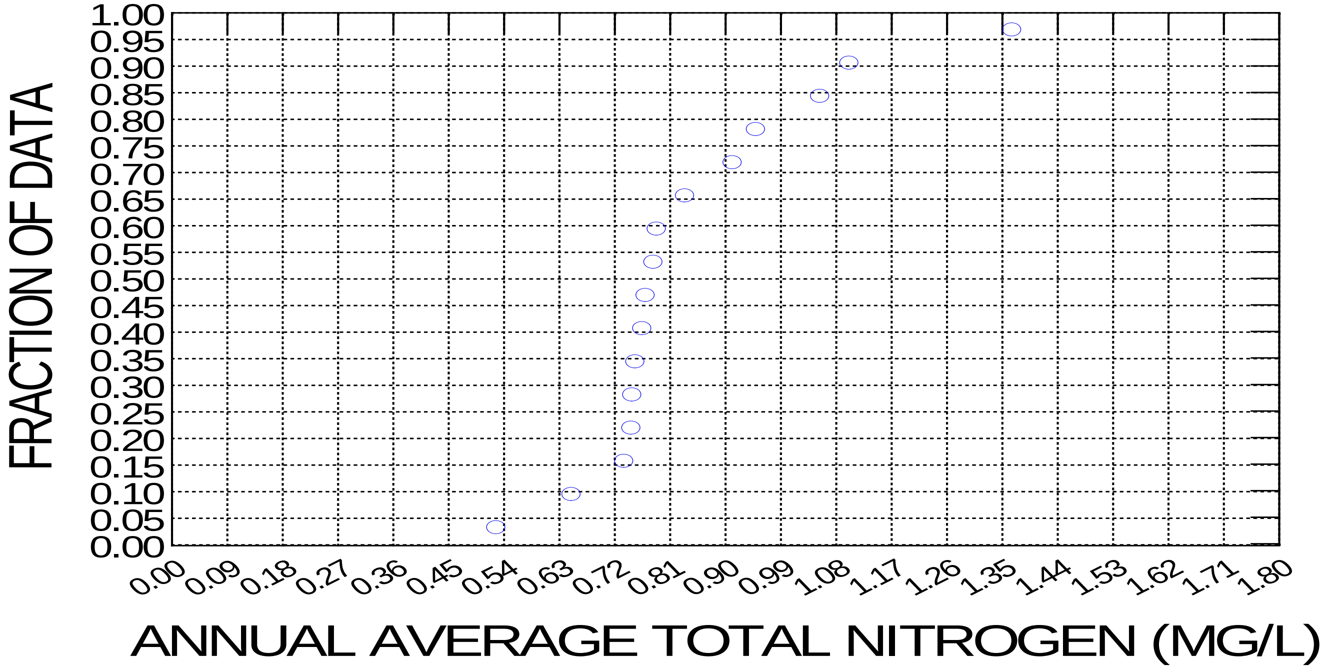

Figure 5.8. Cumulative Frequency Plot of Annual Average TN Concentrations, 1995–2010

5.1.3 Current Conditions for TP

Figure 5.7 illustrates the time series of TN/TP ratios in this portion of the Halifax River. The median ratio is 5.79, and 95% of the values are less than 14. Linear regressions between the annual average CHLAC and TP concentrations over the 1995 to 2010 period were not significant (R^2=0.012, p=0.683). **Figure 5.9** presents a cumulative frequency plot of the annual average TP concentrations over the 1995 to 2010 period. Annual average TP concentrations ranged between 0.110 and 0.185 mg/L, with a median concentration of 0.143 mg/L. Assuming an annual average TP concentration of 0.185 mg/L, together with a TMDL-based annual average TN concentration of 1.13 mg/L, would yield a TN/TP mass ratio of 6.1, which is near the classic Redfield ratio for phytoplankton (Redfield 1934).

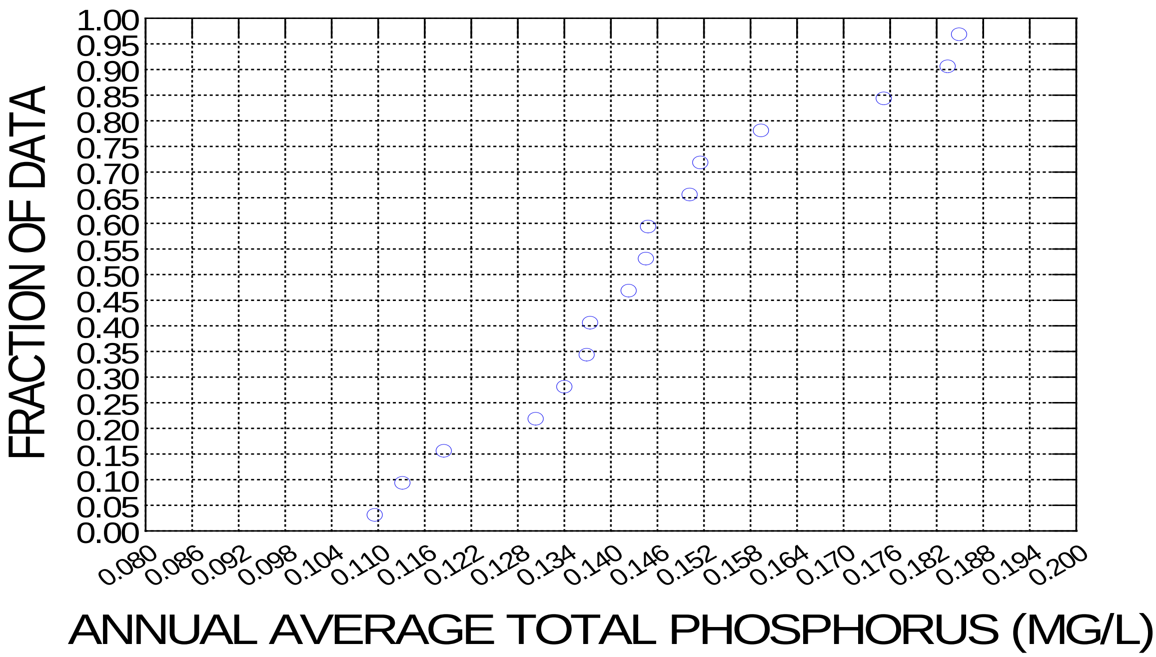

Figure 5.9. Cumulative Frequency Plot of Annual Average TP Concentrations, 1995–2010

5.1.4 Critical Conditions/Seasonality

The results of nonparametric tests (Kruskal-Wallis) presented in **Appendices D** and **E** illustrate significant differences in CHLAC and nutrients on both a seasonal and annual basis. The nutrient impairment was based on annual average CHLAC concentrations exceeding 11 µg/L in 2010. The historical 5-year minimum CHLAC concentration is 7.3 µg/L, and the listing threshold for the historical concentration is 11 µg/L (exceeding a historical minimum by 50% or more over 2 consecutive years). The methodology used for calculating an annual average is based on computing individual seasonal averages. Consequently, seasonality is incorporated into the process of assessment and TMDL development. Reduction in TN was based on setting a CHLAC target below the listing threshold of 11 µg/L.

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:

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

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

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

It should be noted that the various components of the revised TMDL equation may not sum up to the value of the TMDL because (1) 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 (2) 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 best management practices (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**.

The TMDL for the Halifax River is expressed in terms of a percent reduction in TN to meet the nutrient criterion (**Table 6.1**).

Table 6.1. TMDL Components for the Halifax River

[1] Nutrient concentration represents an annual average.
[2] As the TMDL represents a percent reduction, it also complies with EPA requirements to express the TMDL on a daily basis.

WBID	Parameter	TMDL[1] (mg/L)	WLA for Wastewater (lbs/yr)	WLA for NPDES Stormwater (% reduction)[1]	LA (% reduction)[2]	MOS
2363B	TN	1.13	314,376	9%	9%	Implicit

6.2 Load Allocation

Total nitrogen reductions of 9% 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

The combined wasteload allocation from the four permitted facilities in **Table 6.1** was derived from permitted limits. The Ormond Beach WWTF has a permitted annual average discharge of 6.0 MGD, with permitted annual average TN and TP concentrations of 6 and 1 mg/L, respectively. Under these conditions, the annual TN and TP loads are 109,666 and 18,278 lbs, respectively. The Holly Hill WWTF has a permitted annual average discharge of 2.4 MGD, with permitted annual average TN and TP concentrations of 3 and 1 mg/L, respectively. The annual TN and TP loads are 21,933 and 7,311 lbs, respectively. The Daytona Beach/Bethune Point WWTF has a permitted annual average discharge of 20.0 MGD, with permitted annual average TN and TP concentrations of 3 and 1 mg/L, respectively. Annual TN and TP loads under permitted limits are 182,777 and 60,926 lbs, respectively. Any future discharge permits issued in the watershed will also be required to contain appropriate discharge limitations on nitrogen and phosphorus that will comply with the TMDL.

6.3.2 NPDES Stormwater Discharges

Portions of the Halifax River fall within the boundaries of several Phase II MS4 permits. These include the Phase II permits for the city of Holly Hill (FLR04E060), the city of Daytona Beach (FLR04E0115), the city of Ormond Beach (FLR04E036, and Volusia County (FLR04E033. FDOT District 5 is a co-permittee with Volusia County (FLR04E024). MS4 permittees would be responsible for a 9% reduction in TN loads. 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 by setting an annual CHLAC target concentration of 9 µg/L, which is 2 µg/L below the listing threshold for impairment, and applying a 9% reduction to annual average TN concentrations. The 9% reduction is based on the cumulative frequency of annual averages but will also result in annual averages below the target concentration of 1.13 mg/L. The overall average over the 1995 to 2010 period is 0.84 mg/L, and applying a 9% reduction to each year results in a new overall average of 0.76 mg/L.

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 the following:

- *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.*
- *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 Department decision making, and built strong relationships between the Department and local stakeholders that have benefited other program areas.

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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 (ERP) regulations.

Rule 62-40, F.A.C., 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 the 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 FDOT 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 permitting/ERP programs is that the NPDES Program covers both new and existing discharges, while the state's program focuses 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 CHLAC, TEMP, TN, TP, and TSS Observations in Halifax River, 1968–2011

- = Empty cell/no data

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLA 27010027	9/17/1968	-	27.00	1.04	-	3
21FLA 27010028	9/17/1968	-	26.00	1.04	-	-
21FLA 27010026	9/17/1968	-	27.00	1.98	-	15
21FLA 27010029	9/17/1968	-	27.00	0.81	-	10
21FLA 27010032	9/17/1968	-	26.50	1.04	-	26
21FLA 27010034	9/17/1968	-	27.00	0.96	-	31
21FLA 27010039	9/17/1968	-	29.00	1.61	-	20
21FLA 27010036	9/17/1968	-	27.50	1.21	-	20
21FLA 27010035	9/17/1968	-	26.50	1.29	-	18
21FLA 27010037	9/17/1968	-	27.50	1.39	-	22
21FLA 27010038	9/17/1968	-	28.00	1.50	-	24
21FLA 27010033	9/17/1968	-	27.00	1.35	-	38
21FLA 27010031	9/17/1968	-	27.00	-	-	23
21FLA 27010027	10/15/1968	-	24.50	1.28	-	18
21FLA 27010028	10/15/1968	-	24.50	0.83	-	17
21FLA 27010026	10/15/1968	-	24.50	0.86	-	27
21FLA 27010029	10/15/1968	-	24.50	1.07	-	24
21FLA 27010032	10/15/1968	-	24.50	0.86	-	48
21FLA 27010038	10/15/1968	-	25.00	-	-	19
21FLA 27010031	10/15/1968	-	24.50	0.73	-	20
21FLA 27010033	10/15/1968	-	24.50	0.98	-	31
21FLA 27010036	10/15/1968	-	25.00	1.87	-	-
21FLA 27010037	10/15/1968	-	25.00	-	-	21
21FLA 27010035	10/15/1968	-	24.50	1.10	-	23
21FLA 27010034	10/15/1968	-	24.50	0.49	-	26
21FLA 27010039	10/15/1968	-	25.00	2.13	-	16
21FLA 27010027	10/29/1968	-	18.00	0.68	-	8
21FLA 27010028	10/29/1968	-	18.50	0.99	-	19
21FLA 27010026	10/29/1968	-	18.00	1.72	-	14
21FLA 27010029	10/29/1968	-	18.50	1.10	-	21
21FLA 27010032	10/29/1968	-	18.50	1.34	-	41

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLA 27010031	10/29/1968	-	18.50	1.16	-	19
21FLA 27010034	10/29/1968	-	18.50	1.28	-	25
21FLA 27010035	10/29/1968	-	18.50	1.33	-	36
21FLA 27010033	10/29/1968	-	18.50	1.34	-	32
21FLA 27010037	10/29/1968	-	19.00	1.36	-	27
21FLA 27010038	10/29/1968	-	19.00	1.11	-	19
21FLA 27010039	10/29/1968	-	19.50	1.55	-	17
21FLA 27010036	10/29/1968	-	19.00	1.29	-	18
21FLA 27010027	11/12/1968	-	14.00	1.16	-	43
21FLA 27010026	11/12/1968	-	14.00	1.41	-	-
21FLA 27010031	11/12/1968	-	14.00	0.95	-	28
21FLA 27010032	11/12/1968	-	14.00	1.16	-	58
21FLA 27010028	11/12/1968	-	14.50	1.14	-	31
21FLA 27010035	11/12/1968	-	14.50	0.95	-	71
21FLA 27010034	11/12/1968	-	14.50	0.94	-	35
21FLA 27010029	11/12/1968	-	14.00	1.05	-	32
21FLA 27010033	11/12/1968	-	14.50	1.04	-	73
21FLA 27010038	11/12/1968	-	15.00	1.03	-	43
21FLA 27010037	11/12/1968	-	15.00	1.09	-	48
21FLA 27010039	11/12/1968	-	16.50	1.03	-	20
21FLA 27010036	11/12/1968	-	17.00	1.04	-	23
21FLA 27010028	12/3/1968	-	21.50	0.62	-	13
21FLA 27010027	12/3/1968	-	21.00	0.60	-	12
21FLA 27010026	12/3/1968	-	21.00	0.74	-	26
21FLA 27010031	12/3/1968	-	21.50	0.85	-	28
21FLA 27010029	12/3/1968	-	21.50	0.58	-	21
21FLA 27010032	12/3/1968	-	21.00	1.37	-	31
21FLA 27010035	12/3/1968	-	21.50	0.57	-	29
21FLA 27010033	12/3/1968	-	21.50	0.58	-	12
21FLA 27010034	12/3/1968	-	21.50	0.70	-	18
21FLA 27010039	12/3/1968	-	22.00	0.79	-	8
21FLA 27010036	12/3/1968	-	22.00	0.77	-	13
21FLA 27010038	12/3/1968	-	22.50	0.78	-	5
21FLA 27010037	12/3/1968	-	22.00	0.80	-	21

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLA 27010028	5/11/1971	-	27.50	0.68	-	23
21FLA 27010403	5/11/1971	-	27.50	0.82	-	29
21FLA 27010404	5/11/1971	-	26.50	0.84	-	37
21FLA 27010401	5/11/1971	-	26.50	0.83	-	38
21FLA 27010402	5/11/1971	-	27.00	1.02	-	60
21FLA 27010405	5/11/1971	-	27.50	1.13	-	47
21FLA 27010407	5/11/1971	-	27.00	1.38	-	43
21FLA 27010406	5/11/1971	-	27.00	0.94	-	34
21FLA 27010408	5/11/1971	-	27.50	0.99	-	12
21FLA 27010039	5/11/1971	-	28.00	0.96	-	20
21FLA 27010036	5/11/1971	-	27.50	1.00	-	15
21FLA 27010037	5/11/1971	-	27.50	0.95	-	35
21FLA 27010028	5/18/1971	-	27.00	1.01	-	19
21FLA 27010403	5/18/1971	-	27.00	0.76	-	31
21FLA 27010402	5/18/1971	-	27.00	0.87	-	34
21FLA 27010401	5/18/1971	-	26.00	0.93	-	54
21FLA 27010407	5/18/1971	-	26.50	1.02	-	72
21FLA 27010405	5/18/1971	-	26.50	0.89	-	44
21FLA 27010406	5/18/1971	-	27.00	0.79	-	33
21FLA 27010039	5/18/1971	-	27.50	0.92	-	14
21FLA 27010037	5/18/1971	-	27.00	0.97	-	39
21FLA 27010408	5/18/1971	-	27.50	0.93	-	15
21FLA 27010036	5/18/1971	-	27.50	1.05	-	16
21FLA 27010404	5/18/1971	-	26.50	0.88	-	38
21FLA 27010401	7/17/1973	-	30.00	0.72	0.180	17
21FLA 27010028	7/17/1973	-	30.00	1.38	0.180	12
21FLA 27010404	7/17/1973	-	32.00	0.94	0.250	25
21FLA 27010402	7/17/1973	-	32.00	0.48	0.250	26
21FLA 27010403	7/17/1973	-	30.00	0.58	0.270	26
21FLA 27010405	7/17/1973	-	31.70	0.55	0.290	23
21FLA 27010406	7/17/1973	-	31.00	0.70	0.340	21
21FLA 27010407	7/17/1973	-	33.00	0.62	0.470	33
21FLA 27010039	7/17/1973	-	33.00	2.00	0.420	18
21FLA 27010036	7/17/1973	-	32.50	0.84	0.460	19

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLA 27010037	7/17/1973	-	32.00	1.25	0.530	34
21FLA 27010436	10/2/1973	-	27.90	0.87	0.135	23
21FLA 27010037	10/2/1973	-	27.70	1.07	0.435	40
21FLA 27010037	10/9/1973	-	26.70	1.43	0.317	51
21FLA 27010037	11/6/1973	-	23.50	0.44	0.400	14
21FLA 27010037	12/12/1973	-	13.00	0.94	0.250	32
21FLA 27010037	1/16/1974	-	21.00	0.41	0.230	16
21FLA 27010037	2/6/1974	-	18.70	0.64	0.350	28
21FLA 27010037	3/6/1974	-	20.70	0.68	0.370	5
21FLA 27010037	4/3/1974	-	23.50	0.13	0.390	17
21FLA 27010037	5/1/1974	-	23.70	0.58	0.340	12
21FLA 27010037	6/5/1974	-	28.10	1.73	0.410	31
21FLA 27010037	7/10/1974	-	28.00	1.81	0.370	44
21FLA 27010037	8/7/1974	-	27.70	2.19	0.570	37
21FLA 27010037	9/4/1974	-	29.00	1.98	0.610	19
21FLA 27010037	10/2/1974	-	24.60	1.33	0.230	22
21FLA 27010037	11/6/1974	-	24.50	0.96	0.230	30
21FLA 27010037	12/9/1974	-	15.50	0.84	0.200	5
21FLA 27010037	1/14/1975	-	15.00	1.01	0.280	14
21FLA 27010037	2/5/1975	-	21.00	1.18	0.200	7
21FLA 27010037	3/5/1975	-	15.00	1.36	0.170	29
21FLA 27010831	3/18/1975	-	20.90	0.76	0.170	24
21FLA 27010832	3/18/1975	-	22.00	0.79	0.170	12
21FLA 27010403	3/18/1975	-	21.00	0.92	0.200	17
21FLA 27010406	3/18/1975	-	22.00	1.13	0.260	13
21FLA 27010037	3/18/1975	-	22.00	1.39	0.270	15
21FLA 27010037	4/2/1975	-	23.50	1.49	0.280	14
21FLA 27010037	5/13/1975	-	27.50	1.19	0.300	15
21FLA 27010037	6/4/1975	-	27.00	1.37	0.450	19
21FLA 27010037	7/7/1975	-	30.00	1.04	0.300	28
21FLA 27010037	8/6/1975	-	31.00	0.98	0.470	31
21FLA 27010037	9/3/1975	-	30.00	1.48	0.520	21
21FLA 27010037	10/1/1975	-	26.00	2.11	0.300	30
21FLA 27010037	11/4/1975	-	24.20	1.44	0.130	47

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLA 27010037	12/2/1975	-	21.00	1.83	0.210	8
21FLA 27010037	1/6/1976	-	15.20	0.79	0.070	11
21FLA 27010037	2/4/1976	-	15.00	0.60	0.160	7
21FLA 27010037	3/3/1976	-	25.00	1.01	0.200	23
21FLA 27010037	4/13/1976	-	24.00	0.66	0.150	26
21FLA 27010037	6/1/1976	-	26.00	1.24	-	30
21FLA 27010037	7/6/1976	-	28.00	1.35	0.270	19
21FLA 27010037	8/4/1976	-	29.00	2.12	0.310	28
21FLA 27010037	9/8/1976	-	30.00	-	0.430	33
21FLA 27010037	10/5/1976	-	28.00	1.03	0.260	12
21FLA 27010037	11/3/1976	-	18.00	1.26	0.170	14
21FLA 27010037	12/7/1976	-	16.50	0.76	0.120	11
21FLA 27010037	1/5/1977	-	13.50	1.31	0.150	10
21FLA 27010037	2/2/1977	-	10.50	0.58	0.130	22
21FLA 27010037	3/2/1977	-	17.50	0.82	0.140	13
21FLA 27010037	4/6/1977	-	21.00	1.45	0.200	14
21FLA 27010037	5/4/1977	-	25.70	1.37	0.270	16
21FLA 27010037	6/8/1977	-	28.00	1.16	0.290	17
21FLA 27010037	7/6/1977	-	30.50	0.93	0.340	31
21FLA 27010037	8/2/1977	-	29.00	1.39	0.240	16
21FLA 27010037	9/6/1977	-	29.00	1.52	0.230	31
21FLA 27010037	10/4/1977	-	25.00	1.51	0.270	35
21FLA 27010037	11/1/1977	-	21.00	1.48	0.230	20
21FLA 27010037	12/6/1977	-	21.20	1.43	0.290	18
21FLA 27010037	1/3/1978	-	13.20	0.97	0.110	13
21FLA 27010037	2/6/1978	-	10.90	0.86	0.070	53
21FLA 27010037	3/6/1978	-	14.20	1.74	0.060	23
21FLA 27010037	4/3/1978	-	22.50	1.61	0.220	37
21FLA 27010037	5/1/1978	-	22.50	1.16	0.230	24
21FLA 27010037	6/5/1978	-	27.00	0.75	0.250	17
21FLA 27010037	7/10/1978	-	28.50	1.10	0.330	37
21FLA 27010037	7/31/1978	-	27.80	1.14	0.400	14
21FLA 27010037	9/5/1978	-	27.80	1.34	0.370	14
21FLA 27010037	10/9/1978	-	23.00	1.18	0.190	24

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLA 27010037	11/7/1978	-	21.00	0.65	0.120	11
21FLA 27010037	12/6/1978	-	21.50	0.76	0.090	7
21FLA 27010037	2/5/1979	-	12.00	1.08	0.160	56
21FLA 27010037	3/5/1979	-	-	1.25	0.220	20
21FLA 27010037	4/2/1979	-	22.20	1.26	0.280	18
21FLA 27010037	4/30/1979	-	24.20	1.01	0.300	33
21FLA 27010037	6/4/1979	-	-	1.07	0.360	25
21FLA 27010037	7/2/1979	-	-	0.92	0.210	16
21FLA 27010037	8/6/1979	-	31.00	1.44	0.350	15
21FLA 27010037	9/10/1979	-	30.00	1.88	0.265	32
21FLA 27010037	10/8/1979	-	24.00	1.31	0.200	13
21FLA 27010037	11/5/1979	-	22.00	1.03	0.210	16
21FLA 27010037	12/3/1979	-	14.00	0.87	0.180	23
21FLA 27010037	1/7/1980	-	-	0.66	0.180	4
21FLA 27010037	10/6/1980	-	26.00	0.87	0.200	14
21FLA 27010037	1/5/1981	-	13.00	0.55	0.160	8
21FLA 27010037	4/7/1981	-	21.00	1.10	0.230	27
21FLA 27010945	4/11/1981	-	21.00	-	-	-
21FLA 27010037	7/21/1981	-	31.00	1.54	0.350	30
21FLA 27010037	10/5/1981	-	26.60	1.21	0.270	37
21FLA 27010037	1/4/1982	-	20.00	0.93	0.170	12
21FLA 27010037	4/6/1982	-	24.00	1.19	0.320	27
21FLA 27010037	7/6/1982	-	26.00	1.80	0.380	23
21FLA 27010037	10/5/1982	6.0	28.00	1.47	0.250	14
21FLA 27010037	1/4/1983	3.4	18.00	0.78	0.150	10
21FLA 27010037	4/5/1983	2.6	17.50	1.19	0.200	16
21FLA 27010037	7/19/1983	15.8	32.00	0.97	0.260	10
21FLA 27010940	11/16/1983	4.8	19.00	0.94	0.100	9
21FLA 27010943	11/16/1983	5.3	18.00	0.98	0.140	8
21FLA 27010950	11/16/1983	1.3	19.00	1.11	0.180	6
21FLA 27010037	11/16/1983	2.1	19.00	1.29	0.220	9
21FLA 27010943	4/10/1984	17.1	21.00	0.77	0.140	-
21FLA 27010403	4/10/1984	37.9	21.00	0.83	0.155	-
21FLA 27010942	4/10/1984	-	21.00	0.78	0.125	-

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLA 27010406	4/10/1984	6.1	21.00	0.79	0.145	-
21FLA 27010944	4/10/1984	-	21.00	0.74	0.135	-
21FLA 27010945	4/10/1984	-	21.00	0.76	0.145	-
21FLA 27010946	4/10/1984	6.0	21.00	0.83	0.185	-
21FLA 27010037	4/10/1984	-	21.10	0.82	0.190	-
21FLA 27010941	4/10/1984	-	21.00	0.88	0.140	-
21FLA 27010940	4/10/1984	25.1	21.00	0.83	0.140	-
21FLA 27010945	4/11/1984	-	21.00	0.67	0.120	-
21FLA 27010406	4/11/1984	4.2	20.00	0.69	0.110	-
21FLA 27010942	4/11/1984	-	20.00	0.82	0.110	-
21FLA 27010944	4/11/1984	-	20.00	0.72	0.120	-
21FLA 27010946	4/11/1984	4.1	21.00	0.78	0.135	-
21FLA 27010037	4/11/1984	-	21.00	0.79	0.220	-
21FLA 27010403	4/11/1984	5.1	20.50	0.82	0.120	-
21FLA 27010940	4/11/1984	8.6	20.00	0.82	0.140	-
21FLA 27010943	4/11/1984	4.0	20.25	0.73	0.120	-
21FLA 27010941	4/11/1984	-	20.00	0.92	0.130	-
21FLA 27010037	5/21/1984	-	27.00	0.84	0.240	-
21FLA 27010945	5/21/1984	-	26.20	0.92	0.220	-
21FLA 27010946	5/21/1984	15.0	26.50	0.95	0.240	-
21FLA 27010940	5/21/1984	16.3	27.00	1.02	0.190	-
21FLA 27010403	5/21/1984	11.0	27.00	-	0.160	-
21FLA 27010406	5/21/1984	15.4	27.00	-	0.190	-
21FLA 27010942	5/21/1984	-	27.00	-	0.220	-
21FLA 27010943	5/21/1984	11.4	27.00	-	0.150	-
21FLA 27010944	5/21/1984	-	26.50	-	0.170	-
21FLA 27010941	5/21/1984	-	27.00	-	0.170	-
21FLA 27010940	5/22/1984	9.1	27.00	0.82	0.150	-
21FLA 27010037	5/22/1984		27.00	0.84	0.290	-
21FLA 27010403	5/22/1984	10.0	27.00	0.97	0.180	-
21FLA 27010942	5/22/1984	-	26.75	0.82	0.170	-
21FLA 27010945	5/22/1984	-	27.00	0.87	0.230	-
21FLA 27010406	5/22/1984	19.7	27.00	0.82	0.210	-
21FLA 27010943	5/22/1984	12.5	26.75	0.82	0.185	-

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLA 27010944	5/22/1984	-	26.75	0.92	0.215	-
21FLA 27010941	5/22/1984	-	26.75	0.92	0.180	-
21FLA 27010946	5/22/1984	21.8	27.00	0.98	0.280	-
21FLA 27010403	5/23/1984	5.0	27.00	0.72	0.170	-
21FLA 27010406	5/23/1984	10.3	27.00	0.72	0.220	-
21FLA 27010940	5/23/1984	8.6	27.00	0.82	0.160	-
21FLA 27010942	5/23/1984	-	27.00	0.72	0.170	-
21FLA 27010941	5/23/1984	-	27.00	0.72	0.170	-
21FLA 27010945	5/23/1984	-	27.00	0.93	0.270	-
21FLA 27010946	5/23/1984	18.3	27.00	0.84	0.260	-
21FLA 27010943	5/23/1984	8.6	27.00	0.82	0.190	-
21FLA 27010944	5/23/1984	-	27.00	0.92	0.190	-
21FLA 27010037	5/23/1984	-	27.00	0.93	0.260	-
21FLA 27010940	8/22/1984	10.3	27.00	0.97	0.180	16
21FLA 27010943	8/22/1984	13.9	27.00	1.13	0.240	18
21FLA 27010950	8/22/1984	11.1	27.00	1.26	0.310	18
21FLA 27010037	8/22/1984	9.6	27.00	1.39	0.310	15
21FLA 27010567	10/22/1985	4.9	28.60	1.12	0.090	-
21FLA 27010567	10/23/1985	3.7	26.80	1.02	0.110	-
21FLA 27010567	12/16/1985	7.3	13.40	0.84	0.110	9
21FLA 27010567	2/11/1986	12.4	20.80	0.76	0.090	17
21FLA 27010567	2/12/1986	13.7	17.30	0.93	0.060	15
21FLA 27010567	4/28/1986	2.0	24.60	0.57	0.080	6
21FLA 27010567	6/23/1986	4.3	27.90	1.25	0.170	8
21FLA 27010567	7/28/1986	20.0	28.40	1.10	0.150	29
21FLA 27010567	7/29/1986	10.2	27.90	1.00	0.160	21
21FLA 27010567	8/25/1986	3.9	31.40	1.13	0.150	13
21FLA 27010567	8/26/1986	3.4	30.40	0.86	0.130	11
21FLA 27010037	10/7/1986	-	28.30	1.31	0.290	17
21FLA 27010950	10/7/1986	-	28.20	1.31	0.290	16
21FLA 27010943	10/7/1986	-	28.10	1.42	0.240	17
21FLA 27010940	10/7/1986	-	28.30	1.55	0.200	25
21FLA 27010940	1/6/1987	3.4	12.10	0.76	0.110	63
21FLA 27010943	1/6/1987	2.6	12.20	0.86	0.120	38

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLA 27010037	1/6/1987	2.6	12.50	0.91	0.160	48
21FLA 27010950	1/6/1987	2.6	12.60	1.00	0.170	100
21FLA 27010037	4/13/1987	23.1	21.10	2.04	0.250	33
21FLA 27010940	4/13/1987	80.2	22.00	2.19	0.190	48
21FLA 27010950	4/13/1987	31.0	21.30	2.25	0.240	49
21FLA 27010943	4/13/1987	49.9	21.50	2.54	0.230	53
21FLA 27010950	7/21/1987	11.1	29.80	1.47	0.270	18
21FLA 27010940	7/21/1987	12.8	29.50	1.52	0.160	16
21FLA 27010037	7/21/1987	10.7	29.50	1.57	0.310	30
21FLA 27010943	7/21/1987	20.7	29.60	2.06	0.230	26
21FLA 27010940	10/17/1988	4.4	22.00	0.95	0.140	-
21FLA 27010950	10/17/1988	9.7	22.00	1.05	0.170	-
21FLA 27010037	10/17/1988	4.2	22.00	1.06	0.170	-
21FLA 27010943	10/17/1988	5.7	22.00	1.17	0.170	-
21FLA 27010940	1/10/1989	9.1	19.80	0.76	0.120	30
21FLA 27010943	1/10/1989	9.2	19.90	0.87	0.140	39
21FLA 27010950	1/10/1989	4.9	20.00	0.99	0.190	21
21FLA 27010037	1/10/1989	3.2	20.20	1.06	0.220	21
21FLA 27010940	4/10/1989	3.5	22.20	0.95	0.140	8
21FLA 27010943	4/10/1989	3.3	22.50	1.13	0.200	26
21FLA 27010950	4/10/1989	2.3	22.60	1.16	0.250	13
21FLA 27010037	4/10/1989	2.5	22.60	1.34	0.310	33
21FLA 27010940	7/11/1989	12.9	29.00	1.06	0.240	70
21FLA 27010943	7/11/1989	14.8	30.20	1.06	0.320	78
21FLA 27010950	7/11/1989	16.5	29.80	1.15	0.370	71
21FLA 27010037	7/11/1989	15.9	30.20	1.19	0.430	36
21FLA 27010940	1/9/1990	8.5	17.90	0.81	0.060	6
21FLA 27010950	1/9/1990	13.0	18.20	0.94	0.120	12
21FLA 27010943	1/9/1990	10.8	18.10	0.98	0.100	11
21FLA 27010037	1/9/1990	14.6	18.20	1.03	0.160	9
21FLA 27010950	4/17/1990	24.4	24.40	1.25	0.160	32
21FLA 27010943	4/17/1990	17.6	24.20	1.29	0.140	31
21FLA 27010940	4/17/1990	5.2	24.40	1.33	0.110	12
21FLA 27010037	4/17/1990	33.0	24.30	1.78	0.190	29

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLA 27010037	9/24/1990	23.1	26.90	-	-	-
21FLA 27010037	11/6/1990	16.7	23.10	-	-	-
21FLSJWMHR40OB	3/14/1991	19.1	18.50	1.38	0.136	54
21FLSJWMHR92DB	3/14/1991	11.0	17.90	1.48	0.185	-
21FLA 27010037	11/19/1991	11.1	21.42	0.94	0.140	-
21FLVEMDHL12	12/3/1991	3.6	22.80	1.38	0.160	9
21FLVEMDHL09	12/3/1991	9.6	23.39	1.41	0.150	19
21FLVEMDHL11	12/3/1991	10.3	22.70	1.56	0.200	22
21FLVEMDHL05	12/3/1991	9.0	23.34	-	0.120	24
21FLVEMDHL06	12/3/1991	9.2	23.32	-	0.110	28
21FLVEMDHL07	12/3/1991	10.6	23.24	-	0.130	26
21FLA 27010037	1/6/1992	6.6	15.80	0.69	0.120	6
21FLVEMDHL12	1/7/1992	3.1	15.32	1.27	0.110	4
21FLVEMDHL11	1/7/1992	2.4	15.08	1.34	0.070	6
21FLVEMDHL09	1/7/1992	3.1	15.83	1.37	0.080	1
21FLVEMDHL05	1/7/1992	2.8	14.98	-	0.050	8
21FLVEMDHL06	1/7/1992	3.2	15.44	-	0.090	35
21FLVEMDHL07	1/7/1992	2.7	15.49	-	0.060	7
21FLVEMDHL09	2/4/1992	1.4	15.38	1.12	0.100	6
21FLVEMDHL11	2/4/1992	1.0	15.07	1.23	0.100	28
21FLVEMDHL12	2/4/1992	1.8	15.28	1.92	0.140	28
21FLVEMDHL05	2/4/1992	1.0	14.84	-	0.060	13
21FLVEMDHL06	2/4/1992	1.0	15.07	-	0.060	14
21FLVEMDHL07	2/4/1992	1.0	15.00	-	0.060	32
21FLA 27010567	2/25/1992	3.6	19.70	0.51	0.038	48
21FLVEMDHL09	3/3/1992	1.0	20.84	2.02	0.140	31
21FLVEMDHL11	3/3/1992	1.1	19.74	2.09	0.160	30
21FLVEMDHL12	3/3/1992	1.0	19.58	2.10	0.190	28
21FLVEMDHL05	3/3/1992	1.0	20.13	-	0.080	24
21FLVEMDHL06	3/3/1992	1.0	19.61	-	0.080	46
21FLVEMDHL07	3/3/1992	1.0	20.22	-	0.100	15
21FLA 27010037	3/17/1992	14.7	-	-	-	-
21FLVEMDHL11	4/7/1992	5.8	19.13	2.22	0.100	41
21FLVEMDHL12	4/7/1992	7.0	19.13	2.25	0.110	16

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL05	4/7/1992	3.9	19.05	-	0.070	28
21FLVEMDHL06	4/7/1992	5.2	19.05	-	0.110	18
21FLVEMDHL07	4/7/1992	6.3	19.20	-	0.070	28
21FLVEMDHL09	4/7/1992	4.7	19.40	-	0.080	10
21FLVEMDHL11	5/5/1992	7.6	24.10	1.33	0.220	56
21FLVEMDHL09	5/5/1992	9.5	24.59	1.45	0.240	50
21FLVEMDHL12	5/5/1992	10.1	23.90	-	0.240	41
21FLVEMDHL05	5/5/1992	3.9	24.78	-	0.150	66
21FLVEMDHL06	5/5/1992	5.3	24.62	-	0.170	48
21FLVEMDHL07	5/5/1992	5.2	24.70	-	0.170	69
21FLA 27010037	5/18/1992	32.0	27.00	0.79	0.160	20
21FLVEMDHL06	6/2/1992	6.9	28.40	1.03	0.100	36
21FLVEMDHL09	6/2/1992	13.1	28.90	1.20	0.170	38
21FLVEMDHL12	6/2/1992	29.5	28.88	1.53	0.220	72
21FLVEMDHL11	6/2/1992	21.0	28.44	-	-	30
21FLVEMDHL05	6/2/1992	7.2	28.50	-	0.110	32
21FLVEMDHL07	6/2/1992	6.6	28.40	-	0.130	33
21FLVEMDHL11	7/7/1992	15.0	29.87	1.36	0.190	32
21FLVEMDHL12	7/7/1992	18.0	29.89	1.36	0.200	40
21FLVEMDHL07	7/7/1992	20.1	30.50	1.37	0.170	32
21FLVEMDHL09	7/7/1992	13.8	31.00	1.51	0.180	33
21FLVEMDHL06	7/7/1992	19.5	30.00	1.58	0.170	42
21FLVEMDHL05	7/7/1992	19.8	29.70	-	0.170	38
21FLA 27010037	7/20/1992	6.4	30.30	1.25	0.170	17.4
21FLVEMDHL11	8/4/1992	19.6	29.01	1.81	0.340	37
21FLVEMDHL12	8/4/1992	25.2	29.12	2.00	0.410	28
21FLVEMDHL05	8/4/1992	18.6	28.64	-	0.370	38
21FLVEMDHL06	8/4/1992	18.8	29.36	-	0.260	24
21FLVEMDHL07	8/4/1992	26.0	29.62	-	0.250	20
21FLVEMDHL09	8/4/1992	25.8	30.08	-	0.330	26
21FLA 27010037	9/8/1992	36.1	29.80	1.41	0.200	18
21FLVEMDHL06	9/8/1992	20.1	29.90	3.57	0.210	17
21FLVEMDHL11	9/8/1992	-	29.57	3.92	0.260	10
21FLVEMDHL09	9/8/1992	34.9	29.65	4.03	0.290	48

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL12	9/8/1992	24.4	29.97	-	0.270	23
21FLVEMDHL05	9/8/1992	25.6	29.90	-	0.170	27
21FLVEMDHL07	9/8/1992	25.9	29.90	-	0.210	18
21FLVEMDHL07	10/6/1992	3.6	22.90	1.81	0.080	23
21FLVEMDHL06	10/6/1992	2.7	23.00	1.88	0.140	17
21FLVEMDHL09	10/6/1992	4.9	23.00	1.90	0.090	39
21FLVEMDHL05	10/6/1992	3.4	22.80	1.91	-	20
21FLVEMDHL11	10/6/1992	4.9	23.30	2.02	0.110	36
21FLVEMDHL12	10/6/1992	3.0	23.15	2.06	0.150	46
21FLVEMDHL05	11/3/1992	-	24.87	1.29	0.090	15
21FLVEMDHL06	11/3/1992	9.1	24.68	1.49	0.100	15
21FLVEMDHL07	11/3/1992	10.9	26.00	1.53	0.120	49
21FLVEMDHL09	11/3/1992	8.2	25.55	1.53	0.100	12
21FLVEMDHL12	11/3/1992	2.7	25.12	1.68	0.120	5
21FLVEMDHL11	11/3/1992	2.9	24.74	-	0.160	17
21FLA 27010037	11/9/1992	4.0	20.20	1.30	0.200	13
21FLVEMDHL11	12/8/1992	-	17.45	-	-	-
21FLVEMDHL12	12/8/1992	-	17.45	-	-	-
21FLVEMDHL05	12/8/1992	-	17.48	-	-	-
21FLVEMDHL06	12/8/1992	-	17.27	-	-	-
21FLVEMDHL07	12/8/1992	-	17.39	-	-	-
21FLVEMDHL09	12/8/1992	-	17.73	-	-	-
21FLVEMDHL04	1/5/1993	2.6	19.82	0.47	0.060	14.5
21FLVEMDHL06	1/5/1993	2.5	19.79	0.61	0.070	14
21FLVEMDHL05	1/5/1993	2.8	19.93	0.63	0.080	9.5
21FLVEMDHL09	1/5/1993	3.4	20.52	0.77	0.100	8
21FLVEMDHL12	1/5/1993	3.6	20.03	1.04	0.140	4
21FLVEMDHL07	1/5/1993	2.7	20.28	1.04	0.080	10.5
21FLVEMDHL08	1/5/1993	3.7	20.41	1.04	0.120	10
21FLVEMDHL11	1/5/1993	5.0	19.77	1.11	0.130	6
21FLVEMDHL10	1/5/1993	3.7	20.32	1.86	1.710	15
21FLA 27010037	1/25/1993	3.5	19.30	0.79	0.150	13
21FLVEMDHL11	2/2/1993	3.7	14.79	0.49	0.078	11
21FLVEMDHL12	2/2/1993	4.4	14.86	0.55	0.038	7

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLA 27010037	3/1/1993	1.0	14.50	0.78	0.082	11
21FLVEMDHL06	3/2/1993	2.8	15.64	0.91	0.040	6.5
21FLVEMDHL09	3/2/1993	2.9	16.55	1.00	0.070	6
21FLVEMDHL07	3/2/1993	2.0	15.52	1.03	0.070	15.5
21FLVEMDHL08	3/2/1993	2.4	15.74	1.10	0.080	15
21FLVEMDHL12	3/2/1993	1.5	15.03	1.15	0.070	13.5
21FLVEMDHL05	3/2/1993	1.8	15.36	1.20	0.070	10.5
21FLVEMDHL04	3/2/1993	1.2	15.20	1.20	0.090	11
21FLVEMDHL11	3/2/1993	2.2	15.18	1.28	1.480	18
21FLVEMDHL10	3/2/1993	2.9	15.87	1.29	0.090	6
21FLVEMDHL11	4/4/1993	-	20.84	0.80	0.126	17
21FLVEMDHL12	4/6/1993	-	20.69	0.94	0.088	9
21FLVEMDHL07	5/4/1993	10.0	23.80	1.31	0.100	15
21FLVEMDHL11	5/4/1993	18.3	23.02	1.35	0.120	4.5
21FLVEMDHL06	5/4/1993	7.0	23.53	1.35	0.470	19.5
21FLVEMDHL05	5/4/1993	7.0	23.43	1.42	0.090	25.5
21FLVEMDHL09	5/4/1993	10.0	24.46	1.50	0.150	34.5
21FLVEMDHL12	5/4/1993	3.2	23.06	1.74	0.170	5.5
21FLA 27010037	5/24/1993	21.4	25.20	1.03	0.220	29
21FLVEMDHL06	6/8/1993	8.6	30.21	1.48	0.150	40
21FLVEMDHL12	6/8/1993	8.1	30.39	1.54	0.210	10
21FLVEMDHL11	6/8/1993	14.5	29.79	1.56	0.250	50
21FLVEMDHL08	6/8/1993	12.3	30.55	1.60	0.180	48
21FLVEMDHL07	6/8/1993	9.7	30.52	1.65	0.160	16.5
21FLVEMDHL05	6/8/1993	6.8	30.30	1.64	0.170	34
21FLVEMDHL09	6/8/1993	14.1	30.68	1.66	0.230	32
21FLVEMDHL04	6/8/1993	8.6	29.77	1.80	0.170	22
21FLVEMDHL10	6/8/1993	15.7	30.41	1.98	0.280	28
21FLSJWMHR92B	6/16/1993	3.2	28.50	0.62	-	158
21FLSJWMHR29	6/16/1993	2.9	28.90	0.51	-	140.5
21FLA 27010037	7/19/1993	25.8	31.30	0.82	0.230	12.4
21FLSJWMHR29	8/31/1993	20.0	28.50	-	-	77
21FLSJWMHR92B	8/31/1993	25.4	28.50	-	-	69
21FLA 27010037	10/25/1993	19.5	26.20	0.86	0.120	22.9

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL10	1/4/1994	5.3	14.29	0.75	0.120	40
21FLVEMDHL05	1/4/1994	6.4	14.70	0.56	0.080	49
21FLVEMDHL07	1/4/1994	4.6	15.09	0.75	0.090	34
21FLVEMDHL08	1/4/1994	6.3	14.96	0.89	0.150	54
21FLVEMDHL04	1/4/1994	3.2	14.74	0.90	0.070	44
21FLVEMDHL06	1/4/1994	6.1	14.53	0.90	0.080	38
21FLVEMDHL12	1/4/1994	3.3	14.88	0.95	0.190	26
21FLVEMDHL11	1/4/1994	3.2	15.15	0.96	0.130	28
21FLVEMDHL09	1/4/1994	5.4	15.31	1.09	0.200	43
21FLA 27010037	1/18/1994	6.1	15.10	0.44	0.390	13.9
21FLVEMDHL08	2/8/1994	6.9	18.60	0.96	0.100	38
21FLVEMDHL05	2/8/1994	7.5	18.50	1.04	0.080	40
21FLVEMDHL07	2/8/1994	7.0	18.14	1.10	0.070	33
21FLVEMDHL10	2/8/1994	6.6	18.60	1.12	0.110	50
21FLVEMDHL06	2/8/1994	6.6	18.47	1.13	0.090	37
21FLVEMDHL09	2/8/1994	5.7	19.33	1.31	0.085	41.5
21FLVEMDHL12	2/8/1994	3.1	17.64	1.28	0.110	45
21FLVEMDHL04	2/8/1994	4.4	18.19	1.34	0.080	29
21FLVEMDHL11	2/8/1994	8.7	17.73	1.51	0.140	55
21FLVEMDHL12	3/8/1994	3.6	-	1.28	0.060	3.7
21FLVEMDHL07	3/8/1994	9.4	21.60	1.33	0.050	24
21FLVEMDHL08	3/8/1994	12.3	21.24	1.52	0.060	44.5
21FLVEMDHL11	3/8/1994	7.9	-	1.50	0.070	12
21FLVEMDHL05	3/8/1994	9.6	21.20	1.58	0.050	39
21FLVEMDHL09	3/8/1994	14.7	21.58	1.68	0.100	17
21FLVEMDHL06	3/8/1994	10.1	21.70	1.82	0.060	21
21FLVEMDHL04	3/8/1994	16.1	20.65	1.91	0.160	95
21FLVEMDHL10	3/8/1994	13.5	21.25	2.10	0.090	16
21FLA 27010037	4/18/1994	3.3	24.50	1.02	0.130	-
21FLVEMDHL12	5/3/1994	5.2	-	1.29	0.230	19
21FLVEMDHL11	5/3/1994	5.1	-	1.42	0.220	22.5
21FLVEMDHL08	5/3/1994	16.3	27.74	1.57	0.130	43
21FLVEMDHL07	5/3/1994	12.3	27.98	1.59	0.120	42.5
21FLVEMDHL10	5/3/1994	12.4	27.96	1.67	0.140	49

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL06	5/3/1994	13.6	27.55	1.71	0.140	46.5
21FLVEMDHL09	5/3/1994	23.5	28.13	1.73	0.180	35.5
21FLVEMDHL05	5/3/1994	15.9	27.10	2.02	0.140	57.5
21FLVEMDHL04	5/3/1994	11.3	26.91	2.31	0.200	87.5
21FLVEMDHL05	6/7/1994	14.5	28.00	1.27	0.140	52
21FLVEMDHL07	6/7/1994	13.4	28.00	1.59	0.170	49
21FLVEMDHL12	6/7/1994	8.0	28.37	1.62	0.220	40.5
21FLVEMDHL08	6/7/1994	18.9	28.00	1.66	0.190	45
21FLVEMDHL04	6/7/1994	7.2	28.00	1.82	0.150	48
21FLVEMDHL06	6/7/1994	12.6	28.00	1.88	0.160	59
21FLVEMDHL09	6/7/1994	10.4	28.00	1.99	0.190	59
21FLVEMDHL11	6/7/1994	5.8	28.35	2.08	0.230	30
21FLVEMDHL10	6/7/1994	8.0	28.00	2.13	0.250	44.5
21FLVEMDHL08	7/5/1994	15.8	29.00	0.94	0.140	32
21FLA 27010037	7/5/1994	20.6	28.80	0.99	0.200	26
21FLVEMDHL07	7/5/1994	17.4	29.00	1.03	0.017	40.5
21FLVEMDHL06	7/5/1994	12.3	28.00	1.12	0.170	26.5
21FLVEMDHL12	7/5/1994	5.7	28.68	1.14	0.200	21
21FLVEMDHL05	7/5/1994	17.7	28.00	1.18	0.150	47.5
21FLVEMDHL09	7/5/1994	22.5	29.00	1.18	0.190	47
21FLVEMDHL04	7/5/1994	10.1	28.00	1.18	0.170	52.5
21FLVEMDHL11	7/5/1994	13.1	28.29	1.23	0.300	35
21FLVEMDHL10	7/5/1994	17.4	29.00	1.26	0.230	49
21FLVEMDHL05	8/2/1994	12.2	30.00	1.40	0.150	38.7
21FLVEMDHL07	8/2/1994	15.3	31.00	1.43	0.150	46
21FLVEMDHL06	8/2/1994	15.4	30.00	1.49	0.210	58
21FLVEMDHL12	8/2/1994	12.1	-	1.49	0.160	15.6
21FLVEMDHL04	8/2/1994	12.9	30.00	1.51	0.170	53.1
21FLVEMDHL11	8/2/1994	20.5	-	1.52	0.160	31.5
21FLVEMDHL08	8/2/1994	21.0	31.00	1.58	0.180	41.5
21FLVEMDHL10	8/2/1994	35.9	31.00	1.69	0.210	70.5
21FLVEMDHL09	8/2/1994	34.2	31.00	1.91	0.200	48.5
21FLVEMDHL04	9/6/1994	12.0	27.00	1.06	0.145	18.75
21FLVEMDHL07	9/6/1994	20.5	27.00	0.98	0.210	34

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL08	9/6/1994	21.5	28.00	0.99	0.220	30.5
21FLVEMDHL05	9/6/1994	22.6	27.00	1.03	0.160	15.5
21FLVEMDHL09	9/6/1994	21.6	28.00	1.12	0.200	26
21FLVEMDHL10	9/6/1994	24.9	29.00	1.23	0.200	30.5
21FLVEMDHL06	9/6/1994	35.7	27.00	1.44	0.320	35.5
21FLVEMDHL11	9/7/1994	10.1	28.04	0.93	0.190	20
21FLVEMDHL12	9/7/1994	14.2	27.86	1.14	0.190	15.5
21FLA 27010037	10/3/1994	10.1	26.30	1.47	0.230	-
21FLVEMDHL05	10/4/1994	15.4	26.81	1.15	0.205	27.5
21FLVEMDHL06	10/4/1994	11.9	26.90	1.35	0.240	58.5
21FLVEMDHL08	10/4/1994	12.1	26.93	1.39	0.200	55
21FLVEMDHL04	10/4/1994	9.7	26.61	1.41	0.200	45
21FLVEMDHL11	10/4/1994	9.7	26.79	1.42	0.290	39.4
21FLVEMDHL10	10/4/1994	14.3	26.87	1.53	0.200	36
21FLVEMDHL12	10/4/1994	7.2	26.67	1.53	0.270	37.2
21FLVEMDHL09	10/4/1994	12.6	26.92	1.58	0.210	47.6
21FLVEMDHL07	10/4/1994	9.4	26.87	1.65	0.250	47.3
21FLVEMDHL05	11/2/1994	4.0	23.17	0.88	0.170	37
21FLVEMDHL04	11/2/1994	2.6	22.43	0.98	0.180	53
21FLVEMDHL11	11/2/1994	3.2	23.28	0.98	0.180	44
21FLVEMDHL08	11/2/1994	6.2	23.45	0.99	0.170	23
21FLVEMDHL06	11/2/1994	3.9	23.47	1.02	0.195	27
21FLVEMDHL07	11/2/1994	6.0	23.65	1.04	0.150	21
21FLVEMDHL09	11/2/1994	5.4	23.80	1.04	0.170	35
21FLVEMDHL12	11/2/1994	3.1	22.74	1.04	0.190	23.5
21FLVEMDHL10	11/2/1994	5.4	23.60	1.08	0.180	29.5
21FLVEMDHL04	12/6/1994	2.7	22.50	0.86	0.120	13
21FLVEMDHL06	12/6/1994	2.5	22.90	1.26	0.150	18
21FLVEMDHL12	12/6/1994	3.0	22.52	1.34	0.190	9.3
21FLVEMDHL08	12/6/1994	2.6	23.00	1.40	0.165	22
21FLVEMDHL07	12/6/1994	8.0	23.10	1.35	0.160	14.5
21FLVEMDHL09	12/6/1994	2.6	23.20	1.37	0.180	21
21FLVEMDHL05	12/6/1994	2.3	23.10	1.37	0.120	7.7
21FLVEMDHL11	12/6/1994	2.1	22.54	1.43	0.170	23.4

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL10	12/6/1994	2.0	23.40	1.46	0.180	18.5
21FLVEMDHL10	1/10/1995	5.7	15.20	0.68	0.060	11.2
21FLVEMDHL06	1/10/1995	7.1	14.90	0.70	0.050	15.2
21FLVEMDHL08	1/10/1995	7.4	15.50	0.72	0.050	14.9
21FLVEMDHL09	1/10/1995	19.4	15.70	0.75	0.050	12.9
21FLVEMDHL07	1/10/1995	6.7	15.40	0.82	0.055	8
21FLVEMDHL11	1/10/1995	3.5	14.87	0.84	0.080	13.1
21FLVEMDHL04	1/10/1995	3.6	14.40	0.86	0.070	12.8
21FLVEMDHL12	1/10/1995	2.1	14.66	0.86	0.060	8.6
21FLVEMDHL05	1/10/1995	4.0	14.60	0.88	0.050	9.1
21FLA 27010037	1/17/1995	5.3	16.39	0.80	0.094	-
21FLVEMDHL09	2/7/1995	3.7	-	0.61	0.080	8.45
21FLVEMDHL06	2/7/1995	2.9	-	0.71	0.090	8.4
21FLVEMDHL11	2/7/1995	7.8	12.07	0.75	0.100	7.3
21FLVEMDHL07	2/7/1995	2.9	-	0.77	0.090	9.1
21FLVEMDHL05	2/7/1995	2.3	-	0.80	0.100	7.3
21FLVEMDHL04	2/7/1995	-	-	0.81	0.080	8.9
21FLVEMDHL10	2/7/1995	5.8	-	0.87	0.100	12
21FLVEMDHL08	2/7/1995	2.7	-	0.90	0.100	9.1
21FLVEMDHL12	2/7/1995	10.9	12.61	0.91	0.120	4.4
21FLVEMDHL08	3/7/1995	2.0	21.14	0.46	0.070	11.5
21FLVEMDHL09	3/7/1995	3.0	21.13	0.48	0.080	10.8
21FLVEMDHL04	3/7/1995	1.7	20.11	0.51	0.070	14.1
21FLVEMDHL07	3/7/1995	2.3	21.14	0.52	0.080	9.8
21FLVEMDHL10	3/7/1995	4.2	21.51	0.59	0.095	9.15
21FLVEMDHL05	3/7/1995	1.6	20.95	0.56	0.070	20.4
21FLVEMDHL11	3/7/1995	2.7	20.60	0.58	0.110	9
21FLVEMDHL06	3/7/1995	2.9	20.74	0.66	0.090	12.3
21FLVEMDHL12	3/7/1995	4.1	20.37	0.76	0.120	4.3
21FLA 27010037	4/3/1995	3.3	19.86	0.68	0.096	-
21FLVEMDHL08	4/4/1995	2.3	21.60	0.58	0.090	14
21FLVEMDHL10	4/4/1995	2.7	21.90	0.61	0.090	14.8
21FLVEMDHL05	4/4/1995	1.6	21.40	0.62	0.060	10.4
21FLVEMDHL09	4/4/1995	3.6	21.70	0.66	0.080	22.3

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL07	4/4/1995	2.6	21.60	0.66	0.070	12.2
21FLVEMDHL04	4/4/1995	1.8	20.80	0.71	0.080	21.3
21FLVEMDHL06	4/4/1995	2.7	21.40	0.72	0.100	14.3
21FLVEMDHL12	4/4/1995	5.4	21.42	0.77	0.110	11.5
21FLVEMDHL11	4/4/1995	2.8	21.09	0.99	0.090	23
21FLVEMDHL04	5/2/1995	6.4	26.79	0.60	0.190	31.4
21FLVEMDHL06	5/2/1995	7.3	26.49	0.64	0.150	41
21FLVEMDHL10	5/2/1995	12.9	27.19	0.64	0.240	48.5
21FLVEMDHL05	5/2/1995	6.1	26.52	0.67	0.150	22
21FLVEMDHL12	5/2/1995	-	26.71	0.69	0.170	29.1
21FLVEMDHL07	5/2/1995	7.7	26.90	0.70	0.200	40
21FLVEMDHL09	5/2/1995	15.7	26.75	0.72	0.230	61
21FLVEMDHL08	5/2/1995	9.8	27.07	0.73	0.210	37.5
21FLVEMDHL11	5/2/1995	14.5	26.47	0.75	0.270	52
21FLVEMDHL05	6/6/1995	-	26.90	0.36	0.430	36.5
21FLVEMDHL12	6/6/1995	6.8	27.46	0.43	0.350	9.75
21FLVEMDHL09	6/6/1995	7.8	28.10	0.60	0.350	73.3
21FLVEMDHL07	6/6/1995	8.2	27.40	0.74	0.320	78.6
21FLVEMDHL11	6/6/1995	2.9	26.98	0.84	0.290	44.7
21FLVEMDHL04	6/6/1995	8.4	26.70	0.86	0.310	55.7
21FLVEMDHL06	6/6/1995	7.2	27.00	0.88	0.450	56.2
21FLVEMDHL08	6/6/1995	9.1	27.60	1.00	0.310	79.2
21FLVEMDHL10	6/6/1995	7.3	27.80	1.12	0.340	63.3
21FLSJWM27010037	6/21/1995	1.0	28.10	1.12	0.145	62
21FLVEMDHL11	7/11/1995	17.7	29.45	0.34	0.280	33.2
21FLVEMDHL08	7/11/1995	7.6	30.40	0.38	0.240	34
21FLVEMDHL12	7/11/1995	-	29.35	0.53	0.280	22.8
21FLVEMDHL07	7/11/1995	3.5	30.40	0.59	0.280	30
21FLVEMDHL10	7/11/1995	9.3	29.90	0.67	0.320	62.7
21FLVEMDHL09	7/11/1995	8.6	30.20	0.67	0.280	51
21FLVEMDHL05	7/11/1995	11.6	29.60	0.71	0.240	25.3
21FLVEMDHL06	7/11/1995	8.2	29.70	0.73	0.320	36
21FLVEMDHL04	7/11/1995	12.0	30.00	0.93	0.240	39.35
21FLVEMDHL07	8/8/1995	13.1	30.79	1.04	0.330	43

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL12	8/8/1995	12.6	29.95	1.10	0.390	23
21FLVEMDHL05	8/8/1995	10.3	30.13	1.17	0.275	51.5
21FLVEMDHL10	8/8/1995	18.8	30.84	1.17	0.390	62
21FLVEMDHL06	8/8/1995	8.7	30.41	1.17	0.310	66
21FLVEMDHL09	8/8/1995	16.3	31.23	1.20	0.700	69
21FLVEMDHL11	8/8/1995	14.6	30.29	1.20	0.370	55
21FLVEMDHL08	8/8/1995	15.7	30.73	1.24	0.370	71
21FLVEMDHL04	8/8/1995	11.4	30.40	1.24	0.260	51
21FLSJWM27010037	8/23/1995	1.0	30.00	1.14	0.198	34
21FLVEMDHL06	9/6/1995	3.2	25.97	1.48	0.130	17.3
21FLVEMDHL05	9/6/1995	6.9	26.40	1.48	0.110	9.64
21FLVEMDHL07	9/6/1995	5.6	26.95	1.48	0.160	32
21FLVEMDHL12	9/6/1995	5.3	-	1.49	0.160	19.3
21FLVEMDHL04	9/6/1995	3.8	26.00	1.49	0.110	13.5
21FLVEMDHL08	9/6/1995	1.9	26.94	1.55	0.180	36
21FLVEMDHL09	9/6/1995	3.2	27.27	1.56	0.170	33.3
21FLVEMDHL10	9/6/1995	2.9	27.38	1.63	0.180	30.7
21FLVEMDHL11	9/6/1995	2.9	-	1.67	0.190	18
21FLVEMDHL04	10/3/1995	6.2	27.46	1.22	0.120	15.5
21FLVEMDHL06	10/3/1995	3.9	27.84	1.31	0.140	18.5
21FLVEMDHL07	10/3/1995	3.6	27.93	1.46	0.120	23.75
21FLVEMDHL05	10/3/1995	3.9	27.33	1.47	0.110	18.5
21FLVEMDHL10	10/3/1995	1.9	28.11	1.52	0.190	35.2
21FLVEMDHL09	10/3/1995	3.4	28.19	1.58	0.220	20.5
21FLVEMDHL08	10/3/1995	2.5	27.88	1.67	0.210	26.5
21FLVEMDHL11	10/3/1995	3.2	28.40	1.71	0.170	27
21FLVEMDHL12	10/3/1995	-	28.20	1.79	0.180	6.25
21FLSJWM27010037	10/23/1995	5.3	23.20	1.98	0.153	23
21FLVEMDHL11	11/7/1995	4.4	23.15	1.29	0.150	20
21FLVEMDHL07	11/7/1995	8.7	23.50	1.38	0.130	18.7
21FLVEMDHL12	11/7/1995	2.0	23.06	1.40	0.130	13.6
21FLVEMDHL09	11/7/1995	5.9	24.10	1.41	0.130	22.7
21FLVEMDHL08	11/7/1995	4.5	23.90	1.45	0.145	22.65
21FLVEMDHL04	11/7/1995	6.6	22.60	1.44	0.110	17.5

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL10	11/7/1995	4.7	24.00	1.46	0.160	22
21FLVEMDHL05	11/7/1995	5.9	23.10	1.49	0.140	13
21FLVEMDHL06	11/7/1995	4.8	23.20	1.53	0.130	16.5
21FLVEMDHL04	12/5/1995	6.3	19.90	0.52	0.120	17.3
21FLVEMDHL05	12/5/1995	5.8	20.60	0.57	0.130	16
21FLVEMDHL07	12/5/1995	6.5	21.10	0.65	0.140	14.3
21FLVEMDHL06	12/5/1995	5.5	20.40	0.67	0.160	13.7
21FLVEMDHL08	12/5/1995	5.2	21.20	0.67	0.150	9.5
21FLVEMDHL09	12/5/1995	5.7	20.70	0.73	0.150	20.2
21FLVEMDHL10	12/5/1995	7.5	20.60	0.73	0.160	26
21FLVEMDHL12	12/5/1995	7.1	19.83	0.79	0.150	21.2
21FLVEMDHL11	12/5/1995	4.1	20.08	0.80	0.130	10.9
21FLVEMDHL11	1/9/1996	8.6	9.84	0.72	0.070	4.8
21FLVEMDHL12	1/9/1996	9.5	9.78	0.74	0.060	6
21FLVEMDHL11	2/6/1996	38.5	10.33	0.64	0.090	10.8
21FLVEMDHL12	2/6/1996	3.4	11.79	0.66	0.110	5.2
21FLVEMDHL08	2/13/1996	3.1	14.30	0.57	0.100	12.6
21FLVEMDHL06	2/13/1996	4.0	13.30	0.57	0.100	9.2
21FLVEMDHL05	2/13/1996	3.6	13.20	0.59	0.110	12.4
21FLVEMDHL10	2/13/1996	4.0	-	0.64	0.110	10.25
21FLVEMDHL09	2/13/1996	2.8	14.60	0.60	0.110	10.4
21FLVEMDHL07	2/13/1996	3.0	14.20	0.71	0.110	13.6
21FLVEMDHL04	2/13/1996	5.2	13.50	0.73	0.110	18.4
21FLSJWM27010037	2/26/1996	2.8	21.90	0.88	0.084	10
21FLVEMDHL05	3/5/1996	1.8	18.30	0.48	0.100	12.4
21FLVEMDHL04	3/5/1996	5.7	18.00	0.54	0.110	11.6
21FLVEMDHL06	3/5/1996	1.7	18.30	0.55	0.120	13.2
21FLVEMDHL08	3/5/1996	1.1	18.50	0.61	0.120	11.2
21FLVEMDHL07	3/5/1996	1.4	18.30	0.62	0.130	11.6
21FLVEMDHL09	3/5/1996	1.4	18.40	0.63	0.120	17.2
21FLVEMDHL10	3/5/1996	1.8	18.80	0.70	0.120	7.6
21FLVEMDHL11	3/6/1996	1.0	19.07	0.59	0.150	9.2
21FLVEMDHL12	3/6/1996	1.3	19.09	0.72	0.200	11.6
21FLVEMDHL11	4/2/1996	2.1	20.42	0.94	0.130	21

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL12	4/2/1996	2.9	20.13	0.96	0.160	16
21FLVEMDHL10	4/2/1996	5.1	20.60	1.05	0.170	43
21FLVEMDHL08	4/2/1996	1.0	20.50	1.06	0.150	44
21FLVEMDHL09	4/2/1996	5.2	20.30	1.13	0.190	57
21FLVEMDHL04	4/2/1996	5.0	19.50	1.16	0.150	50
21FLVEMDHL07	4/2/1996	3.6	20.30	1.16	0.140	42
21FLVEMDHL05	4/2/1996	4.3	19.60	1.18	0.140	40
21FLVEMDHL06	4/2/1996	3.1	19.90	1.21	0.150	52
21FLSJWM27010037	4/24/1996	1.0	24.20	1.34	0.222	43
21FLVEMDHL12	5/7/1996	8.0	27.61	0.64	0.130	7
21FLVEMDHL09	5/7/1996	8.4	28.00	0.69	0.140	25
21FLVEMDHL10	5/7/1996	7.9	28.40	0.69	0.140	14
21FLVEMDHL08	5/7/1996	7.2	27.80	0.74	0.160	32
21FLVEMDHL11	5/7/1996	5.1	27.25	0.76	0.160	28
21FLVEMDHL06	5/7/1996	8.1	27.50	0.84	0.130	19
21FLVEMDHL05	5/7/1996	9.0	27.70	0.85	0.130	22
21FLVEMDHL07	5/7/1996	9.0	27.90	0.86	0.170	28
21FLVEMDHL04	5/7/1996	12.6	27.20	0.90	0.130	29
21FLSJWM27010037	6/4/1996	10.2	27.30	0.92	0.169	16
21FLVEMDHL12	6/4/1996	5.8	26.86	0.56	0.170	7.2
21FLVEMDHL06	6/4/1996	3.9	26.60	0.56	0.180	10
21FLVEMDHL07	6/4/1996	-	27.10	0.58	0.230	14
21FLVEMDHL08	6/4/1996	2.8	27.00	0.59	0.270	20
21FLVEMDHL04	6/4/1996	5.2	26.55	0.65	0.270	33.5
21FLVEMDHL10	6/4/1996	6.9	27.20	0.63	0.250	21
21FLVEMDHL09	6/4/1996	4.2	27.00	0.66	0.280	34
21FLVEMDHL05	6/4/1996	3.6	26.20	0.67	0.150	14
21FLVEMDHL11	6/4/1996	5.2	26.39	0.71	0.210	39
21FLVEMDHL12	7/9/1996	4.9	28.33	0.73	0.170	10
21FLVEMDHL07	7/9/1996	4.7	28.20	0.75	0.150	28
21FLVEMDHL09	7/9/1996	12.3	28.20	0.80	0.150	16
21FLVEMDHL08	7/9/1996	8.8	28.30	0.84	0.180	45
21FLVEMDHL11	7/9/1996	5.5	27.86	0.85	0.190	24
21FLVEMDHL04	7/9/1996	6.0	28.20	0.89	0.110	12

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL10	7/9/1996	13.5	28.20	0.89	0.190	52
21FLVEMDHL05	7/9/1996	4.9	28.40	0.91	0.125	31.5
21FLVEMDHL06	7/9/1996	4.9	28.20	0.97	0.160	53
21FLVEMDHL06	8/6/1996	6.4	30.55	0.70	0.140	7.15
21FLVEMDHL11	8/6/1996	8.6	-	0.73	0.190	20
21FLVEMDHL12	8/6/1996	13.4	-	0.74	0.220	11
21FLVEMDHL05	8/6/1996	6.9	30.60	0.74	0.130	11
21FLVEMDHL04	8/6/1996	5.0	30.30	0.77	0.120	17
21FLVEMDHL10	8/6/1996	5.2	31.40	0.79	0.260	20
21FLVEMDHL07	8/6/1996	8.9	31.40	0.80	0.150	11
21FLVEMDHL09	8/6/1996	9.1	31.70	0.82	0.170	18
21FLVEMDHL08	8/6/1996	2.6	31.20	0.87	0.160	16
21FLSJWM27010037	8/12/1996	14.7	29.90	1.11	0.215	23
21FLVEMDHL12	9/4/1996	27.8	28.97	0.51	0.220	16
21FLVEMDHL06	9/4/1996	10.6	29.41	0.51	0.160	24
21FLVEMDHL04	9/4/1996	8.6	29.33	0.51	0.190	28
21FLVEMDHL10	9/4/1996	9.8	30.10	0.53	0.220	29
21FLVEMDHL07	9/4/1996	6.5	29.72	0.55	0.160	31
21FLVEMDHL09	9/4/1996	14.4	30.27	0.56	0.190	34
21FLVEMDHL08	9/4/1996	13.3	29.86	0.62	0.170	36
21FLVEMDHL05	9/4/1996	8.6	29.29	0.67	0.230	44
21FLVEMDHL11	9/4/1996	6.1	28.91	0.70	0.150	29
21FLA 27010404	9/9/1996	9.2	29.88	0.62	0.110	-
21FLA 27010402	9/9/1996	7.4	29.78	0.62	0.110	-
21FLA 27010468	9/9/1996	11.9	28.47	0.63	0.099	-
21FLA 27010407	9/9/1996	17.6	29.86	0.65	0.140	-
21FLA 27010405	9/9/1996	15.8	30.60	0.65	0.150	-
21FLA 27010832	9/9/1996	9.3	30.48	0.67	0.120	-
21FLVEMDHL11	10/8/1996	4.5	24.29	0.68	0.190	13
21FLVEMDHL12	10/8/1996	2.6	24.22	0.70	0.280	9.3
21FLSJWM27010037	10/14/1996	3.1	-	1.04	0.127	29
21FLVEMDHL05	11/5/1996	6.3	21.10	0.96	0.090	23
21FLVEMDHL04	11/5/1996	4.1	21.40	1.03	0.090	19
21FLVEMDHL10	11/5/1996	5.1	22.40	1.05	0.150	22

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL08	11/5/1996	5.6	22.10	1.08	0.165	30.5
21FLVEMDHL07	11/5/1996	1.4	21.80	1.09	0.140	27
21FLVEMDHL06	11/5/1996	7.2	21.50	1.10	0.120	24
21FLVEMDHL11	11/5/1996	4.9	21.72	1.11	0.130	24
21FLVEMDHL09	11/5/1996	7.2	22.40	1.12	0.140	25
21FLVEMDHL12	11/5/1996	2.9	22.36	1.14	0.140	11
21FLVEMDHL07	12/3/1996	8.8	18.80	0.43	0.090	10
21FLVEMDHL06	12/3/1996	6.6	18.20	0.47	0.100	10
21FLVEMDHL08	12/3/1996	6.8	18.60	0.48	0.120	12
21FLVEMDHL11	12/3/1996	8.7	18.49	0.52	0.090	10
21FLVEMDHL09	12/3/1996	9.3	19.20	0.54	0.120	15.5
21FLVEMDHL10	12/3/1996	11.1	18.80	0.55	0.080	12
21FLVEMDHL04	12/3/1996	8.4	17.80	0.56	0.120	14
21FLVEMDHL12	12/3/1996	4.9	19.02	0.58	0.120	5.2
21FLVEMDHL05	12/3/1996	9.1	17.70	0.59	0.120	15
21FLSJWM27010037	12/9/1996	6.9	16.10	0.59	0.080	20
21FLVEMDHL07	1/7/1997	1.0	22.10	0.32	0.160	14
21FLVEMDHL06	1/7/1997	1.7	21.60	0.34	0.130	14
21FLVEMDHL08	1/7/1997	2.2	22.10	0.37	0.240	14
21FLVEMDHL10	1/7/1997	7.2	21.85	0.42	0.160	24.5
21FLVEMDHL05	1/7/1997	2.7	21.60	0.42	0.140	27
21FLVEMDHL04	1/7/1997	2.3	21.10	0.42	0.150	22
21FLVEMDHL09	1/7/1997	6.8	22.10	0.46	0.160	30
21FLVEMDHL12	1/7/1997	6.3	21.37	0.53	0.150	9
21FLVEMDHL11	1/7/1997	4.3	21.33	0.56	0.170	35
21FLSJWM27010037	2/4/1997	1.2	17.70	0.39	0.075	27
21FLVEMDHL10	2/4/1997	3.0	18.40	0.31	0.250	7.8
21FLVEMDHL05	2/4/1997	1.2	17.70	0.34	0.140	6
21FLVEMDHL07	2/4/1997	1.4	18.20	0.34	0.120	11
21FLVEMDHL08	2/4/1997	1.2	18.50	0.36	0.130	9.2
21FLVEMDHL04	2/4/1997	1.9	17.50	0.36	0.190	11
21FLVEMDHL06	2/4/1997	2.0	17.80	0.36	0.130	8.5
21FLVEMDHL09	2/4/1997	2.0	18.70	0.37	0.170	6
21FLVEMDHL11	2/4/1997	2.7	17.57	0.52	0.160	10.4

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL12	2/4/1997	3.4	18.27	0.55	0.150	11.7
21FLVEMDHL06	3/4/1997	7.4	24.10	0.44	0.230	33
21FLVEMDHL04	3/4/1997	6.2	23.80	0.47	0.230	39
21FLVEMDHL07	3/4/1997	7.2	24.20	0.49	0.270	33.3
21FLVEMDHL05	3/4/1997	4.1	24.00	0.55	0.250	56.5
21FLVEMDHL08	3/4/1997	7.9	24.50	0.58	0.210	38
21FLVEMDHL10	3/4/1997	8.5	24.50	0.61	0.200	29
21FLVEMDHL09	3/4/1997	10.6	24.90	0.62	0.230	34
21FLVEMDHL11	3/4/1997	11.0	23.78	0.68	0.210	42
21FLVEMDHL12	3/4/1997	6.7	24.00	0.72	0.180	14
21FLSJWM27010037	4/7/1997	10.4	23.60	0.29	0.139	64
21FLVEMDHL05	4/8/1997	7.4	22.70	0.55	0.125	18
21FLVEMDHL04	4/8/1997	10.4	23.40	0.56	0.320	57.5
21FLVEMDHL12	4/8/1997	9.5	22.24	0.79	0.170	32
21FLVEMDHL09	4/8/1997	10.5	23.40	0.80	0.160	43
21FLVEMDHL10	4/8/1997	15.8	23.50	0.82	0.150	36
21FLVEMDHL11	4/8/1997	20.6	23.15	0.84	0.170	48
21FLVEMDHL08	4/8/1997	17.6	23.50	0.95	0.200	54
21FLVEMDHL07	4/8/1997	15.5	23.40	1.16	0.270	42
21FLVEMDHL06	4/8/1997	8.4	23.10	-	0.190	37
21FLVEMDHL09	5/6/1997	7.1	25.10	0.54	0.080	33
21FLVEMDHL12	5/6/1997	8.8	26.20	0.56	0.100	18
21FLVEMDHL08	5/6/1997	5.5	25.30	0.58	0.100	20
21FLVEMDHL10	5/6/1997	5.5	25.10	0.61	0.100	29
21FLVEMDHL07	5/6/1997	8.0	25.00	0.69	0.100	20
21FLVEMDHL11	5/6/1997	6.5	26.10	0.70	0.120	44
21FLVEMDHL05	5/6/1997	4.8	24.00	0.76	0.070	37
21FLVEMDHL04	5/6/1997	5.9	24.00	0.83	0.080	50
21FLVEMDHL06	5/6/1997	6.5	21.30	0.81	0.170	76
21FLSJWM27010037	6/2/1997	8.1	26.90	0.53	0.126	35
21FLVEMDHL06	6/3/1997	11.7	26.70	0.67	0.090	15
21FLVEMDHL11	6/3/1997	9.3	26.60	0.72	0.110	22
21FLVEMDHL05	6/3/1997	5.5	26.30	0.85	0.095	31
21FLVEMDHL04	6/3/1997	1.4	25.60	0.77	0.070	24

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL12	6/3/1997	4.0	26.49	0.80	0.120	14
21FLVEMDHL07	6/3/1997	15.4	26.80	0.81	0.110	14
21FLVEMDHL08	6/3/1997	16.7	27.10	0.87	0.160	24
21FLVEMDHL09	6/3/1997	7.5	27.50	0.90	0.120	24
21FLVEMDHL10	6/3/1997	15.5	27.10	0.91	0.120	24
21FLVEMDHL07	7/8/1997	17.9	30.90	1.04	0.140	26
21FLVEMDHL06	7/8/1997	15.0	29.45	1.09	0.135	39
21FLVEMDHL10	7/8/1997	19.4	30.50	1.08	0.170	30
21FLVEMDHL09	7/8/1997	20.7	30.50	1.09	0.170	37
21FLVEMDHL08	7/8/1997	19.0	30.50	1.13	0.180	44
21FLVEMDHL05	7/8/1997	9.2	29.20	1.31	0.140	50
21FLVEMDHL04	7/8/1997	6.0	29.50	1.72	0.130	32
21FLVEMDHL11	7/8/1997	18.7	29.67	-	0.190	49
21FLVEMDHL12	7/8/1997	13.0	29.75	-	0.140	12
21FLVEMDHL12	8/5/1997	13.8	29.25	1.00	0.140	16
21FLVEMDHL07	8/5/1997	15.2	29.25	1.04	0.140	20
21FLVEMDHL04	8/5/1997	11.2	29.00	1.10	0.090	14
21FLVEMDHL10	8/5/1997	18.7	29.40	1.11	0.150	23
21FLVEMDHL09	8/5/1997	16.7	29.30	1.13	0.150	27
21FLVEMDHL06	8/5/1997	11.9	29.00	1.13	0.110	22
21FLVEMDHL11	8/5/1997	14.1	29.07	1.14	0.140	20
21FLVEMDHL05	8/5/1997	11.1	29.00	1.24	0.130	15
21FLVEMDHL08	8/5/1997	13.2	29.40	1.29	0.170	42
21FLSJWM27010037	8/13/1997	29.7	30.80	0.63	0.151	25
21FLSJWM27010037	9/9/1997	9.5	28.20	1.08	0.119	24
21FLVEMDHL07	9/9/1997	1.8	28.10	0.69	0.120	12
21FLVEMDHL04	9/9/1997	1.1	26.90	0.73	0.110	14
21FLVEMDHL09	9/9/1997	1.2	28.60	0.73	0.120	12
21FLVEMDHL08	9/9/1997	1.7	28.05	0.75	0.130	11.5
21FLVEMDHL05	9/9/1997	1.0	26.80	0.74	0.100	16
21FLVEMDHL10	9/9/1997	1.0	28.30	0.78	0.140	14
21FLVEMDHL11	9/9/1997	1.0	27.34	0.79	0.130	15
21FLVEMDHL06	9/9/1997	1.1	27.20	0.82	0.130	30
21FLVEMDHL12	9/9/1997	1.0	27.73	1.02	0.160	2.5

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLSJWM27010037	10/6/1997	4.9	26.10	1.00	0.117	9.5
21FLVEMDHL07	10/7/1997	1.0	26.50	0.78	0.070	12
21FLVEMDHL05	10/7/1997	2.7	25.60	0.85	0.060	16
21FLVEMDHL11	10/7/1997	1.0	25.85	0.87	0.070	13
21FLVEMDHL04	10/7/1997	1.0	25.70	0.89	0.060	18
21FLVEMDHL08	10/7/1997	-	26.30	0.89	0.070	9
21FLVEMDHL06	10/7/1997	1.3	25.80	0.91	0.080	16
21FLVEMDHL12	10/7/1997	1.0	25.96	0.93	0.110	12
21FLVEMDHL09	10/7/1997	1.5	26.30	0.99	0.085	17.5
21FLVEMDHL10	10/7/1997	1.0	26.50	0.98	0.100	9
21FLVEMDHL04	11/4/1997	3.2	20.50	0.75	0.110	22
21FLVEMDHL07	11/4/1997	7.9	21.50	0.76	0.140	22
21FLVEMDHL09	11/4/1997	6.7	21.80	0.78	0.120	18
21FLVEMDHL05	11/4/1997	4.7	20.90	0.82	0.100	18
21FLVEMDHL06	11/4/1997	6.2	21.20	0.83	0.110	18
21FLVEMDHL10	11/4/1997	5.6	22.00	0.84	0.190	26
21FLVEMDHL08	11/4/1997	9.0	21.70	0.85	0.220	38
21FLVEMDHL11	11/4/1997	5.8	21.39	0.86	0.150	20
21FLVEMDHL12	11/4/1997	3.4	21.09	0.86	0.150	14
21FLSJWM27010037	12/1/1997	3.6	19.60	1.09	0.111	31
21FLVEMDHL05	12/2/1997	2.8	18.50	0.75	0.090	12
21FLVEMDHL06	12/2/1997	3.1	18.80	0.76	0.110	21
21FLVEMDHL04	12/2/1997	2.4	17.90	0.78	0.080	8
21FLVEMDHL07	12/2/1997	3.0	19.00	0.85	0.140	24
21FLVEMDHL12	12/2/1997	3.1	18.78	0.85	0.130	18
21FLVEMDHL09	12/2/1997	5.9	19.40	0.87	0.130	14
21FLVEMDHL08	12/2/1997	5.7	19.00	0.89	0.140	28
21FLVEMDHL10	12/2/1997	5.1	19.50	0.90	0.210	15
21FLVEMDHL11	12/2/1997	1.3	19.02	0.93	0.130	18
21FLVEMDHL06	1/6/1998	1.0	18.80	0.83	0.060	10
21FLVEMDHL04	1/6/1998	1.0	18.60	0.88	0.060	6.7
21FLVEMDHL10	1/6/1998	1.0	18.80	0.90	0.080	9
21FLVEMDHL05	1/6/1998	1.0	18.90	0.90	0.070	9
21FLVEMDHL11	1/6/1998	1.0	17.81	0.92	0.080	11

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL09	1/6/1998	1.0	18.90	0.93	0.080	8.3
21FLVEMDHL07	1/6/1998	1.0	19.00	0.94	0.070	13
21FLVEMDHL12	1/6/1998	1.0	18.29	0.94	0.080	5.4
21FLVEMDHL08	1/6/1998	1.0	18.90	1.11	0.070	11
21FLSJWM27010037	1/12/1998	1.0	17.60	1.18	0.117	13
21FLSJWM27010037	3/3/1998	1.5	17.70	1.03	0.094	1.3
21FLVEMDHL04	3/3/1998	3.8	17.00	0.77	0.070	12
21FLVEMDHL07	3/3/1998	5.9	17.80	0.83	0.090	20
21FLVEMDHL05	3/3/1998	2.5	17.00	0.87	0.070	13.5
21FLVEMDHL12	3/3/1998	1.1	16.76	0.86	0.085	7
21FLVEMDHL06	3/3/1998	5.2	17.40	0.86	0.090	13
21FLVEMDHL11	3/3/1998	4.6	17.54	0.88	0.110	22
21FLVEMDHL05	4/7/1998	6.7	22.80	0.71	0.070	14
21FLVEMDHL06	4/7/1998	6.5	22.60	0.72	0.120	14
21FLVEMDHL12	4/7/1998	4.5	21.70	0.72	0.180	11
21FLVEMDHL10	4/7/1998	4.1	-	0.74	0.120	15
21FLVEMDHL07	4/7/1998	7.8	23.10	0.74	0.130	18
21FLVEMDHL08	4/7/1998	9.0	23.10	0.76	0.140	20
21FLVEMDHL04	4/7/1998	4.5	22.50	0.77	0.080	13
21FLVEMDHL11	4/7/1998	3.2	21.60	0.79	0.150	15
21FLVEMDHL09	4/7/1998	7.0	23.70	0.80	0.150	23
21FLSJWM27010037	4/20/1998	1.0	24.30	1.05	0.152	36
21FLVEMDHL07	5/5/1998	5.2	24.20	0.55	0.080	24
21FLVEMDHL06	5/5/1998	1.7	23.85	0.63	0.110	39
21FLVEMDHL05	5/5/1998	2.6	23.80	0.62	0.090	36
21FLVEMDHL04	5/5/1998	3.3	23.40	0.68	0.100	48
21FLVEMDHL08	5/5/1998	6.7	24.20	0.69	0.120	32
21FLVEMDHL12	5/5/1998	4.3	23.85	0.70	0.120	18
21FLVEMDHL11	5/5/1998	6.9	23.20	0.74	0.140	30
21FLVEMDHL10	5/5/1998	7.3	24.00	0.75	0.120	32
21FLVEMDHL09	5/5/1998	8.4	24.40	0.69	0.110	28
21FLVEMDHL11	6/2/1998	7.4	29.37	0.58	0.140	34
21FLVEMDHL06	6/2/1998	8.3	29.90	0.63	0.150	31
21FLVEMDHL07	6/2/1998	9.8	30.40	0.64	0.170	35

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL04	6/2/1998	8.7	29.50	0.66	0.140	38
21FLVEMDHL12	6/2/1998	1.0	29.63	0.67	0.160	25
21FLVEMDHL05	6/2/1998	6.2	29.40	0.67	0.150	49
21FLVEMDHL10	6/2/1998	8.5	30.30	0.68	0.140	38
21FLVEMDHL09	6/2/1998	13.0	30.70	0.69	0.150	41
21FLVEMDHL08	6/2/1998	8.8	30.10	0.74	0.220	59
21FLSJWM27010037	6/10/1998	13.4	28.00	0.87	0.124	49
21FLVEMDHL05	7/7/1998	6.3	30.60	0.59	0.170	31
21FLVEMDHL06	7/7/1998	13.3	30.60	0.65	0.150	32
21FLVEMDHL07	7/7/1998	9.1	30.50	0.69	0.150	25
21FLVEMDHL11	7/7/1998	7.2	29.71	0.76	0.200	42
21FLVEMDHL12	7/7/1998	17.2	29.85	0.82	0.240	12
21FLVEMDHL10	7/7/1998	10.4	30.30	0.83	0.245	43.5
21FLVEMDHL09	7/7/1998	4.0	30.60	0.85	0.220	36
21FLVEMDHL08	7/7/1998	17.0	30.10	0.86	0.240	52
21FLVEMDHL04	7/7/1998	9.4	29.90	0.98	0.280	40
21FLVEMDHL12	8/4/1998	9.8	30.25	0.49	0.160	14
21FLVEMDHL06	8/4/1998	12.0	29.40	0.57	0.170	36
21FLVEMDHL04	8/4/1998	12.9	29.00	0.59	0.150	28
21FLVEMDHL11	8/4/1998	6.9	29.55	0.60	0.180	45
21FLVEMDHL07	8/4/1998	10.8	30.15	0.62	0.190	40.5
21FLVEMDHL05	8/4/1998	19.1	29.40	0.61	0.150	33
21FLVEMDHL08	8/4/1998	14.8	30.20	0.62	0.190	35
21FLVEMDHL10	8/4/1998	7.4	30.20	0.71	0.200	56
21FLVEMDHL09	8/4/1998	10.4	30.40	0.72	0.200	50
21FLVEMDHL08	9/9/1998	2.6	28.80	0.73	0.125	23.5
21FLVEMDHL07	9/9/1998	1.5	28.70	0.78	0.180	20
21FLVEMDHL09	9/9/1998	1.8	29.00	0.82	0.150	32
21FLVEMDHL11	9/9/1998	8.0	28.77	0.90	0.170	22
21FLVEMDHL06	9/9/1998	2.4	28.50	0.90	0.210	26
21FLVEMDHL12	9/9/1998	20.2	28.68	0.91	0.200	20
21FLVEMDHL05	9/9/1998	3.8	28.20	0.94	0.200	34
21FLVEMDHL10	9/9/1998	1.3	29.00	0.99	0.200	52
21FLVEMDHL04	9/9/1998	1.2	28.50	1.08	0.200	26

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDHL12	10/6/1998	14.7	28.73	0.86	0.160	22
21FLVEMDHL10	10/6/1998	21.1	29.48	0.88	0.190	17
21FLVEMDHL08	10/6/1998	21.7	29.18	0.91	0.150	26
21FLVEMDHL11	10/6/1998	16.8	28.80	0.94	0.200	28
21FLVEMDHL09	10/6/1998	21.5	29.29	1.09	0.165	29
21FLVEMDHL07	10/6/1998	24.6	29.10	0.99	0.150	24
21FLVEMDHL06	10/6/1998	9.8	28.75	1.30	0.200	48
21FLVEMDHL04	10/6/1998	2.9	28.01	1.49	0.190	43
21FLVEMDHL05	10/6/1998	7.2	28.51	1.50	0.250	69
21FLSJWM27010037	10/13/1998	10.1	28.20	1.79	0.198	36
21FLVEMDHL05	11/3/1998	7.5	24.40	0.81	0.150	49.5
21FLVEMDHL06	11/3/1998	8.2	24.50	0.83	0.120	24
21FLVEMDHL04	11/3/1998	5.5	24.30	0.85	0.150	54
21FLVEMDHL07	11/3/1998	13.1	24.80	0.89	0.140	22
21FLVEMDHL11	11/3/1998	10.3	24.50	1.04	0.160	17
21FLVEMDHL12	11/3/1998	6.5	24.67	1.06	0.140	9.5
21FLVEMDHL09	11/3/1998	7.9	24.90	1.06	0.150	30
21FLVEMDHL10	11/3/1998	14.6	24.80	1.10	0.160	23
21FLVEMDHL08	11/3/1998	15.3	24.80	1.12	0.160	47
21FLVEMDHL11	12/1/1998	15.0	22.80	0.62	0.120	11
21FLVEMDHL05	12/1/1998	7.7	23.00	0.63	0.080	20
21FLVEMDHL08	12/1/1998	13.6	23.30	0.63	0.120	17
21FLVEMDHL07	12/1/1998	11.4	23.10	0.69	0.130	13
21FLVEMDHL12	12/1/1998	7.7	23.20	0.71	0.100	8.7
21FLVEMDHL06	12/1/1998	9.9	23.00	0.72	0.110	22
21FLVEMDHL09	12/1/1998	11.5	23.60	0.58	0.110	27
21FLVEMDHL10	12/1/1998	12.9	23.40	0.58	0.100	14
21FLVEMDHL04	12/1/1998	2.9	22.60	0.56	0.100	19
21FLSJWM27010037	12/21/1998	12.0	18.40	0.99	0.103	62
21FLVEMDVC-009	1/5/1999	6.4	13.50	0.40	0.390	24
21FLVEMDVC-007	1/5/1999	-	13.70	0.32	0.120	22
21FLVEMDVC-004	1/5/1999	3.2	13.10	0.35	0.100	16
21FLVEMDVC-005	1/5/1999	2.4	12.10	0.36	0.090	16
21FLVEMDVC-011	1/5/1999	4.5	13.11	0.37	0.110	19

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-008	1/5/1999	5.6	13.60	0.37	0.190	25
21FLVEMDVC-010	1/5/1999	7.0	13.90	0.41	0.130	27
21FLVEMDVC-006	1/5/1999	3.4	12.20	0.41	0.090	15
21FLVEMDVC-012	1/5/1999	4.9	14.31	0.42	0.100	10
21FLVEMDVC-006	2/2/1999	4.4	19.60	0.49	0.100	25
21FLVEMDVC-005	2/2/1999	8.3	19.60	0.44	0.090	26
21FLVEMDVC-010	2/2/1999	5.3	20.40	0.45	0.110	16
21FLVEMDVC-004	2/2/1999	3.7	19.50	0.45	0.080	16
21FLVEMDVC-012	2/2/1999	3.6	19.80	0.46	0.130	-
21FLVEMDVC-008	2/2/1999	5.9	20.40	0.46	0.130	23
21FLVEMDVC-011	2/2/1999	4.0	19.70	0.49	0.110	-
21FLVEMDVC-009	2/2/1999	4.6	20.20	0.49	0.120	20
21FLVEMDVC-007	2/2/1999	7.6	20.10	0.53	0.140	27
21FLVEMDVC-012	2/3/1999	3.6	19.80	0.46	0.130	14
21FLVEMDVC-011	2/3/1999	4.0	19.70	0.49	0.110	18
21FLSJWM27010037	2/4/1999	7.5	20.80	0.90	0.121	80
21FLVEMDVC-008	3/3/1999	6.3	18.00	0.35	0.440	20
21FLVEMDVC-005	3/3/1999	4.3	17.30	0.47	0.170	30
21FLVEMDVC-007	3/3/1999	4.3	17.70	0.53	0.140	20
21FLVEMDVC-009	3/3/1999	5.1	17.90	0.53	0.210	18
21FLVEMDVC-012	3/3/1999	1.2	17.10	0.56	0.130	9
21FLVEMDVC-004	3/3/1999	4.3	16.60	0.63	0.200	41
21FLVEMDVC-011	3/3/1999	4.5	17.10	0.64	0.150	30
21FLVEMDVC-006	3/3/1999	3.4	17.50	0.67	0.170	33
21FLVEMDVC-010	3/3/1999	6.1	17.90	0.67	0.160	14
21FLVEMDVC-005	4/5/1999	5.6	24.05	0.44	0.160	15.5
21FLVEMDVC-004	4/5/1999	6.7	23.85	0.48	0.160	28.5
21FLVEMDVC-007	4/5/1999	7.7	24.45	0.46	0.155	24.5
21FLVEMDVC-006	4/5/1999	3.6	24.10	0.49	0.165	19.5
21FLVEMDVC-008	4/5/1999	8.9	24.40	0.59	0.300	20
21FLVEMDVC-012	4/5/1999	9.6	24.10	0.60	0.190	14.5
21FLVEMDVC-009	4/5/1999	7.3	24.40	0.69	0.345	30.5
21FLVEMDVC-011	4/5/1999	5.6	23.70	0.68	0.185	29
21FLVEMDVC-010	4/5/1999	7.0	24.55	0.72	0.230	22

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLSJWM27010037	4/15/1999	7.6	23.50	0.74	0.118	100
21FLVEMDVC-012	6/8/1999	8.6	28.20	0.62	0.150	22
21FLVEMDVC-008	6/8/1999	11.0	28.90	0.64	0.170	41
21FLVEMDVC-009	6/8/1999	10.2	29.20	0.65	0.200	52
21FLVEMDVC-007	6/8/1999	9.9	29.00	0.67	0.150	31
21FLVEMDVC-010	6/8/1999	9.5	28.90	0.67	0.160	42
21FLVEMDVC-006	6/8/1999	9.6	28.40	0.70	0.150	48
21FLVEMDVC-011	6/8/1999	9.2	27.90	0.76	0.170	18
21FLVEMDVC-005	6/8/1999	13.6	28.40	0.78	0.150	71
21FLVEMDVC-004	6/8/1999	11.8	28.40	0.78	0.160	42
21FLSJWM27010037	6/23/1999	10.9	28.50	0.43	0.094	30
21FLVEMDVC-012	7/8/1999	12.2	30.60	0.62	0.270	10
21FLVEMDVC-010	7/8/1999	13.3	30.80	0.63	0.390	24
21FLVEMDVC-007	7/8/1999	13.8	31.10	0.64	0.430	27
21FLVEMDVC-009	7/8/1999	13.5	31.40	0.69	0.330	44
21FLVEMDVC-008	7/8/1999	17.7	30.90	0.72	0.400	51
21FLVEMDVC-006	7/8/1999	13.2	30.60	0.75	0.270	38
21FLVEMDVC-005	7/8/1999	11.5	30.40	0.76	0.260	36
21FLVEMDVC-011	7/8/1999	9.0	30.00	0.89	0.280	56
21FLVEMDVC-004	7/8/1999	14.9	30.00	0.93	0.300	59
21FLVEMDVC-012	8/3/1999	8.7	30.70	0.76	0.170	16
21FLVEMDVC-008	8/3/1999	12.8	30.70	0.79	0.230	52
21FLVEMDVC-009	8/3/1999	18.8	30.50	0.80	0.230	46
21FLVEMDVC-010	8/3/1999	12.0	30.80	0.88	0.230	52
21FLVEMDVC-006	8/3/1999	13.1	29.80	0.88	0.190	39
21FLVEMDVC-005	8/3/1999	5.5	29.60	0.90	0.210	51
21FLVEMDVC-011	8/3/1999	14.7	30.60	0.90	0.220	56
21FLVEMDVC-007	8/3/1999	9.9	30.50	0.93	0.260	55
21FLVEMDVC-004	8/3/1999	9.2	30.40	0.97	0.230	49
21FLSJWM27010037	8/4/1999	8.0	30.00	1.07	0.168	30
21FLVEMDVC-007	9/8/1999	19.2	28.90	0.72	0.220	28
21FLVEMDVC-008	9/8/1999	14.5	29.20	0.81	0.220	40
21FLVEMDVC-009	9/8/1999	15.2	29.70	0.83	0.250	72
21FLVEMDVC-006	9/8/1999	14.2	29.00	0.88	0.240	51

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-012	9/8/1999	12.2	28.90	0.93	0.220	38
21FLVEMDVC-004	9/8/1999	11.5	28.60	0.98	0.270	86
21FLVEMDVC-011	9/8/1999	12.7	28.90	1.00	0.280	60
21FLVEMDVC-005	9/8/1999	14.4	28.90	1.02	0.260	59
21FLVEMDVC-010	9/8/1999	8.3	29.20	1.06	0.310	88
21FLVEMDVC-011	10/5/1999	10.7	26.80	1.00	0.180	17
21FLVEMDVC-012	10/5/1999	11.0	26.80	1.02	0.170	12
21FLVEMDVC-008	10/5/1999	-	26.70	1.14	0.190	30
21FLVEMDVC-010	10/5/1999	15.2	26.70	1.15	0.200	34
21FLVEMDVC-009	10/5/1999	27.3	26.70	1.17	0.210	30
21FLVEMDVC-004	10/5/1999	12.8	26.50	1.29	0.170	24
21FLVEMDVC-007	10/5/1999	16.3	26.80	1.32	0.210	49
21FLVEMDVC-005	10/5/1999	10.5	26.70	1.33	0.170	28
21FLVEMDVC-006	10/5/1999	12.4	26.60	1.55	0.200	33
21FLSJWM27010037	10/12/1999	21.5	27.10	1.02	0.176	40
21FLVEMDVC-006	11/2/1999	14.2	24.60	1.04	0.140	32
21FLVEMDVC-004	11/2/1999	4.6	24.40	1.06	0.200	34
21FLVEMDVC-005	11/2/1999	8.8	24.50	1.07	0.160	31
21FLVEMDVC-010	11/2/1999	13.1	24.60	1.09	0.150	28
21FLVEMDVC-007	11/2/1999	9.6	24.70	1.10	0.170	40
21FLVEMDVC-008	11/2/1999	10.5	24.80	1.11	0.170	38
21FLVEMDVC-011	11/2/1999	7.1	24.30	1.22	0.240	26
21FLVEMDVC-009	11/2/1999	15.1	24.80	1.23	0.180	39
21FLVEMDVC-012	11/2/1999	6.9	24.70	1.26	0.170	6.2
21FLSJWM27010037	12/1/1999	1.0	16.80	0.75	0.093	20
21FLVEMDVC-007	12/7/1999	8.6	18.20	0.52	0.110	18
21FLVEMDVC-005	12/7/1999	7.9	18.00	0.54	0.080	31
21FLVEMDVC-006	12/7/1999	7.6	17.90	0.54	0.090	26
21FLVEMDVC-004	12/7/1999	9.0	17.50	0.56	0.080	26
21FLVEMDVC-008	12/7/1999	9.5	18.00	0.57	0.090	20
21FLVEMDVC-010	12/7/1999	9.0	18.10	0.65	0.080	22
21FLVEMDVC-012	12/7/1999	3.4	17.30	0.66	0.080	22
21FLVEMDVC-011	12/7/1999	-	17.50	0.67	0.100	6.5
21FLVEMDVC-009	12/7/1999	11.8	18.30	0.69	0.110	26

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-007	1/4/2000	7.0	18.90	0.42	0.100	31
21FLVEMDVC-009	1/4/2000	7.8	19.40	0.42	0.090	18
21FLVEMDVC-008	1/4/2000	7.7	19.41	0.45	0.090	16
21FLVEMDVC-010	1/4/2000	8.7	18.74	0.46	0.090	18
21FLVEMDVC-011	1/4/2000	9.4	17.81	0.48	0.100	18
21FLVEMDVC-012	1/4/2000	9.7	17.79	0.51	0.100	8
21FLVEMDVC-005	1/4/2000	9.3	18.60	0.52	0.090	20
21FLVEMDVC-004	1/4/2000	7.8	18.20	0.66	0.110	43
21FLVEMDVC-006	1/4/2000	1.0	18.80	0.70	0.110	22
21FLSJWM27010037	2/3/2000	4.4	14.10	0.64	0.076	42
21FLVEMDVC-007	4/4/2000	10.0	23.40	0.36	0.150	28
21FLVEMDVC-008	4/4/2000	11.3	23.50	0.41	0.110	20
21FLVEMDVC-010	4/4/2000	6.8	23.60	0.45	0.130	18
21FLVEMDVC-012	4/4/2000	4.2	23.88	0.46	0.150	7.5
21FLVEMDVC-009	4/4/2000	12.8	23.60	0.52	0.130	22
21FLVEMDVC-011	4/4/2000	11.6	23.53	0.61	0.150	17
21FLVEMDVC-005	4/4/2000	13.9	23.50	0.62	0.130	45
21FLVEMDVC-004	4/4/2000	14.5	23.00	0.67	0.100	45
21FLVEMDVC-006	4/4/2000	12.3	23.60	0.74	0.160	60
21FLSJWM27010037	4/20/2000	13.5	24.90	0.74	0.136	44
21FLSJWM27010037	5/31/2000	8.4	27.40	1.12	0.313	52
21FLVEMDVC-012	7/11/2000	7.1	30.59	0.65	0.140	12
21FLVEMDVC-007	7/11/2000	6.0	31.50	0.65	0.160	23
21FLVEMDVC-008	7/11/2000	6.7	31.40	0.76	0.160	27
21FLVEMDVC-009	7/11/2000	3.6	31.60	0.77	0.170	39
21FLVEMDVC-011	7/11/2000	8.0	29.87	0.78	0.170	32
21FLVEMDVC-006	7/11/2000	2.7	30.60	0.82	0.190	37
21FLVEMDVC-004	7/11/2000	3.0	30.10	0.84	0.160	41
21FLVEMDVC-010	7/11/2000	8.1	31.20	0.86	0.180	46
21FLVEMDVC-005	7/11/2000	5.8	30.40	0.90	0.170	31
21FLSJWM27010037	8/28/2000	20.4	30.90	0.87	0.328	46
21FLVEMDVC-004	10/3/2000	1.0	25.00	0.79	0.120	28
21FLVEMDVC-005	10/3/2000	1.8	25.20	0.90	0.120	22
21FLVEMDVC-006	10/3/2000	1.2	25.20	0.96	0.120	17

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-007	10/3/2000	5.8	25.50	0.97	0.200	28
21FLVEMDVC-008	10/3/2000	16.0	25.50	1.07	0.220	27
21FLVEMDVC-011	10/3/2000	1.6	24.96	1.16	0.150	29
21FLVEMDVC-009	10/3/2000	7.1	25.30	1.17	0.170	32
21FLVEMDVC-012	10/3/2000	5.6	25.16	1.21	0.160	19
21FLVEMDVC-010	10/3/2000	1.0	25.20	1.31	0.190	38
21FLSJWM27010037	10/9/2000	8.1	22.60	1.58	0.270	59
21FLSJWM27010037	12/4/2000	7.6	15.70	0.60	0.165	31
21FLVEMDVC-010	2/6/2001	1.0	15.13	0.32	0.120	9.8
21FLVEMDVC-007	2/6/2001	1.0	15.10	0.32	0.050	7.8
21FLVEMDVC-009	2/6/2001	1.0	15.56	0.32	0.100	7.2
21FLVEMDVC-006	2/6/2001	1.0	14.81	0.34	0.080	6.8
21FLVEMDVC-005	2/6/2001	1.0	14.70	0.35	0.080	12
21FLVEMDVC-008	2/6/2001	1.0	15.16	0.37	0.100	9.2
21FLVEMDVC-004	2/6/2001	1.0	14.15	0.39	0.090	24
21FLVEMDVC-011	2/6/2001	1.0	14.58	0.42	0.090	11
21FLVEMDVC-012	2/6/2001	1.0	14.89	0.51	0.150	8
21FLSJWM27010037	2/19/2001	5.5	18.80	0.62	0.092	27
21FLSJWM27010037	4/11/2001	10.5	25.40	1.05	0.140	30
21FLVEMDVC-005	5/8/2001	10.3	23.75	0.63	0.170	46
21FLVEMDVC-010	5/8/2001	13.7	23.95	0.66	0.170	33
21FLVEMDVC-011	5/8/2001	2.7	23.88	0.67	0.190	41
21FLVEMDVC-007	5/8/2001	12.4	24.00	0.67	0.150	38
21FLVEMDVC-012	5/8/2001	1.0	23.79	0.73	0.170	24
21FLVEMDVC-004	5/8/2001	10.0	24.68	0.74	0.270	97
21FLVEMDVC-008	5/8/2001	17.4	24.13	0.80	0.180	48
21FLVEMDVC-006	5/8/2001	10.8	24.02	0.80	0.180	58
21FLVEMDVC-009	5/8/2001	11.6	24.15	0.83	0.210	55
21FLSJWM27010037	6/19/2001	2.0	30.30	1.53	0.221	84
21FLFMRIHAL200108	8/7/2001	8.2	28.50	0.97	0.190	-
21FLFMRIHAL200107	8/7/2001	21.3	29.20	0.98	0.198	-
21FLVEMDVC-007	8/7/2001	7.9	28.31	0.99	0.360	21
21FLVEMDVC-012	8/7/2001	4.8	28.80	1.05	0.410	20
21FLVEMDVC-009	8/7/2001	7.9	28.71	1.06	0.280	24

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-008	8/7/2001	4.0	28.22	1.06	0.320	20
21FLVEMDVC-006	8/7/2001	35.4	28.49	1.11	0.280	27
21FLVEMDVC-011	8/7/2001	5.4	28.41	1.13	0.300	29
21FLVEMDVC-010	8/7/2001	1.0	28.56	1.17	0.290	26
21FLVEMDVC-004	8/7/2001	22.1	28.25	1.28	0.180	20
21FLVEMDVC-005	8/7/2001	21.1	28.23	1.36	0.160	16
21FLSJWM27010037	8/14/2001	8.6	30.70	-	-	148
21FLSJWM27010037	10/8/2001	2.3	24.60	1.07	0.213	29
21FLVEMDVC-004	11/6/2001	1.5	20.65	0.56	0.450	46
21FLVEMDVC-005	11/6/2001	1.0	20.10	0.59	0.270	28
21FLVEMDVC-008	11/6/2001	1.0	20.57	0.72	0.100	22
21FLVEMDVC-006	11/6/2001	1.0	20.06	0.72	0.230	36
21FLVEMDVC-007	11/6/2001	1.0	20.32	0.75	0.120	20
21FLVEMDVC-011	11/6/2001	1.0	20.42	0.78	0.140	11
21FLVEMDVC-010	11/6/2001	1.0	20.51	0.81	0.140	15
21FLVEMDVC-009	11/6/2001	1.0	20.43	0.84	0.130	38
21FLVEMDVC-012	11/6/2001	1.0	21.11	1.07	0.090	8
21FLSJWM27010037	12/10/2001	2.5	24.05	1.10	0.121	12
21FLVEMDVC-005	1/28/2002	4.2	20.58	1.33	0.069	5
21FLVEMDVC-004	2/4/2002	1.2	21.90	1.40	0.081	3.8
21FLSJWM27010037	2/18/2002	5.9	16.70	0.61	0.108	13
21FLVEMDVC-006	3/4/2002	2.9	18.06	-	-	-
21FLVEMDVC-007	3/4/2002	1.0	17.24	-	-	-
21FLVEMDVC-008	3/4/2002	2.3	15.65	-	-	-
21FLVEMDVC-005	4/1/2002	21.4	26.26	1.17	0.093	6.3
21FLVEMDVC-006	4/1/2002	7.6	24.15	1.20	0.055	1.5
21FLVEMDVC-004	4/2/2002	24.7	25.69	1.09	0.080	6.1
21FLSJWM27010037	4/8/2002	6.0	22.10	0.66	0.146	25
21FLVEMDVC-006	6/3/2002	43.6	31.14	-	-	-
21FLVEMDVC-007	6/3/2002	4.6	28.22	-	-	-
21FLVEMDVC-008	6/3/2002	6.1	29.17	-	-	-
21FLSJWM27010037	6/12/2002	9.3	-	0.74	0.274	24
21FLVEMDVC-006	7/15/2002	8.2	28.20	1.16	0.077	5.5
21FLVEMDVC-005	7/15/2002	11.9	28.71	1.27	0.083	3.65

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-004	7/16/2002	6.3	28.75	1.49	0.115	6.8
21FLSJWM27010037	8/8/2002	5.1	28.70	0.24	0.208	12
21FLVEMDVC-006	9/9/2002	6.4	29.31	-	-	-
21FLVEMDVC-007	9/9/2002	1.1	25.52	-	-	-
21FLVEMDVC-008	9/9/2002	3.3	25.42	-	-	-
21FLVEMDVC-005	9/10/2002	10.0	28.49	-	-	-
21FLVEMDVC-009	9/10/2002	10.9	29.30	-	-	-
21FLSJWM27010037	10/9/2002	9.0	29.10	0.88	0.160	22
21FLVEMDVC-005	10/21/2002	6.8	24.05	1.22	0.070	1.55
21FLVEMDVC-006	10/21/2002	5.8	24.09	1.28	0.093	3.2
21FLVEMDVC-004	10/22/2002	-	25.27	1.29	0.091	3.7
21FLVEMDVC-006	12/2/2002	-	16.49	-	-	-
21FLVEMDVC-007	12/2/2002	-	17.64	-	-	-
21FLSJWM27010037	12/30/2002	8.7	13.90	0.75	0.097	7.5
21FLVEMDVC-006	2/4/2003	-	16.10	0.53	0.070	168
21FLVEMDVC-004	2/4/2003	-	15.80	0.59	0.050	138
21FLVEMDVC-005	2/4/2003	-	15.85	0.62	0.070	37
21FLVEMDVC-007	2/4/2003	-	16.04	0.63	0.160	23.4
21FLVEMDVC-008	2/4/2003	-	16.23	0.68	0.110	33.6
21FLVEMDVC-009	2/4/2003	-	16.13	0.68	0.120	36.4
21FLVEMDVC-012	2/4/2003	-	15.99	0.71	0.060	13.3
21FLVEMDVC-010	2/4/2003	-	16.28	0.72	0.080	31.6
21FLVEMDVC-011	2/4/2003	-	16.19	0.72	0.110	19.5
21FLSJWM27010037	2/10/2003	3.9	15.10	0.69	0.097	33
21FLSJWM27010037	4/9/2003	6.3	25.00	1.26	0.132	15.5
21FLVEMDVC-008	5/6/2003	-	27.55	0.76	0.220	26
21FLVEMDVC-006	5/6/2003	-	27.40	0.78	0.180	20
21FLVEMDVC-007	5/6/2003	-	27.74	0.80	0.220	38
21FLVEMDVC-010	5/6/2003	-	27.82	0.84	0.190	14
21FLVEMDVC-004	5/6/2003	-	27.85	0.85	0.190	23
21FLVEMDVC-005	5/6/2003	-	27.46	0.90	0.190	24
21FLVEMDVC-009	5/6/2003	-	27.80	0.93	0.160	23
21FLVEMDVC-011	5/14/2003	-	27.87	0.81	0.190	18
21FLVEMDVC-012	5/14/2003	-	28.51	0.83	0.190	16.2

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLSJWM27010037	6/16/2003	11.5	30.96	0.78	0.163	23.5
21FLVEMDVC-012	8/5/2003	-	30.17	-	-	-
21FLVEMDVC-005	8/5/2003	-	29.20	-	-	-
21FLVEMDVC-006	8/5/2003	-	29.47	-	-	-
21FLVEMDVC-007	8/5/2003	-	29.71	-	-	-
21FLVEMDVC-008	8/5/2003	-	29.79	-	-	-
21FLVEMDVC-009	8/5/2003	-	30.24	-	-	-
21FLVEMDVC-010	8/5/2003	-	29.64	-	-	-
21FLVEMDVC-011	8/5/2003	-	29.92	-	-	-
21FLVEMDVC-004	8/5/2003	-	29.41	-	-	-
21FLSJWM27010037	8/11/2003	3.8	28.80	1.31	0.214	19
21FLSJWM27010037	10/27/2003	5.1	25.09	0.87	0.133	13
21FLVEMDVC-012	11/4/2003	-	25.70	-	-	-
21FLVEMDVC-005	11/4/2003	-	25.92	-	-	-
21FLVEMDVC-006	11/4/2003	-	25.96	-	-	-
21FLVEMDVC-007	11/4/2003	-	26.16	-	-	-
21FLVEMDVC-008	11/4/2003	-	25.85	-	-	-
21FLVEMDVC-009	11/4/2003	-	25.58	-	-	-
21FLVEMDVC-010	11/4/2003	-	25.73	-	-	-
21FLVEMDVC-011	11/4/2003	-	26.21	-	-	-
21FLVEMDVC-004	11/4/2003	-	25.66	-	-	-
21FLSJWM27010037	12/3/2003	4.7	17.02	0.76	0.098	17.5
21FLVEMDVC-012	1/6/2004	7.9	20.13	-	-	-
21FLVEMDVC-008	1/6/2004	2.1	20.32	-	-	-
21FLVEMDVC-009	1/6/2004	1.6	20.45	-	-	-
21FLVEMDVC-010	1/6/2004	3.0	20.55	-	-	-
21FLVEMDVC-011	1/6/2004	3.3	20.30	-	-	-
21FLVEMDVC-012	2/4/2004	5.6	17.00	-	-	-
21FLVEMDVC-008	2/4/2004	1.9	16.77	-	-	-
21FLVEMDVC-009	2/4/2004	1.8	16.95	-	-	-
21FLVEMDVC-010	2/4/2004	1.3	17.10	-	-	-
21FLVEMDVC-011	2/4/2004	3.2	17.04	-	-	-
21FLSJWM27010037	2/11/2004	2.3	17.19	0.40	0.072	19.5
21FLVEMDVC-012	3/2/2004	3.9	16.80	-	-	-

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-005	3/2/2004	1.9	17.10	-	-	-
21FLVEMDVC-006	3/2/2004	1.3	16.96	-	-	-
21FLVEMDVC-007	3/2/2004	1.1	17.02	-	-	-
21FLVEMDVC-008	3/2/2004	2.4	16.80	-	-	-
21FLVEMDVC-009	3/2/2004	1.8	17.04	-	-	-
21FLVEMDVC-010	3/2/2004	2.4	16.71	-	-	-
21FLVEMDVC-011	3/2/2004	3.1	16.80	-	-	-
21FLVEMDVC-004	3/2/2004	2.4	16.92	-	-	-
21FLSJWM27010037	4/7/2004	3.3	20.78	0.57	0.098	30.5
21FLVEMDVC-012	4/13/2004	6.7	22.90	-	-	-
21FLVEMDVC-008	4/13/2004	6.5	22.76	-	-	-
21FLVEMDVC-009	4/13/2004	4.5	22.98	-	-	-
21FLVEMDVC-010	4/13/2004	5.4	22.91	-	-	-
21FLVEMDVC-011	4/13/2004	6.1	22.91	-	-	-
21FLVEMDVC-012	5/12/2004	5.5	25.85	-	-	-
21FLVEMDVC-008	5/12/2004	3.3	26.11	-	-	-
21FLVEMDVC-009	5/12/2004	3.4	26.12	-	-	-
21FLVEMDVC-010	5/12/2004	2.8	25.97	-	-	-
21FLVEMDVC-011	5/12/2004	3.6	25.90	-	-	-
21FLVEMDVC-012	6/8/2004	-	29.84	-	-	-
21FLVEMDVC-005	6/8/2004	-	28.71	-	-	-
21FLVEMDVC-006	6/8/2004	-	28.55	-	-	-
21FLVEMDVC-007	6/8/2004	-	28.92	-	-	-
21FLVEMDVC-008	6/8/2004	-	28.65	-	-	-
21FLVEMDVC-009	6/8/2004	-	28.96	-	-	-
21FLVEMDVC-010	6/8/2004	-	28.62	-	-	-
21FLVEMDVC-011	6/8/2004	-	29.45	-	-	-
21FLVEMDVC-004	6/8/2004	-	28.50	-	-	-
21FLSJWM27010037	6/9/2004	11.2	29.18	0.75	0.157	16
21FLVEMDVC-012	7/7/2004	-	30.97	-	-	-
21FLVEMDVC-008	7/7/2004	-	30.25	-	-	-
21FLVEMDVC-009	7/7/2004	-	30.60	-	-	-
21FLVEMDVC-010	7/7/2004	-	30.27	-	-	-
21FLVEMDVC-011	7/7/2004	-	30.43	-	-	-

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-012	8/4/2004	-	29.02	-	-	-
21FLVEMDVC-008	8/4/2004	-	28.93	-	-	-
21FLVEMDVC-009	8/4/2004	-	28.98	-	-	-
21FLVEMDVC-010	8/4/2004	-	28.85	-	-	-
21FLVEMDVC-011	8/4/2004	-	28.94	-	-	-
21FLFMRISTR200432	8/9/2004	3.6	27.20	0.85	0.113	
21FLSJWM27010037	8/12/2004	21.0	28.73	1.18	0.177	33
21FLSJWM27010037	10/7/2004	1.0	25.64	1.44	0.162	18.5
21FLVEMDVC-012	10/12/2004	-	24.76	-	-	-
21FLVEMDVC-005	10/12/2004	-	24.55	-	-	-
21FLVEMDVC-006	10/12/2004	-	24.65	-	-	-
21FLVEMDVC-007	10/12/2004	-	24.84	-	-	-
21FLVEMDVC-008	10/12/2004	-	24.78	-	-	-
21FLVEMDVC-009	10/12/2004	-	24.82	-	-	-
21FLVEMDVC-010	10/12/2004	-	24.90	-	-	-
21FLVEMDVC-011	10/12/2004	-	24.94	-	-	-
21FLVEMDVC-004	10/12/2004	-	24.45	-	-	-
21FLVEMDVC-012	11/9/2004	-	21.80	-	-	-
21FLVEMDVC-008	11/9/2004	-	21.74	-	-	-
21FLVEMDVC-009	11/9/2004	-	21.80	-	-	-
21FLVEMDVC-010	11/9/2004	-	21.80	-	-	-
21FLVEMDVC-011	11/9/2004	-	21.81	-	-	-
21FLVEMDVC-012	12/7/2004	-	19.71	-	-	-
21FLVEMDVC-005	12/7/2004	-	18.97	-	-	-
21FLVEMDVC-006	12/7/2004	-	19.18	-	-	-
21FLVEMDVC-007	12/7/2004	-	19.29	-	-	-
21FLVEMDVC-008	12/7/2004	-	19.40	-	-	-
21FLVEMDVC-009	12/7/2004	-	19.47	-	-	-
21FLVEMDVC-010	12/7/2004	-	19.11	-	-	-
21FLVEMDVC-011	12/7/2004	-	16.97	-	-	-
21FLVEMDVC-004	12/7/2004	-	18.85	-	-	-
21FLSJWM27010037	12/13/2004	4.4	16.54	0.66	0.097	7.3
21FLVEMDVC-012	1/4/2005	-	18.04	-	-	-
21FLVEMDVC-008	1/4/2005	-	17.98	-	-	-

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-009	1/4/2005	-	18.02	-	-	-
21FLVEMDVC-010	1/4/2005	-	17.98	-	-	-
21FLVEMDVC-011	1/4/2005	-	18.00	-	-	-
21FLVEMDVC-012	2/8/2005	-	15.06	-	-	-
21FLVEMDVC-005	2/8/2005	-	14.20	-	-	-
21FLVEMDVC-006	2/8/2005	-	14.45	-	-	-
21FLVEMDVC-007	2/8/2005	-	14.57	-	-	-
21FLVEMDVC-008	2/8/2005	-	14.88	-	-	-
21FLVEMDVC-009	2/8/2005	-	14.94	-	-	-
21FLVEMDVC-010	2/8/2005	-	15.21	-	-	-
21FLVEMDVC-011	2/8/2005	-	15.16	-	-	-
21FLVEMDVC-004	2/8/2005	-	13.90	-	-	-
21FLSJWM27010037	2/10/2005	4.1	16.75	0.45	0.069	9.5
21FLCEN 27010120	2/21/2005	-	18.03	-	-	-
21FLCEN 27010119	2/21/2005	-	17.70	-	-	-
21FLCEN 27010945	2/21/2005	-	17.76	-	-	-
21FLCEN 27010950	2/21/2005	-	18.01	-	-	-
21FLCEN 27010946	2/21/2005	-	17.90	-	-	-
21FLVEMDVC-012	3/1/2005	6.1	17.43	-	-	-
21FLVEMDVC-008	3/1/2005	8.5	16.72	-	-	-
21FLVEMDVC-009	3/1/2005	8.7	17.30	-	-	-
21FLVEMDVC-010	3/1/2005	8.6	17.26	-	-	-
21FLVEMDVC-011	3/1/2005	6.0	17.25	-	-	-
21FLVEMDVC-012	4/5/2005	-	21.33	-	-	-
21FLVEMDVC-008	4/5/2005	-	20.71	-	-	-
21FLVEMDVC-009	4/5/2005	-	20.95	-	-	-
21FLVEMDVC-010	4/5/2005	-	20.69	-	-	-
21FLVEMDVC-011	4/5/2005	-	20.78	-	-	-
21FLSJWM27010037	4/13/2005	5.8	22.72	0.63	0.111	13
21FLCEN 27010120	4/26/2005	-	21.00	-	-	-
21FLCEN 27010119	4/26/2005	-	21.00	-	-	-
21FLCEN 27010945	4/26/2005	-	21.00	-	-	-
21FLCEN 27010950	4/26/2005	-	21.00	-	-	-
21FLCEN 27010946	4/26/2005	-	21.00	-	-	-

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-012	5/3/2005	-	24.06	-	-	-
21FLVEMDVC-011	5/3/2005	-	23.74	-	-	-
21FLVEMDVC-005	5/10/2005	-	24.47	-	-	-
21FLVEMDVC-006	5/10/2005	-	24.15	-	-	-
21FLVEMDVC-007	5/10/2005	-	24.10	-	-	-
21FLVEMDVC-008	5/10/2005	-	24.52	-	-	-
21FLVEMDVC-009	5/10/2005	-	24.71	-	-	-
21FLVEMDVC-010	5/10/2005	-	24.32	-	-	-
21FLVEMDVC-004	5/10/2005	-	24.26	-	-	-
21FLSJWM27010037	6/1/2005	3.3	26.53	0.69	0.140	32
21FLVEMDVC-012	6/7/2005	-	27.75	-	-	-
21FLVEMDVC-008	6/7/2005	-	27.72	-	-	-
21FLVEMDVC-009	6/7/2005	-	27.78	-	-	-
21FLVEMDVC-010	6/7/2005	-	27.74	-	-	-
21FLVEMDVC-011	6/7/2005	-	27.72	-	-	-
21FLCEN 27010120	6/21/2005	-	28.50	-	-	-
21FLCEN 27010119	6/21/2005	-	28.30	-	-	-
21FLCEN 27010945	6/21/2005	-	28.40	-	-	-
21FLCEN 27010950	6/21/2005	-	28.40	-	-	-
21FLCEN 27010946	6/21/2005	-	28.40	-	-	-
21FLFMRIFLEALT158	7/25/2005	7.4	-	0.77	0.147	-
21FLFMRIFLEALT2005158	7/25/2005	-	31.60	-	-	-
21FLVEMDVC-012	8/9/2005	-	32.29	-	-	-
21FLVEMDVC-005	8/9/2005	-	30.80	-	-	-
21FLVEMDVC-006	8/9/2005	-	30.80	-	-	-
21FLVEMDVC-007	8/9/2005	-	31.20	-	-	-
21FLVEMDVC-008	8/9/2005	-	31.10	-	-	-
21FLVEMDVC-009	8/9/2005	-	30.90	-	-	-
21FLVEMDVC-010	8/9/2005	-	30.60	-	-	-
21FLVEMDVC-011	8/9/2005	-	32.10	-	-	-
21FLVEMDVC-004	8/9/2005	-	30.70	-	-	-
21FLSJWM27010037	8/10/2005	1.9	30.44	0.95	0.183	5
21FLCEN 27010121	8/16/2005	-	31.30	-	-	-
21FLCEN 27010120	8/16/2005	-	31.20	-	-	-

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLCEN 27010119	8/16/2005	-	31.40	-	-	-
21FLCEN 27010950	8/16/2005	-	31.10	-	-	-
21FLCEN 27010946	8/16/2005	-	31.20	-	-	-
21FLVEMDVC-012	9/13/2005	-	27.17	-	-	-
21FLVEMDVC-008	9/13/2005	-	27.12	-	-	-
21FLVEMDVC-009	9/13/2005	-	27.28	-	-	-
21FLVEMDVC-010	9/13/2005	-	27.23	-	-	-
21FLVEMDVC-011	9/13/2005	-	27.37	-	-	-
21FLSJWM27010037	10/10/2005	1.0	28.08	1.38	0.116	10
21FLCEN 27010121	10/11/2005	-	28.40	-	-	-
21FLCEN 27010120	10/11/2005	-	28.20	-	-	-
21FLCEN 27010119	10/11/2005	-	28.30	-	-	-
21FLCEN 27010950	10/11/2005	-	28.40	-	-	-
21FLCEN 27010946	10/11/2005	-	28.30	-	-	-
21FLVEMDVC-012	10/11/2005	-	28.60	-	-	-
21FLVEMDVC-008	10/11/2005	-	28.20	-	-	-
21FLVEMDVC-009	10/11/2005	-	28.30	-	-	-
21FLVEMDVC-010	10/11/2005	-	28.30	-	-	-
21FLVEMDVC-011	10/11/2005	-	28.40	-	-	-
21FLVEMDVC-012	11/8/2005	-	23.29	-	-	-
21FLVEMDVC-005	11/8/2005	-	23.61	-	-	-
21FLVEMDVC-006	11/8/2005	-	23.62	-	-	-
21FLVEMDVC-007	11/8/2005	-	23.82	-	-	-
21FLVEMDVC-008	11/8/2005	-	23.79	-	-	-
21FLVEMDVC-009	11/8/2005	-	24.09	-	-	-
21FLVEMDVC-010	11/8/2005	-	23.84	-	-	-
21FLVEMDVC-011	11/8/2005	-	23.64	-	-	-
21FLVEMDVC-004	11/8/2005	-	23.51	-	-	-
21FLVEMDVC-012	12/6/2005	-	18.33	-	-	-
21FLVEMDVC-008	12/6/2005	-	18.18	-	-	-
21FLVEMDVC-009	12/6/2005		18.42	-	-	-
21FLVEMDVC-010	12/6/2005	-	18.36	-	-	-
21FLVEMDVC-011	12/6/2005	-	18.39	-	-	-
21FLSJWM27010037	12/19/2005	2.4	15.78	0.64	0.070	9

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-012	1/10/2006	2.0	15.20	-	0.030	3
21FLVEMDVC-005	1/10/2006	-	15.16	-	0.020	4
21FLVEMDVC-006	1/10/2006	-	15.02	-	0.020	2.8
21FLVEMDVC-007	1/10/2006	-	15.02	-	0.020	3.2
21FLVEMDVC-008	1/10/2006	-	15.75	-	0.020	4.4
21FLVEMDVC-009	1/10/2006	-	15.68	-	0.020	4.4
21FLVEMDVC-010	1/10/2006	-	15.26	-	0.020	6
21FLVEMDVC-011	1/10/2006	1.8	15.57	-	0.030	7
21FLVEMDVC-004	1/10/2006	-	14.96	-	0.020	14
21FLSJWM27010037	2/6/2006	1.4	15.20	0.42	0.091	7.5
21FLVEMDVC-012	2/7/2006	-	15.92	-	-	-
21FLVEMDVC-008	2/7/2006	-	15.16	-	-	-
21FLVEMDVC-009	2/7/2006	-	15.48	-	-	-
21FLVEMDVC-010	2/7/2006	-	15.35	-	-	-
21FLVEMDVC-011	2/7/2006	-	15.48	-	-	-
21FLVEMDVC-012	4/4/2006	-	23.65	-	0.220	49.5
21FLVEMDVC-005	4/4/2006	5.4	24.02	-	0.160	22
21FLVEMDVC-006	4/4/2006	1.5	23.95	-	0.130	30.5
21FLVEMDVC-007	4/4/2006	2.7	24.09	-	0.130	39.6
21FLVEMDVC-008	4/4/2006	5.5	24.14	-	0.160	64.5
21FLVEMDVC-009	4/4/2006	5.5	24.40	-	0.180	61
21FLVEMDVC-010	4/4/2006	4.6	24.02	-	0.160	33.2
21FLVEMDVC-011	4/4/2006	-	23.73	-	0.180	27.7
21FLVEMDVC-004	4/4/2006	5.6	24.22	-	0.240	67
21FLSJWM27010037	4/5/2006	6.1	23.18	0.37	0.132	26
21FLVEMDVC-012	5/2/2006	-	22.01	-	-	-
21FLVEMDVC-008	5/2/2006	-	21.86	-	-	-
21FLVEMDVC-009	5/2/2006	-	22.04	-	-	-
21FLVEMDVC-010	5/2/2006	-	21.91	-	-	-
21FLVEMDVC-011	5/2/2006	-	21.80	-	-	-
21FLSJWM27010037	6/5/2006	5.1	28.37	0.41	0.162	30.5
21FLVEMDVC-012	6/6/2006	-	28.76	-	-	-
21FLVEMDVC-008	6/6/2006	-	28.20	-	-	-
21FLVEMDVC-009	6/6/2006	-	28.54	-	-	-

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-010	6/6/2006	-	28.50	-	-	-
21FLVEMDVC-011	6/6/2006	-	28.58	-	-	-
21FLVEMDVC-005	7/11/2006	-	29.99	0.38	0.170	19
21FLVEMDVC-006	7/11/2006	-	30.10	0.42	0.180	28
21FLVEMDVC-007	7/11/2006	-	30.29	0.36	0.190	24
21FLVEMDVC-008	7/11/2006	-	30.52	0.55	0.220	38
21FLVEMDVC-009	7/11/2006	-	30.18	0.61	0.300	29
21FLVEMDVC-010	7/11/2006	-	30.34	0.44	0.200	18
21FLVEMDVC-004	7/11/2006	-	29.91	0.34	-	19
21FLVEMDVC-012	7/12/2006	12.4	31.15	0.59	0.250	14.4
21FLVEMDVC-011	7/12/2006	11.9	30.44	0.58	0.260	28.5
21FLSJWM27010037	8/1/2006	5.6	29.52	0.98	0.258	23
21FLVEMDVC-012	8/1/2006	5.4	29.64	-	-	-
21FLVEMDVC-008	8/1/2006	9.9	29.22	-	-	-
21FLVEMDVC-009	8/1/2006	6.1	29.45	-	-	-
21FLVEMDVC-010	8/1/2006	2.9	29.49	-	-	-
21FLVEMDVC-011	8/1/2006	3.9	29.56	-	-	-
21FLVEMDVC-012	9/5/2006	8.7	29.68	-	-	-
21FLVEMDVC-008	9/5/2006	4.6	29.22	-	-	-
21FLVEMDVC-009	9/5/2006	2.4	29.54	-	-	-
21FLVEMDVC-010	9/5/2006	3.0	29.53	-	-	-
21FLVEMDVC-011	9/5/2006	6.4	29.68	-	-	-
21FLVEMDVC-012	10/2/2006	3.7	28.85	-	0.190	14
21FLVEMDVC-011	10/2/2006	1.4	27.67	-	0.180	18
21FLVEMDVC-005	10/3/2006	-	27.65	-	0.140	16
21FLVEMDVC-006	10/3/2006	-	27.73	-	0.130	15
21FLVEMDVC-007	10/3/2006	-	27.85	-	0.140	19
21FLVEMDVC-008	10/3/2006	-	27.74	-	0.170	17
21FLVEMDVC-009	10/3/2006	-	27.96	-	0.180	15
21FLVEMDVC-010	10/3/2006	-	27.81	-	0.190	18
21FLVEMDVC-004	10/3/2006	-	27.67	-	0.110	21
21FLSJWM27010037	10/4/2006	3.4	26.29	1.00	0.180	15.5
21FLVEMDVC-012	11/7/2006	-	20.66	-	-	-
21FLVEMDVC-008	11/7/2006	-	20.42	-	-	-

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-009	11/7/2006	-	20.39	-	-	-
21FLVEMDVC-010	11/7/2006	-	20.63	-	-	-
21FLVEMDVC-011	11/7/2006	-	20.73	-	-	-
21FLSJWM27010037	12/1/2006	5.2	21.80	0.54	0.108	20.5
21FLVEMDVC-012	1/9/2007	3.8	19.22	-	-	-
21FLVEMDVC-008	1/9/2007	5.1	19.52	-	-	-
21FLVEMDVC-009	1/9/2007	1.0	19.61	-	-	-
21FLVEMDVC-010	1/9/2007	3.6	19.69	-	-	-
21FLVEMDVC-011	1/9/2007	3.4	19.50	-	-	-
21FLSJWM27010037	2/5/2007	3.9	14.69	0.28	0.050	7.5
21FLVEMDVC-012	2/5/2007	1.9	14.59	-	0.080	6
21FLVEMDVC-011	2/5/2007	2.2	14.28	-	0.060	10
21FLVEMDVC-005	2/6/2007	2.9	12.36	-	0.070	9.4
21FLVEMDVC-006	2/6/2007	2.5	12.56	-	0.080	18
21FLVEMDVC-007	2/6/2007	4.1	12.99	-	0.070	13
21FLVEMDVC-008	2/6/2007	4.4	13.12	-	0.070	12
21FLVEMDVC-009	2/6/2007	4.0	13.06	-	0.070	12
21FLVEMDVC-010	2/6/2007	3.7	13.32	-	0.070	9
21FLVEMDVC-004	2/6/2007	5.1	13.24	-	0.130	52.5
21FLVEMDVC-012	3/6/2007	4.8	17.14	-	-	-
21FLVEMDVC-008	3/6/2007	3.5	16.46	-	-	-
21FLVEMDVC-009	3/6/2007	3.1	16.65	-	-	-
21FLVEMDVC-010	3/6/2007	3.1	16.96	-	-	-
21FLVEMDVC-011	3/6/2007	2.2	16.98	-	-	-
21FLVEMDVC-012	4/3/2007	10.7	24.14	-	-	-
21FLVEMDVC-008	4/3/2007	6.5	23.72	-	-	-
21FLVEMDVC-009	4/3/2007	5.8	23.89	-	-	-
21FLVEMDVC-010	4/3/2007	7.7	23.99	-	-	-
21FLVEMDVC-011	4/3/2007	7.7	23.95	-	-	-
21FLSJWM27010037	4/5/2007	4.6	24.30	0.62	0.127	22
21FLVEMDVC-012	5/8/2007	-	23.60	-	-	18
21FLVEMDVC-005	5/8/2007	-	20.93	-	-	146
21FLVEMDVC-006	5/8/2007	-	20.80	-	-	114
21FLVEMDVC-007	5/8/2007	-	21.47	-	-	114

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-008	5/8/2007	-	21.66	-	-	94
21FLVEMDVC-009	5/8/2007	-	21.90	-	-	104
21FLVEMDVC-010	5/8/2007	-	22.15	-	-	43
21FLVEMDVC-004	5/8/2007	-	21.75	-	-	80
21FLSJWM27010037	6/7/2007	9.1	26.53	0.97	0.209	63
21FLSJWM27010037	8/1/2007	3.9	29.04	0.92	0.139	26.5
21FLVEMDVC-012	8/6/2007	-	31.60	0.75	0.230	14
21FLVEMDVC-011	8/6/2007	-	31.10	0.80	0.220	17
21FLVEMDVC-005	8/7/2007	-	31.53	1.01	0.190	24
21FLVEMDVC-006	8/7/2007	-	31.75	0.68	0.190	22
21FLVEMDVC-007	8/7/2007	-	32.36	0.75	0.210	16
21FLVEMDVC-008	8/7/2007	-	31.95	0.84	0.220	24
21FLVEMDVC-009	8/7/2007	-	32.13	0.87	0.220	24
21FLVEMDVC-010	8/7/2007	-	31.56	0.85	0.230	36
21FLVEMDVC-004	8/7/2007	-	31.41	1.08	0.210	42
21FLSJWM27010037	10/1/2007	2.4	25.58	-	0.188	19
21FLVEMDVC-012	11/6/2007	-	21.20	-	0.080	8
21FLVEMDVC-005	11/6/2007	-	20.80	-	0.050	17.6
21FLVEMDVC-006	11/6/2007	-	20.80	-	0.050	22.8
21FLVEMDVC-008	11/6/2007	-	21.63	-	0.080	35.6
21FLVEMDVC-009	11/6/2007	-	21.41	-	0.080	38.8
21FLVEMDVC-010	11/6/2007	-	21.46	-	0.080	27.5
21FLVEMDVC-011	11/6/2007	-	20.92	-	0.090	15
21FLVEMDVC-004	11/6/2007	-	20.70	-	0.060	24.8
21FLSJWM27010037	12/10/2007	2.3	21.18	0.66	0.111	14
21FLVEMDVC-009	2/5/2008	5.3	21.39	0.52	0.070	28.4
21FLVEMDVC-012	2/5/2008	6.5	20.60	0.57	0.070	24
21FLVEMDVC-005	2/5/2008	8.8	20.83	0.60	0.090	45.8
21FLVEMDVC-006	2/5/2008	8.7	21.24	-	0.080	36.4
21FLVEMDVC-007	2/5/2008	6.9	21.12	-	0.070	28.8
21FLVEMDVC-008	2/5/2008	7.9	21.44	-	0.070	44.2
21FLVEMDVC-010	2/5/2008	5.4	20.87	-	0.060	21.8
21FLVEMDVC-011	2/5/2008	11.4	20.40	-	0.080	21.8
21FLVEMDVC-004	2/5/2008	3.7	20.69	-	0.080	42.6

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLSJWM27010037	2/7/2008	7.6	21.53	0.59	0.216	86
21FLSJWM27010037	4/3/2008	8.2	24.79	0.75	0.198	15
21FLVEMDVC-012	5/6/2008	10.5	27.10	-	-	31.6
21FLVEMDVC-005	5/6/2008	9.5	25.68	-	-	53.2
21FLVEMDVC-006	5/6/2008	2.9	25.81	-	-	68.6
21FLVEMDVC-007	5/6/2008	5.3	25.93	0.59	-	46.6
21FLVEMDVC-008	5/6/2008	10.0	26.06	0.62	-	51.6
21FLVEMDVC-009	5/6/2008	3.3	25.88	-	-	51.8
21FLVEMDVC-010	5/6/2008	4.5	25.87	-	-	38.2
21FLVEMDVC-011	5/6/2008	5.5	26.40	-	-	70.6
21FLVEMDVC-004	5/6/2008	8.1	26.19	-	-	75.4
21FLSJWM27010037	6/9/2008	10.8	30.51	0.73	0.298	35
21FLVEMDVC-012	6/10/2008	8.4	31.34	-	-	-
21FLVEMDVC-008	6/10/2008	9.4	30.82	-	-	-
21FLVEMDVC-009	6/10/2008	9.4	30.91	-	-	-
21FLVEMDVC-010	6/10/2008	13.5	30.89	-	-	-
21FLVEMDVC-011	6/10/2008	10.6	30.90	-	-	-
21FLVEMDVC-012	7/22/2008	11.9	30.74	-	-	-
21FLVEMDVC-008	7/22/2008	30.9	30.16	-	-	-
21FLVEMDVC-009	7/22/2008	38.5	30.42	-	-	-
21FLVEMDVC-010	7/22/2008	27.4	30.36	-	-	-
21FLVEMDVC-011	7/22/2008	27.1	30.39	-	-	-
21FLVEMDVC-012	8/5/2008	15.1	31.44	-	0.150	23.2
21FLVEMDVC-005	8/5/2008	10.4	30.12	-	0.130	20.2
21FLVEMDVC-006	8/5/2008	41.1	29.92	-	0.150	33.6
21FLVEMDVC-007	8/5/2008	9.8	30.63	0.80	0.130	24
21FLVEMDVC-008	8/5/2008	21.4	30.39	0.83	0.150	25.6
21FLVEMDVC-009	8/5/2008	21.1	36.34	0.84	0.150	34.4
21FLVEMDVC-010	8/5/2008	11.9	30.32	-	0.160	35.6
21FLVEMDVC-011	8/5/2008	17.2	31.29	0.75	0.140	25.2
21FLVEMDVC-004	8/5/2008	7.7	29.63	1.03	0.140	20
21FLSJWM27010037	8/6/2008	18.8	30.81	0.68	0.251	26
21FLVEMDVC-012	9/9/2008	4.8	29.82	-	-	-
21FLVEMDVC-008	9/9/2008	2.3	29.11	-	-	-

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-009	9/9/2008	3.2	29.11	-	-	-
21FLVEMDVC-010	9/9/2008	2.7	28.96	-	-	-
21FLVEMDVC-011	9/9/2008	3.7	29.28	-	-	-
21FLSJWM27010037	10/2/2008	3.4	26.47	1.00	0.239	20.5
21FLVEMDVC-012	10/7/2008	4.4	26.00	-	-	-
21FLVEMDVC-008	10/7/2008	3.4	25.60	-	-	-
21FLVEMDVC-009	10/7/2008	2.5	25.78	-	-	-
21FLVEMDVC-010	10/7/2008	2.5	25.69	-	-	-
21FLVEMDVC-011	10/7/2008	3.0	25.80	-	-	-
21FLVEMDVC-005	11/3/2008	10.1	19.98	0.90	0.100	21.8
21FLVEMDVC-006	11/3/2008	7.9	20.63	1.26	0.270	20.6
21FLVEMDVC-007	11/3/2008	7.4	20.06	1.07	0.110	21.7
21FLVEMDVC-008	11/3/2008	10.9	20.29	1.12	0.120	15.7
21FLVEMDVC-009	11/3/2008	5.3	19.80	1.10	0.120	36.3
21FLVEMDVC-010	11/3/2008	4.0	20.09	1.13	0.120	14.9
21FLVEMDVC-004	11/3/2008	8.8	20.11	0.74	0.130	46.2
21FLVEMDVC-012	11/4/2008	3.0	20.80	-	0.130	14.1
21FLSJWM27010037	12/9/2008	4.4	17.21	0.60	0.118	21
21FLA 27010942	1/6/2009	6.2	20.30	0.79	0.068	22
21FLA 27010567	1/6/2009	6.4	20.28	0.82	0.064	19
21FLVEMDVC-012	1/12/2009	7.0	17.91	-	-	-
21FLVEMDVC-008	1/12/2009	6.3	17.84	-	-	-
21FLVEMDVC-009	1/12/2009	10.0	18.10	-	-	-
21FLVEMDVC-010	1/12/2009	12.7	18.32	-	-	-
21FLVEMDVC-011	1/12/2009	7.0	17.92	-	-	-
21FLVEMDVC-HL11A	1/12/2009	9.3	18.06	-	-	-
21FLVEMDVC-006	2/3/2009	2.5	14.56	0.72	0.050	18.9
21FLVEMDVC-004	2/3/2009	4.5	14.54	0.75	0.060	28.4
21FLVEMDVC-012	2/3/2009	-	15.25	0.84	0.100	18.7
21FLVEMDVC-011	2/3/2009	9.1	15.30	0.86	0.090	28.2
21FLVEMDVC-010	2/3/2009	9.0	15.18	0.96	0.080	28.3
21FLVEMDVC-005	2/3/2009	2.1	14.30	0.73	0.050	21.8
21FLVEMDVC-007	2/3/2009	3.7	15.07	0.83	0.070	24.7
21FLVEMDVC-008	2/3/2009	4.3	14.97	0.87	0.070	31.5

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-009	2/3/2009	6.9	15.47	0.83	0.070	22.5
21FLSJWM27010037	2/16/2009	11.5	19.09	0.48	0.117	21
21FLA 27010034	2/26/2009	8.4	16.78	0.77	0.073	34
21FLA 27010942	2/26/2009	3.1	16.63	-	-	-
21FLA 27010567	2/26/2009	2.4	16.44	-	-	-
21FLVEMDVC-012	3/26/2009	7.3	21.33	-	-	-
21FLVEMDVC-008	3/26/2009	6.0	20.76	-	-	-
21FLVEMDVC-009	3/26/2009	4.7	21.05	-	-	-
21FLVEMDVC-010	3/26/2009	7.1	21.11	-	-	-
21FLVEMDVC-011	3/26/2009	6.1	21.26	-	-	-
21FLVEMDVC-HL11A	3/26/2009	9.6	21.07	-	-	-
21FLSJWM27010037	4/9/2009	7.3	18.64	0.76	0.135	36.5
21FLVEMDVC-012	4/16/2009	6.2	23.01	-	-	-
21FLVEMDVC-008	4/16/2009	7.1	22.15	-	-	-
21FLVEMDVC-009	4/16/2009	5.2	22.37	-	-	-
21FLVEMDVC-010	4/16/2009	3.6	22.21	-	-	-
21FLVEMDVC-011	4/16/2009	6.0	22.29	-	-	-
21FLVEMDVC-HL11A	4/16/2009	5.5	22.64	-	-	-
21FLVEMDVC-012	5/5/2009	5.1	26.50	0.49	0.100	24.3
21FLVEMDVC-011	5/5/2009	9.1	26.10	0.51	0.120	35.4
21FLVEMDVC-009	5/5/2009	6.7	27.25	1.06	0.210	79.3
21FLVEMDVC-005	5/5/2009	9.8	26.48	0.75	0.130	26.3
21FLVEMDVC-006	5/5/2009	9.2	26.70	0.69	0.110	31.4
21FLVEMDVC-007	5/5/2009	9.4	27.04	0.78	0.140	33.3
21FLVEMDVC-008	5/5/2009	12.2	26.40	1.02	0.190	40.4
21FLVEMDVC-010	5/5/2009	3.7	26.54	0.87	0.170	54.8
21FLVEMDVC-004	5/5/2009	13.1	26.23	0.98	0.140	92.2
21FLSJWM27010037	6/4/2009	45.1	28.97	1.55	0.236	23
21FLA 27010567	6/9/2009	8.1	27.10	2.04	0.180	29
21FLA 27010034	6/9/2009	15.0	27.10	2.05	0.220	51
21FLA 27010942	6/9/2009	7.9	27.70	2.17	0.220	68
21FLVEMDVC-012	6/22/2009	10.4	31.27	-	-	-
21FLVEMDVC-008	6/22/2009	26.1	31.16	-	-	-
21FLVEMDVC-009	6/22/2009	10.7	31.13	-	-	-

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-010	6/22/2009	11.0	31.84	-	-	-
21FLVEMDVC-011	6/22/2009	12.1	31.31	-	-	-
21FLVEMDVC-HL11A	6/22/2009	12.1	30.98	-	-	-
21FLA 27010034	7/14/2009	33.0	29.90	1.40	0.130	23
21FLA 27010942	7/14/2009	29.0	30.30	1.51	0.140	21
21FLA 27010567	7/14/2009	34.0	29.20	1.61	0.120	25
21FLVEMDVC-009	8/4/2009	15.8	31.62	1.03	0.170	5.3
21FLVEMDVC-011	8/4/2009	4.8	30.80	1.15	0.190	4.3
21FLVEMDVC-012	8/4/2009	4.9	31.30	1.22	0.180	3
21FLVEMDVC-006	8/4/2009	4.8	31.27	1.33	0.140	6.6
21FLVEMDVC-004	8/4/2009	17.7	30.46	1.58	0.170	22.1
21FLVEMDVC-005	8/4/2009	18.7	30.78	1.60	0.160	23.8
21FLVEMDVC-007	8/4/2009	19.3	31.25	1.37	0.170	21.8
21FLVEMDVC-008	8/4/2009	19.7	31.03	1.26	0.170	17.6
21FLVEMDVC-010	8/4/2009	7.6	31.28	1.17	0.180	9.8
21FLSJWM27010037	8/5/2009	3.0	30.42	1.26	0.221	13.5
21FLA 27010034	9/9/2009	-	28.68	-	-	-
21FLA 27010942	9/9/2009	-	28.62	-	-	-
21FLA 27010567	9/9/2009	-	28.51	-	-	-
21FLVEMDVC-012	9/15/2009	1.1	28.73	-	-	-
21FLVEMDVC-008	9/15/2009	1.9	28.48	-	-	-
21FLVEMDVC-009	9/15/2009	2.1	28.58	-	-	-
21FLVEMDVC-010	9/15/2009	2.4	28.58	-	-	-
21FLVEMDVC-011	9/15/2009	1.3	28.53	-	-	-
21FLVEMDVC-HL11A	9/15/2009	2.0	28.70	-	-	-
21FLVEMDVC-012	10/12/2009	9.5	29.69	-	-	-
21FLVEMDVC-008	10/12/2009	7.4	29.23	-	-	-
21FLVEMDVC-009	10/12/2009	4.4	29.34	-	-	-
21FLVEMDVC-010	10/12/2009	4.0	29.36	-	-	-
21FLVEMDVC-011	10/12/2009	4.7	29.44	-	-	-
21FLVEMDVC-HL11A	10/12/2009	8.3	29.62	-	-	-
21FLVEMDVC-012	11/3/2009	1.5	24.81	1.02	0.130	9.6
21FLVEMDVC-011	11/3/2009	1.6	24.02	1.07	0.130	11.8
21FLVEMDVC-004	11/3/2009	3.2	23.28	1.20	0.140	25.7

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-005	11/3/2009	1.9	22.98	1.37	0.180	0.4
21FLVEMDVC-006	11/3/2009	2.1	23.14	1.24	0.150	14.3
21FLVEMDVC-007	11/3/2009	1.9	23.77	1.21	0.150	19.1
21FLVEMDVC-008	11/3/2009	1.8	23.88	1.14	0.150	16.5
21FLVEMDVC-009	11/3/2009	1.4	23.97	1.03	0.140	18.6
21FLVEMDVC-010	11/3/2009	2.1	23.93	1.03	0.130	11
21FLVEMDVC-012	12/7/2009	2.4	18.03	-	-	-
21FLVEMDVC-008	12/7/2009	1.8	17.23	-	-	-
21FLVEMDVC-009	12/7/2009	1.4	17.39	-	-	-
21FLVEMDVC-010	12/7/2009	1.6	17.33	-	-	-
21FLVEMDVC-011	12/7/2009	2.1	17.61	-	-	-
21FLVEMDVC-HL11A	12/7/2009	2.1	17.74	-	-	-
21FLVEMDVC-012	3/3/2010	13.9	15.89	1.26	0.140	57.2
21FLVEMDVC-011	3/3/2010	11.6	13.81	1.51	0.160	41.5
21FLVEMDVC-005	3/3/2010	12.5	12.80	1.38	0.110	43.2
21FLVEMDVC-006	3/3/2010	9.3	13.02	1.48	0.130	59.8
21FLVEMDVC-007	3/3/2010	12.3	13.24	1.45	0.140	60
21FLVEMDVC-008	3/3/2010	23.9	13.26	1.91	0.160	63.4
21FLVEMDVC-009	3/3/2010	19.0	13.40	1.44	0.180	71
21FLVEMDVC-010	3/3/2010	17.2	13.69	1.42	0.180	72
21FLVEMDVC-004	3/3/2010	8.6	13.63	1.02	0.060	31.2
21FLVEMDVC-012	4/6/2010	11.1	25.45	1.22	0.130	41.6
21FLVEMDVC-011	4/6/2010	5.1	24.81	1.27	0.110	18.8
21FLVEMDVC-010	4/6/2010	15.7	24.43	1.29	0.130	26
21FLVEMDVC-008	4/6/2010	13.3	24.45	1.37	0.130	37.2
21FLVEMDVC-006	4/6/2010	16.5	24.67	1.39	0.100	26.4
21FLVEMDVC-005	4/6/2010	9.8	24.70	1.41	0.090	20
21FLVEMDVC-009	4/6/2010	17.0	24.86	1.41	0.140	38
21FLVEMDVC-004	4/6/2010	16.0	24.36	1.42	0.090	21.6
21FLVEMDVC-007	4/6/2010	17.8	24.41	1.49	0.120	36.8
21FLVEMDVC-012	5/4/2010	8.8	27.85	-	-	-
21FLVEMDVC-008	5/4/2010	9.8	27.09	-	-	-
21FLVEMDVC-009	5/4/2010	7.0	27.11	-	-	-
21FLVEMDVC-010	5/4/2010	10.4	27.01	-	-	-

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-011	5/4/2010	8.1	27.31	-	-	-
21FLVEMDVC-HL11A	5/4/2010	9.4	27.37	-	-	-
21FLVEMDVC-012	6/8/2010	-	29.65	-	-	-
21FLVEMDVC-008	6/8/2010	-	29.10	-	-	-
21FLVEMDVC-009	6/8/2010	-	29.21	-	-	-
21FLVEMDVC-010	6/8/2010	-	29.11	-	-	-
21FLVEMDVC-011	6/8/2010	-	29.06	-	-	-
21FLVEMDVC-HL11A	6/8/2010	-	29.50	-	-	-
21FLVEMDVC-012	7/13/2010	17.2	31.08	-	0.150	45.4
21FLVEMDVC-005	7/13/2010	21.6	29.96	1.10	0.170	50.6
21FLVEMDVC-006	7/13/2010	14.6	30.17	1.35	0.180	55.8
21FLVEMDVC-007	7/13/2010	13.0	30.41	1.34	0.160	26.8
21FLVEMDVC-008	7/13/2010	10.5	30.44	1.25	0.180	57.2
21FLVEMDVC-009	7/13/2010	3.1	30.05	1.01	0.150	46
21FLVEMDVC-010	7/13/2010	5.9	30.22	0.90	0.130	30
21FLVEMDVC-011	7/13/2010	12.6	30.90	-	0.140	42.8
21FLVEMDVC-004	7/13/2010	19.1	30.21	1.08	0.130	40.6
21FLVEMDVC-012	8/2/2010	6.9	31.75	-	-	-
21FLVEMDVC-008	8/2/2010	11.9	30.93	-	-	-
21FLVEMDVC-009	8/2/2010	9.6	31.03	-	-	-
21FLVEMDVC-010	8/2/2010	4.6	30.91	-	-	-
21FLVEMDVC-011	8/2/2010	3.8	31.05	-	-	-
21FLVEMDVC-HL11A	8/2/2010	9.4	31.61	-	-	-
21FLVEMDVC-011	10/5/2010	9.7	24.70	-	0.100	20.2
21FLVEMDVC-012	10/5/2010	9.9	25.65	-	0.100	12.6
21FLVEMDVC-005	10/5/2010	13.1	24.22	-	0.080	19.8
21FLVEMDVC-006	10/5/2010	10.9	24.39	-	0.090	23.8
21FLVEMDVC-007	10/5/2010	11.5	24.45	-	0.100	27.8
21FLVEMDVC-008	10/5/2010	8.0	24.43	-	0.110	22.8
21FLVEMDVC-009	10/5/2010	10.0	24.70	-	0.120	24.5
21FLVEMDVC-010	10/5/2010	8.6	24.30	-	0.140	26.8
21FLVEMDVC-004	10/5/2010	14.6	23.98	-	0.100	31.6
21FLSJWM27010037	10/20/2010	8.1	23.78	-	0.182	58
21FLSJWM27010037	12/7/2010	3.1	11.59	-	0.102	48

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-006	1/11/2011	5.7	13.70	-	0.130	11.6
21FLVEMDVC-005	1/11/2011	7.3	13.83	-	0.200	11.4
21FLVEMDVC-007	1/11/2011	4.6	14.09	-	0.130	7.2
21FLVEMDVC-011	1/11/2011	15.6	14.25	-	0.120	11.8
21FLVEMDVC-010	1/11/2011	10.8	14.44	-	0.160	7
21FLVEMDVC-009	1/11/2011	9.1	14.24	-	0.110	10.8
21FLVEMDVC-008	1/11/2011	5.1	14.19	-	0.170	12.2
21FLVEMDVC-012	1/11/2011	14.3	14.67	-	0.120	8.4
21FLVEMDVC-004	1/11/2011	10.7	13.85	-	0.120	13.4
21FLVEMDVC-012	2/9/2011	5.7	16.09	-	-	-
21FLVEMDVC-008	2/9/2011	7.3	15.41	-	-	-
21FLVEMDVC-009	2/9/2011	5.1	16.01	-	-	-
21FLVEMDVC-010	2/9/2011	6.2	15.51	-	-	-
21FLVEMDVC-011	2/9/2011	6.5	16.11	-	-	-
21FLVEMDVC-HL11A	2/9/2011	6.2	16.22	-	-	-
21FLSJWM27010037	2/14/2011	3.9	13.28	0.47	0.112	43
21FLVEMDVC-012	3/7/2011	12.4	19.95	-	-	-
21FLVEMDVC-008	3/7/2011	11.3	19.17	-	-	-
21FLVEMDVC-009	3/7/2011	10.0	19.77	-	-	-
21FLVEMDVC-010	3/7/2011	10.0	19.91	-	-	-
21FLVEMDVC-011	3/7/2011	12.0	19.78	-	-	-
21FLVEMDVC-HL11A	3/7/2011	9.7	20.02	-	-	-
21FLSJWM27010037	4/1/2011	9.6	21.01	0.71	0.141	52
21FLVEMDVC-012	4/12/2011	10.0	27.50	-	-	-
21FLVEMDVC-005	4/12/2011	9.4	26.40	-	-	-
21FLVEMDVC-006	4/12/2011	11.7	26.80	-	-	-
21FLVEMDVC-007	4/12/2011	14.9	26.98	-	-	-
21FLVEMDVC-008	4/12/2011	14.0	26.78	-	-	-
21FLVEMDVC-009	4/12/2011	12.8	27.24	-	-	-
21FLVEMDVC-010	4/12/2011	11.4	26.96	-	-	-
21FLVEMDVC-011	4/12/2011	13.8	26.90	-	-	-
21FLVEMDVC-004	4/12/2011	16.7	26.20	-	-	-
21FLVEMDVC-012	5/9/2011	14.2	26.28	-	-	-
21FLVEMDVC-008	5/9/2011	11.5	25.09	-	-	-

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-009	5/9/2011	14.3	25.62	-	-	-
21FLVEMDVC-010	5/9/2011	9.5	25.22	-	-	-
21FLVEMDVC-011	5/9/2011	11.3	25.38	-	-	-
21FLVEMDVC-HL11A	5/9/2011	12.9	26.50	-	-	-
21FLVEMDVC-012	6/6/2011	17.8	29.50	-	-	-
21FLVEMDVC-008	6/6/2011	16.2	29.06	-	-	-
21FLVEMDVC-009	6/6/2011	17.2	29.61	-	-	-
21FLVEMDVC-010	6/6/2011	15.2	29.40	-	-	-
21FLVEMDVC-011	6/6/2011	15.3	29.31	-	-	-
21FLVEMDVC-HL11A	6/6/2011	20.7	29.43	-	-	-
21FLSJWM27010037	6/15/2011	10.3	28.95	0.86	0.189	94
21FLVEMDVC-008	7/12/2011	10.3	30.49	-	0.080	11
21FLVEMDVC-012	7/12/2011	27.6	31.61	-	0.140	13.4
21FLVEMDVC-006	7/12/2011	8.0	30.53	-	0.130	12.8
21FLVEMDVC-010	7/12/2011	13.9	30.32	-	0.120	50.6
21FLVEMDVC-007	7/12/2011	13.7	30.21	-	0.110	16.8
21FLVEMDVC-005	7/12/2011	15.3	29.94	-	0.140	16.2
21FLVEMDVC-009	7/12/2011	14.8	30.83	-	0.130	25.8
21FLVEMDVC-011	7/12/2011	25.0	30.74	-	0.150	45.1
21FLVEMDVC-004	7/12/2011	20.8	29.88	-	0.150	22.4
21FLVEMDVC-012	8/1/2011	6.9	31.29	-	-	-
21FLVEMDVC-008	8/1/2011	12.4	31.18	-	-	-
21FLVEMDVC-009	8/1/2011	12.6	31.18	-	-	-
21FLVEMDVC-010	8/1/2011	12.5	31.29	-	-	-
21FLVEMDVC-011	8/1/2011	10.2	31.37	-	-	-
21FLVEMDVC-HL11A	8/1/2011	12.5	31.31	-	-	-
21FLSJWM27010037	8/11/2011	17.9	29.47	0.82	0.177	62
21FLVEMDVC-012	9/12/2011	13.9	29.31	-	-	-
21FLVEMDVC-008	9/12/2011	6.6	29.16	-	-	-
21FLVEMDVC-009	9/12/2011	9.0	29.18	-	-	-
21FLVEMDVC-010	9/12/2011	10.4	29.27	-	-	-
21FLVEMDVC-011	9/12/2011	11.6	29.43	-	-	-
21FLVEMDVC-HL11A	9/12/2011	15.0	29.46	-	-	-
21FLVEMDVC-005	10/4/2011	7.8	24.17	-	0.070	10

Station	Sample Date	CHLAC (µg/L)	TEMP (°C)	TN (mg/L)	TP (mg/L)	TSS (mg/L)
21FLVEMDVC-010	10/4/2011	3.6	24.96	-	0.120	4.3
21FLVEMDVC-009	10/4/2011	3.7	25.36	-	0.100	4.8
21FLVEMDVC-004	10/4/2011	5.9	24.37	-	0.090	16.2
21FLVEMDVC-007	10/4/2011	6.0	24.53	-	0.080	8.2
21FLVEMDVC-011	10/4/2011	4.8	25.22	-	0.120	14.8
21FLVEMDVC-006	10/4/2011	7.6	24.33	-	0.120	14.8
21FLVEMDVC-008	10/4/2011	6.8	24.94	-	0.100	7.9
21FLVEMDVC-012	10/4/2011	-	26.40	-	0.160	22
21FLVEMDVC-012	11/14/2011	5.2	19.85	-	-	-
21FLVEMDVC-008	11/14/2011	3.3	19.03	-	-	-
21FLVEMDVC-009	11/14/2011	2.6	19.20	-	-	-
21FLVEMDVC-010	11/14/2011	2.9	19.46	-	-	-
21FLVEMDVC-011	11/14/2011	3.2	19.52	-	-	-
21FLVEMDVC-HL11A	11/14/2011	4.5	19.88	-	-	-
21FLSJWM27010037	11/16/2011	11.4	22.60	0.27	0.056	10.6
21FLVEMDVC-012	12/5/2011	11.6	19.52	-	-	-
21FLVEMDVC-008	12/5/2011	2.7	18.81	-	-	-
21FLVEMDVC-009	12/5/2011	4.5	18.88	-	-	-
21FLVEMDVC-010	12/5/2011	5.3	18.91	-	-	-
21FLVEMDVC-011	12/5/2011	6.9	19.09	-	-	-
21FLVEMDVC-HL11A	12/5/2011	5.3	19.10	-	-	-

Appendix C: LSPC Modeling Methodology, Daytona Watershed

An LSPC model was utilized to estimate the nutrient loads within and discharge from the Daytona watershed, including loads from the Guana, Pellicer, and Tomoka Rivers.

LSPC is a watershed modeling system that includes streamlined Hydrological Simulation Program–Fortran (HSPF) algorithms for simulating hydrology, sediment, and general water quality, as well as a simplified stream fate and transport model. LSPC is derived from the Mining Data Analysis System (MDAS), which was originally developed by EPA Region 3 (under contract with Tetra Tech) and has been widely used for the development of TMDLs. In 2003, EPA Region 4 contracted with Tetra Tech to refine, streamline, and produce user documentation for the model for public distribution. LSPC was developed to serve as the primary watershed model for the EPA TMDL Modeling Toolbox. It was used to simulate runoff (flow, BOD, TN, TP, and DO) from the land surface using a daily timestep for current and natural conditions. LSPC provided tributary flows and temperature to the Environmental Fluid Dynamics Code (EFDC) estuary models and tributary water quality concentrations to Water Quality Analysis Simulation Program 7 (WASP7) estuary models.

To evaluate the contributing sources to a waterbody and to represent the spatial variability of these sources within the watershed model, the contributing drainage area was represented by a series of subwatersheds for each of the models. The subwatersheds for the Daytona Watershed model were developed using the 12-digit hydrologic unit code (HUC 12) watershed data layer and the U.S. Geological Survey (USGS) National Hydrography Dataset (NHD) (**Figure C.1**).

The LSPC model has a representative reach defined for each subwatershed, and the main channel stem within each subwatershed was used as the representative reach. The characteristics for each reach included the length and slope of the reach, the channel geometry and the connectivity between the subwatersheds. Length and slope data for each reach were obtained using the USGS Digital Elevation Model (DEM) and NHD data.

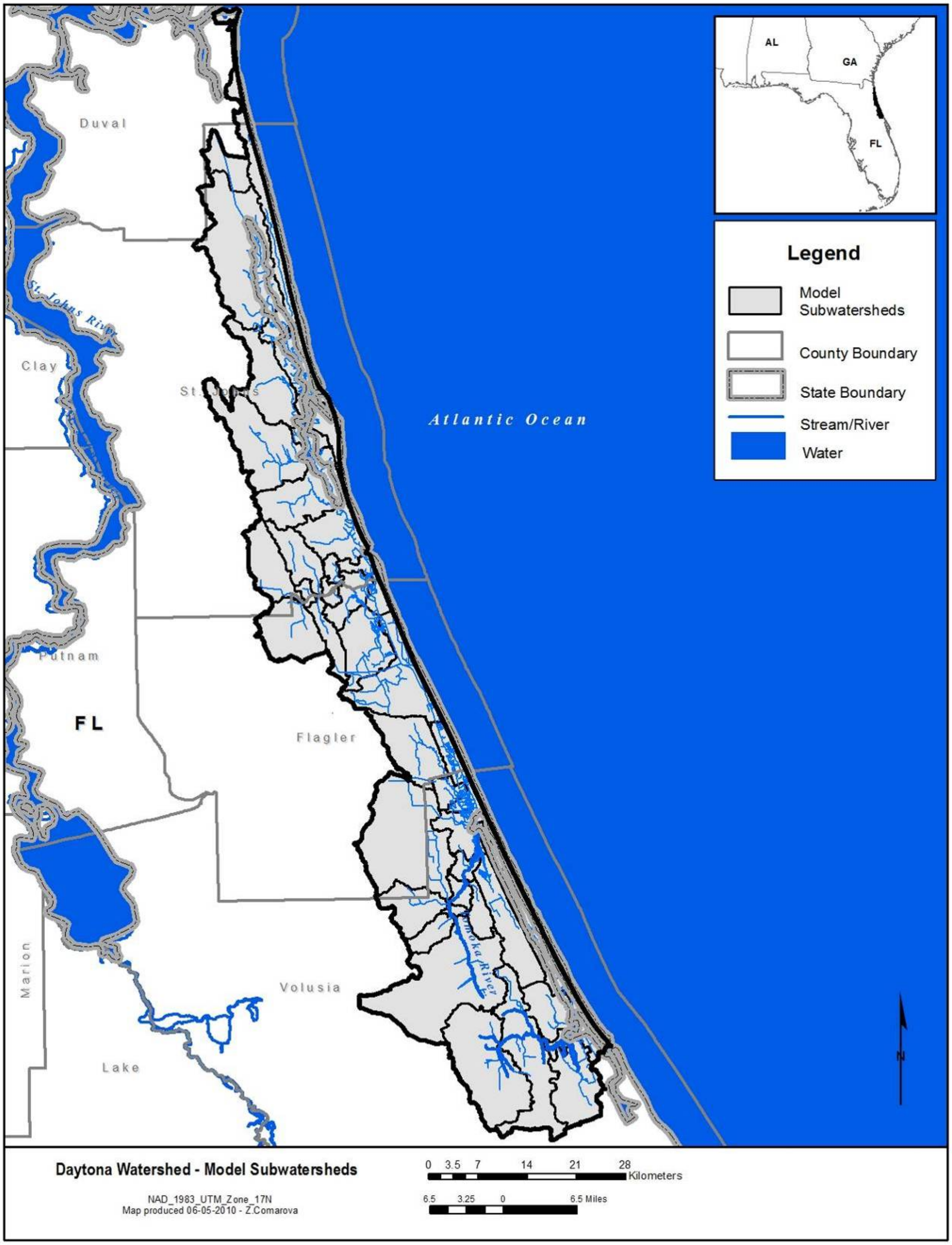

Figure C.1. LSPC Subwatershed Boundaries for the Daytona Watershed

The attributes supplied for each reach were used to develop a function table (FTABLE) that describes the hydrology of the stream reach by defining the functional relationship between water depth, surface area, water volume, and outflow in the segment. The assumption of a fixed depth, area, volume, outflow relationship rules out cases where the flow reverses direction or where one reach influences another upstream reach in a time-dependent way.

The watershed model uses land use data as the basis for representing hydrology and nonpoint source loadings. The Department's Level III Florida land use, specifically the SJRWMD 2004 dataset, was used to determine the land use representation. The National Land Cover Dataset (NLCD) was used to develop the impervious land use representations.

The SJRWMD coverage utilized a variety of land use classes that were grouped and reclassified into 18 land use categories, as follows: beaches/dune/mud, open water, utility swaths, developed open space, developed low intensity, developed medium intensity, developed high intensity, clear-cut/sparse, quarries/strip mines, deciduous forest, evergreen forest, mixed forest, golf courses, pasture, row crop, forested wetland, nonforested wetland (salt/brackish), and nonforested wetland (freshwater). The LSPC model requires the division of land uses in each subwatershed into separate pervious and impervious land units. The NLCD 2006 percent impervious coverage was used to determine the percent impervious area associated with each land use category. Any impervious areas associated with utility swaths, developed open space, and developed low intensity were grouped together and placed into a new land use category named *low intensity development impervious*. Impervious areas associated with medium-development and high-intensity development were kept separate and placed into two new categories for *medium-intensity development impervious and high-intensity development impervious*, respectively. Finally, any impervious areas not already accounted for in the three developed impervious categories were grouped together into a fourth new category for all remaining impervious land use (**Figure C.2**).

Soil data for the Florida watersheds was obtained from the SSURGO database produced and distributed by the USDA–NRCS. The SSURGO data were used to determine the total area that each hydrologic soil group covered within each subwatershed. The subwatersheds were represented by the hydrologic soil group that had the highest percentage of coverage within the boundaries of the subwatershed. There dominant soil groups in Daytona are D and D-type soils (B/D), which have a high water table due to characteristics such as slow infiltration rates or shallow soils over an impervious layer (**Figure C.3**).

Facilities permitted under the NPDES Program are, by definition, considered point sources. The NPDES GIS coverages provided by the Department were adopted as the starting point for the evaluation of point sources for the Florida watershed models and reflected discharges as of December 2009. In areas where data were incomplete, data from the EPA Permit Compliance System (PCS) were used. Following data collection, any remaining gaps in the data of three months or less were filled by averaging data from before and after gap months. If the gaps in the data were larger than three months, the long-term average was supplied. Stormwater discharges, such as MS4s, were not input directly into the model but were assumed to be included in the urban land use loading. Point sources that were designated as reuse facilities were not input directly into the model but were accounted for in the adjustment of the hydrologic calibration parameters. **Figure C.4** shows the point sources directly discharging to the Daytona Watershed that were included in the watershed model.

In the watershed model, nonpoint source loadings and hydrologic conditions are dependent on weather conditions. Hourly data from weather stations within the boundaries of, or close to, the subwatersheds were applied to the watershed model. A weather data forcing file was generated in ASCII format (*.air) for each meteorological station used in the hydrologic evaluations in LSPC. Each meteorological station file contained atmospheric data used in modeling the hydrologic processes. These data included precipitation, air temperature, dew point temperature, wind speed, cloud cover, evaporation, and solar radiation. These data were used directly, or calculated from the observed data. The Daytona Watershed model weather stations contained data from 1996 through 2009. **Table C.1** lists the meteorological stations used in the model.

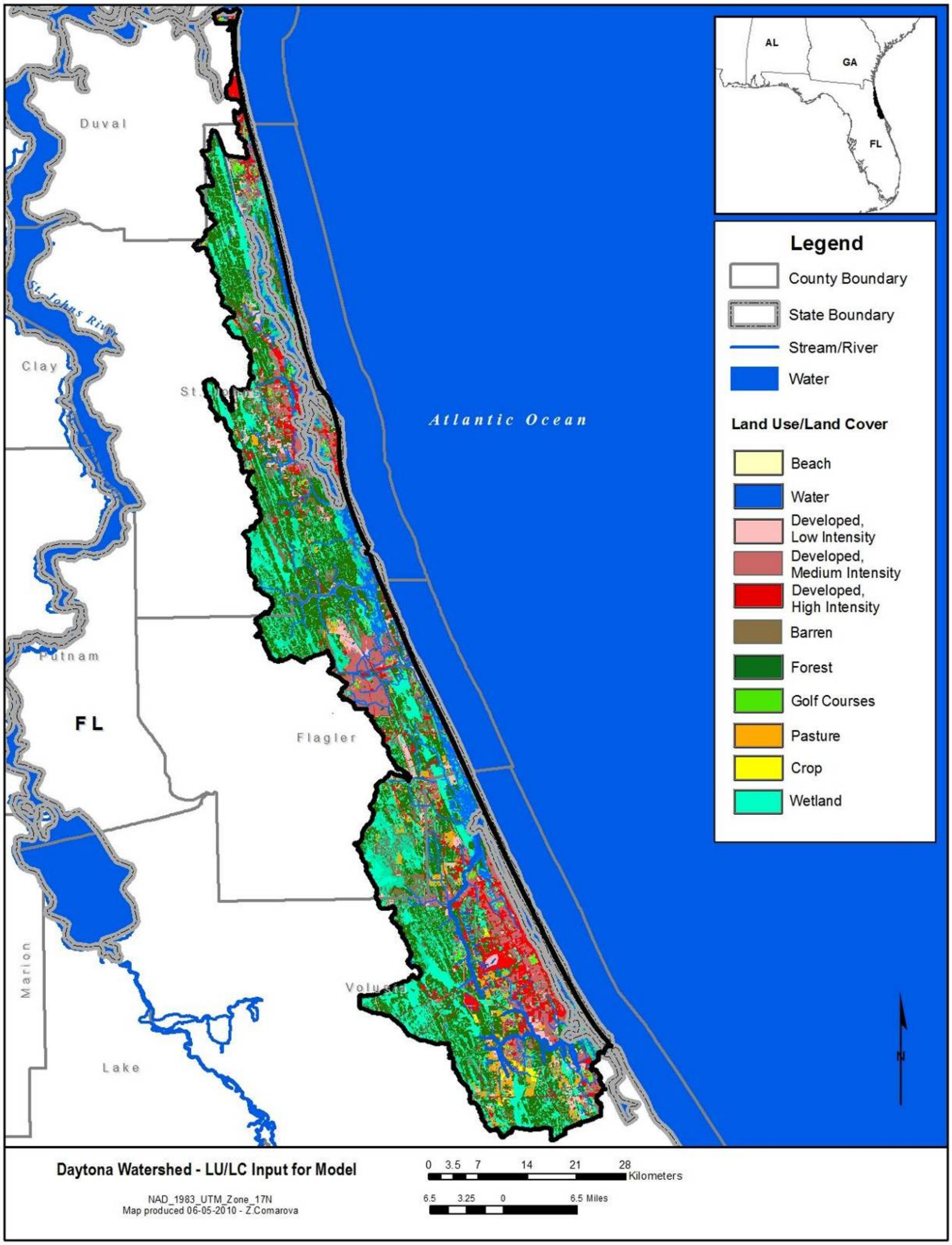

Figure C.2. Reclassified SJRWMD 2004 Land Use Coverage of the Daytona Watershed

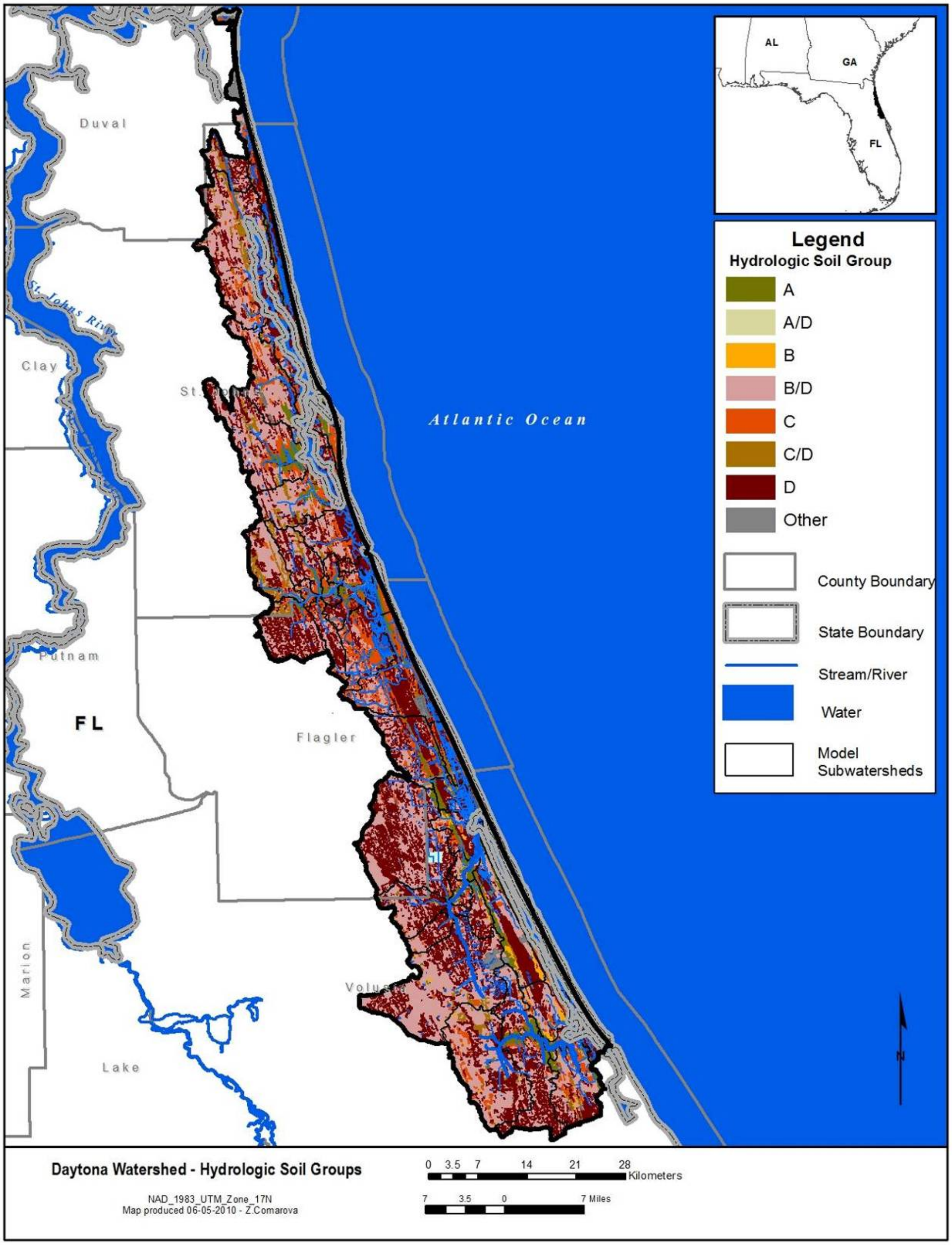

Figure C.3. Hydrologic Soil Groups for the Daytona Watershed

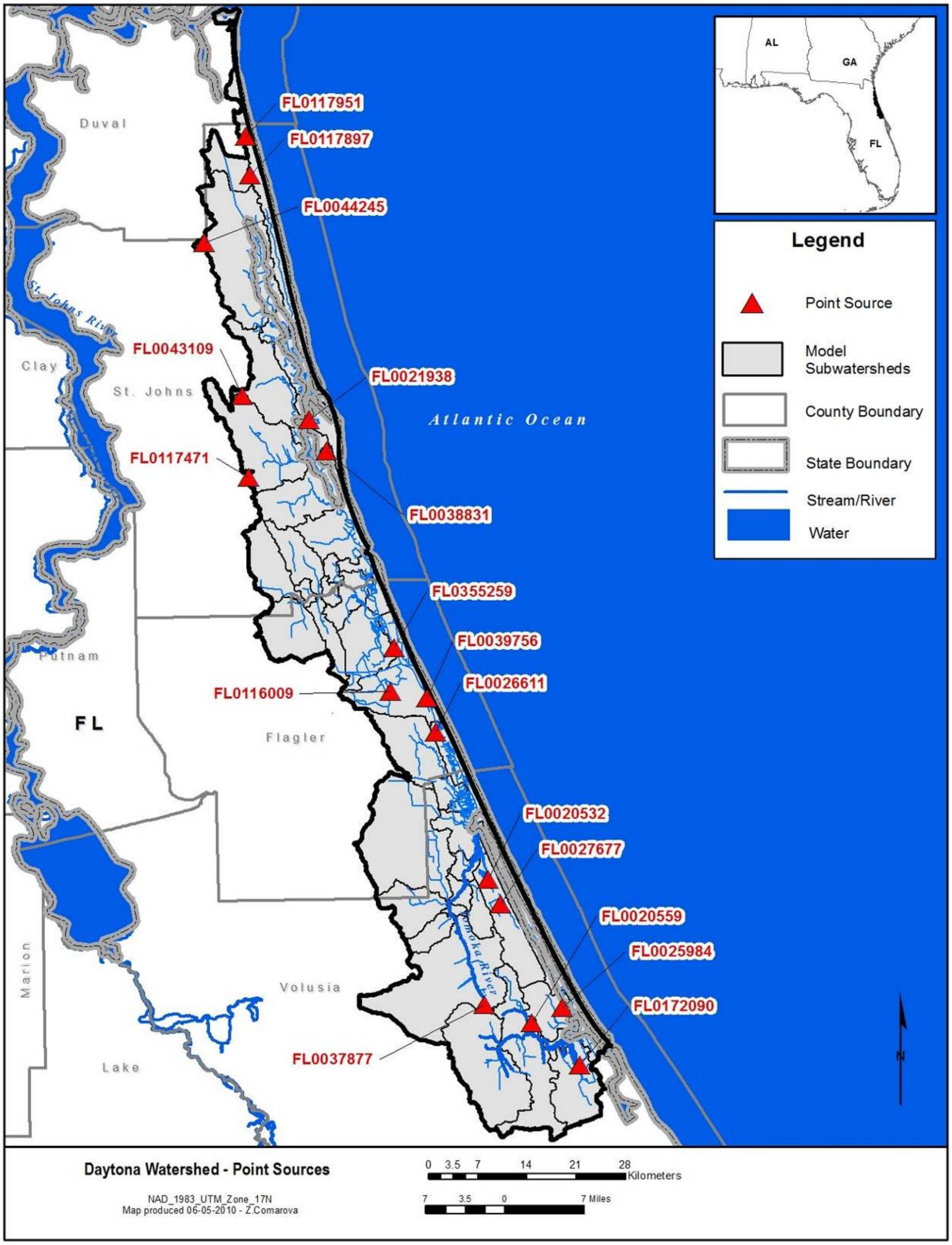

Figure C.4. Point Sources Included in the Daytona Watershed Model

Table C.1. Meteorological Stations used in the Daytona Watershed Model

Station ID	LSPC ID	Station Name	Elevation	County	Latitude	Longitude
082150	1	Daytona Beach	29	Volusia, FL	29.1903	-81.0636
082158	2	Daytona Beach Intl Airport	31	Volusia, FL	29.1828	-81.0483
084366	3	Jacksonville Beach	10	Duval, FL	30.2900	-81.3922
086767	4	Palm Coast 6 NE	5	Flagler, FL	29.6347	-81.2061
087826	5	St. Augustine Lighthouse	12	St. Johns FL	29.8875	-81.2917

The calibration of the LSPC watershed hydrology model involved comparing simulated stream flows with the USGS flow stations. The calibration of the hydrologic parameters was performed from January 1, 1997, through December 31, 2009. The best available gages were used as hydrology calibration stations.

LSPC's algorithms are identical to those in HSPF. The LSPC/HSPF modules used to represent watershed hydrology include PWATER (water budget simulation for pervious land units) and IWATER (water budget simulation for impervious land units). A detailed description of relevant hydrological algorithms is presented in the *HSPF Version 12 User's Manual* (Bicknell *et al.* 2004).

Calibration parameters were adjusted within the *BASINS Technical Note 6* (EPA 2000) typical minimum and maximum ranges for both hydrologic soil group and land use. Parameters were not adjusted outside the possible minimum and maximum ranges. To calibrate, information on the watersheds' topography, geology, climate, land use, and anthropogenic influences was researched. Parameters were adjusted within reasonable constraints until an acceptable agreement was achieved between simulated and observed stream flow. Model parameters adjusted included evapotranspiration, infiltration, upper and lower zone storage, ground water storage, losses to the deep ground water system, and Manning's roughness coefficient "n."

A rating system was applied to the calibration and validations stations to determine the overall calibration success. A weighted score was assigned to simulated versus observed errors, with total flow, storm flow, and low flow volumes having the greatest weight. The summation of the weighted scores was assigned a qualitative descriptor of Very Good (VG), Good (G), Fair (F), or Poor (P). The highest possible score was 80 and the lowest possible score was 20. Scores from 80 to 76 were rated as VG, 75 to 56 G, 55 to 36 F, and 35 to 20 P.

Figures C.5 through **C.10** and **Tables C.2** and **C.3** present the hydrologic calibration results.

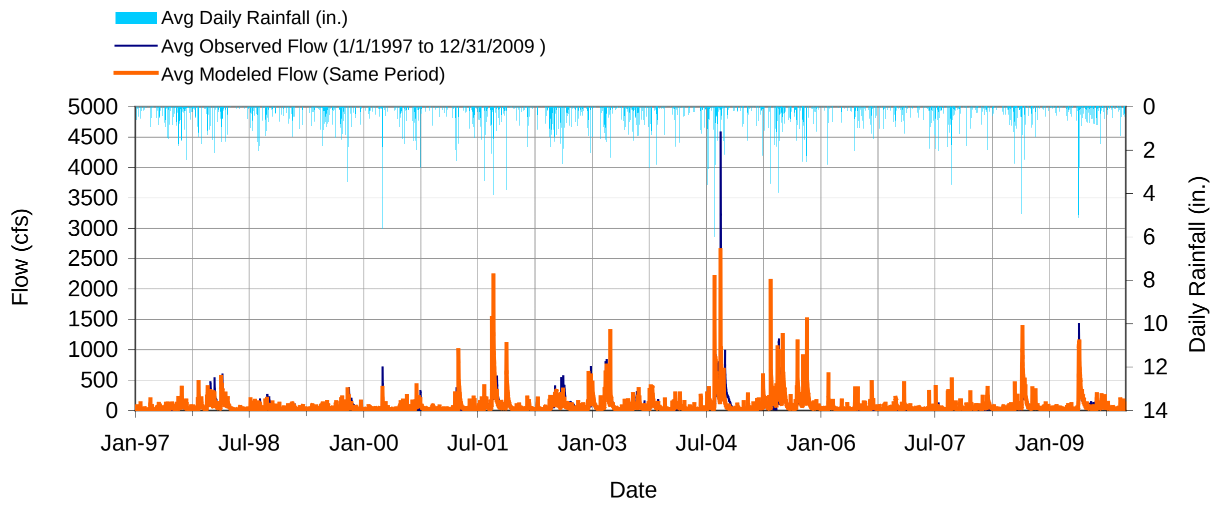

Figure C.5. Mean Daily Flow: Model Outlet 120015 versus USGS 02247510 Tomoka River near Holly Hill, FL

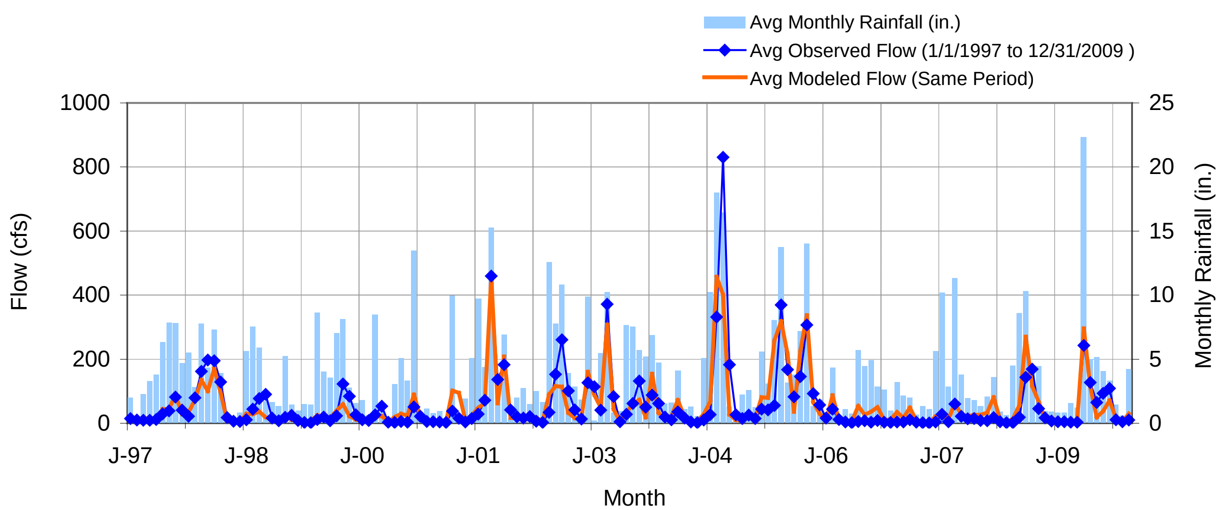

Figure C.6. Mean Monthly Flow: Model Outlet 120015 versus USGS 02247510 Tomoka River near Holly Hill, FL

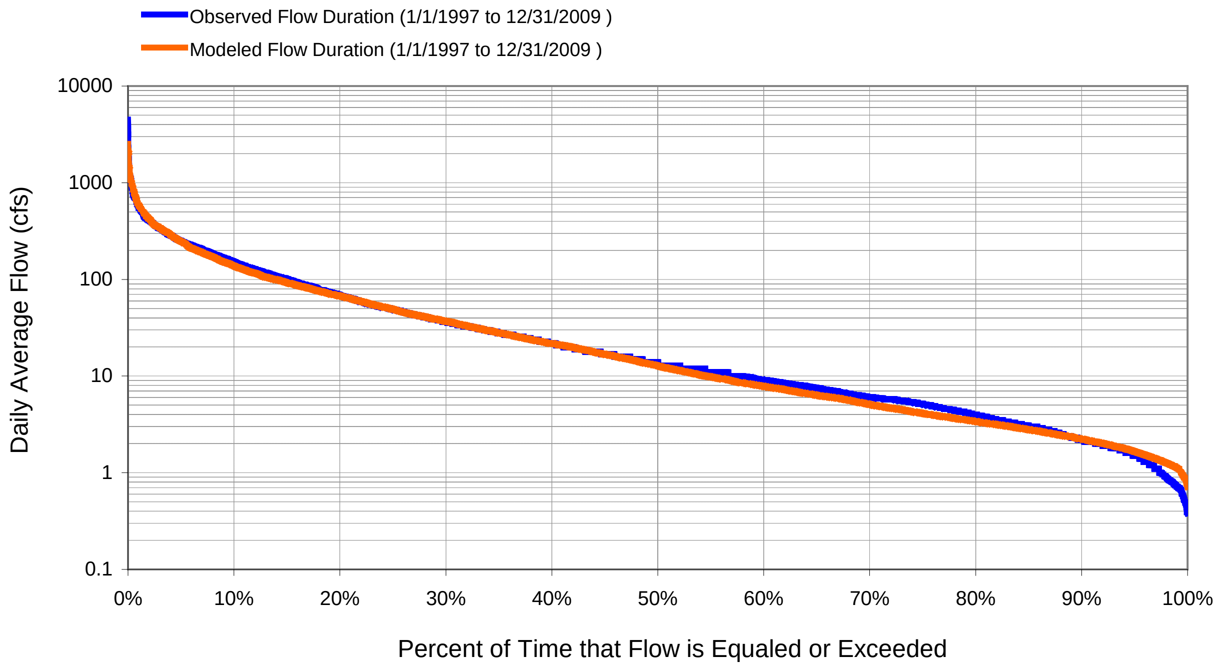

Figure C.7. Flow Exceedance: Model Outlet 120015 versus USGS 02247510 Tomoka River near Holly Hill, FL

Table C.2. Summary Statistics: Model Outlet 120015 versus USGS 02247510 Tomoka River near Holly Hill, FL

LSPC Simulated Flow		Observed Flow Gage		
REACH OUTFLOW FROM SUBBASIN 120015 13-Year Analysis Period: 1/1/1997 - 12/31/2009 Flow volumes are (inches/year) for upstream drainage area		USGS 02247510 TOMOKA RIVER NEAR HOLLY HILL, FL Hydrologic Unit Code: 3080201 Latitude: 29.21748099 Longitude: -81.1086687 Drainage Area (sq-mi): 76.8		
Total Simulated In-stream Flow:	**10.09**	Total Observed In-stream Flow:		**10.20**
Total of simulated highest 10% flows:	**6.16**	Total of Observed highest 10% flows:		**6.14**
Total of Simulated lowest 50% flows:	**0.45**	Total of Observed Lowest 50% flows:		**0.50**
Simulated Summer Flow Volume (months 7-9):	**4.15**	Observed Summer Flow Volume (7-9):		**4.56**
Simulated Fall Flow Volume (months 10-12):	**2.11**	Observed Fall Flow Volume (10-12):		**2.51**
Simulated Winter Flow Volume (months 1-3):	**1.86**	Observed Winter Flow Volume (1-3):		**1.76**
Simulated Spring Flow Volume (months 4-6):	**1.97**	Observed Spring Flow Volume (4-6):		**1.38**
Total Simulated Storm Volume:	**4.22**	Total Observed Storm Volume:		**2.95**
Simulated Summer Storm Volume (7-9):	**1.76**	Observed Summer Storm Volume (7-9):		**1.44**
Errors (Simulated-Observed)	*Error Statistics*	*Recommended Criteria*	*Score*	
Error in total volume:	-1.07	10	16	
Error in 50% lowest flows:	**-10.09**	10	9	
Error in 10% highest flows:	0.20	15	12	
Seasonal volume error - Summer:	-8.89	30	8	
Seasonal volume error - Fall:	-15.90	30	8	
Seasonal volume error - Winter:	5.81	30	8	
Seasonal volume error - Spring:	**42.90**	30	4	
Error in storm volumes:	**43.01**	20	1	
Error in summer storm volumes:	22.56	50	4	
Nash-Sutcliffe Coefficient of Efficiency, E:	0.250	Total Score	70	
Baseline adjusted coefficient (Garrick), E':	0.362	Rating	G	

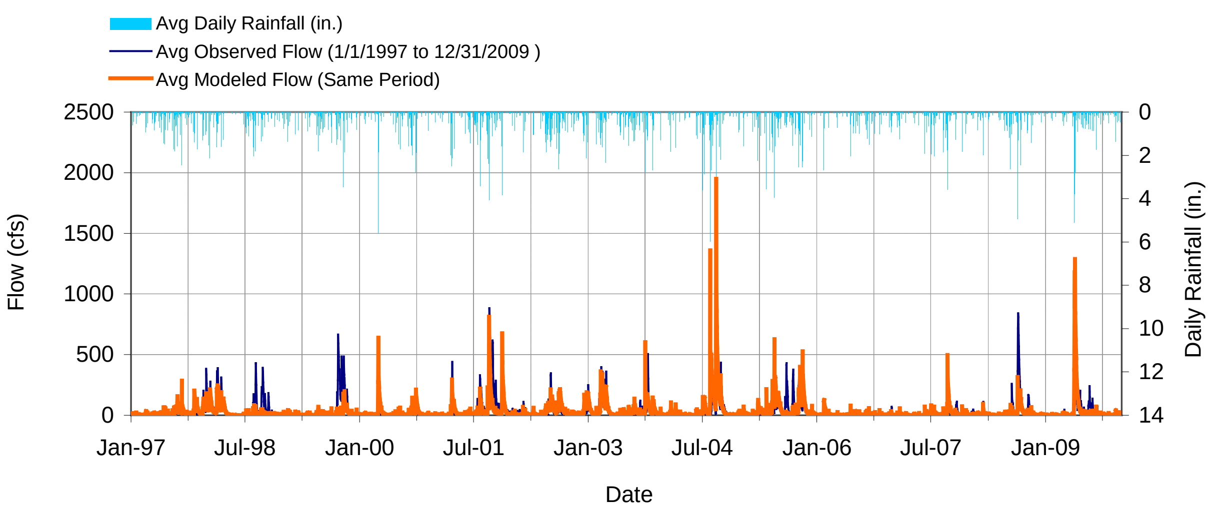

Figure C.8. Mean Daily Flow: Model Outlet 120007 versus USGS 02248000 Spruce Creek near Samsula, FL

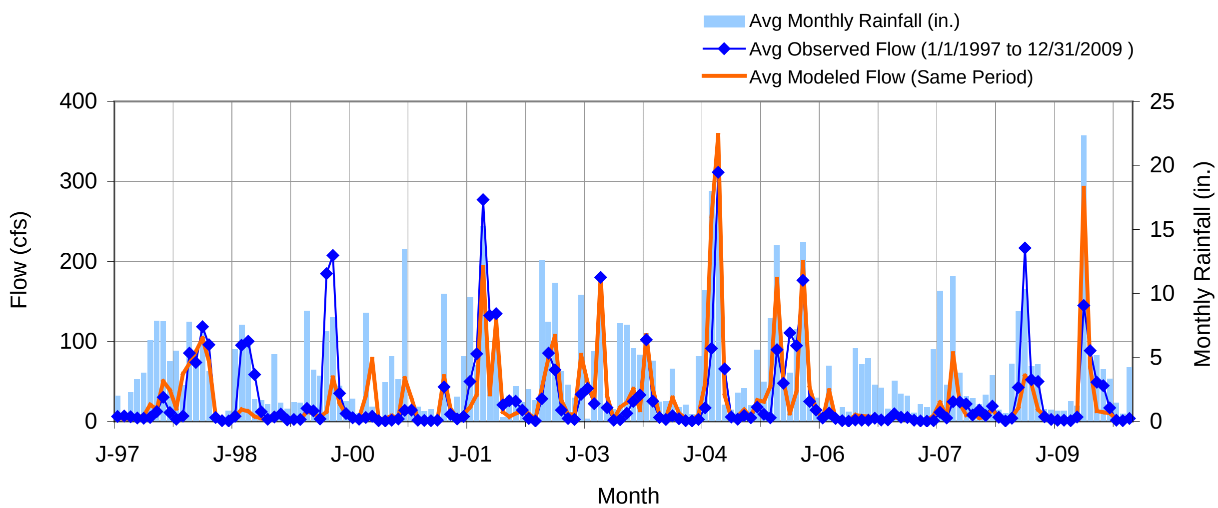

Figure C.9. Mean Monthly Flow: Model Outlet 120007 versus USGS 02248000 Spruce Creek near Samsula, FL

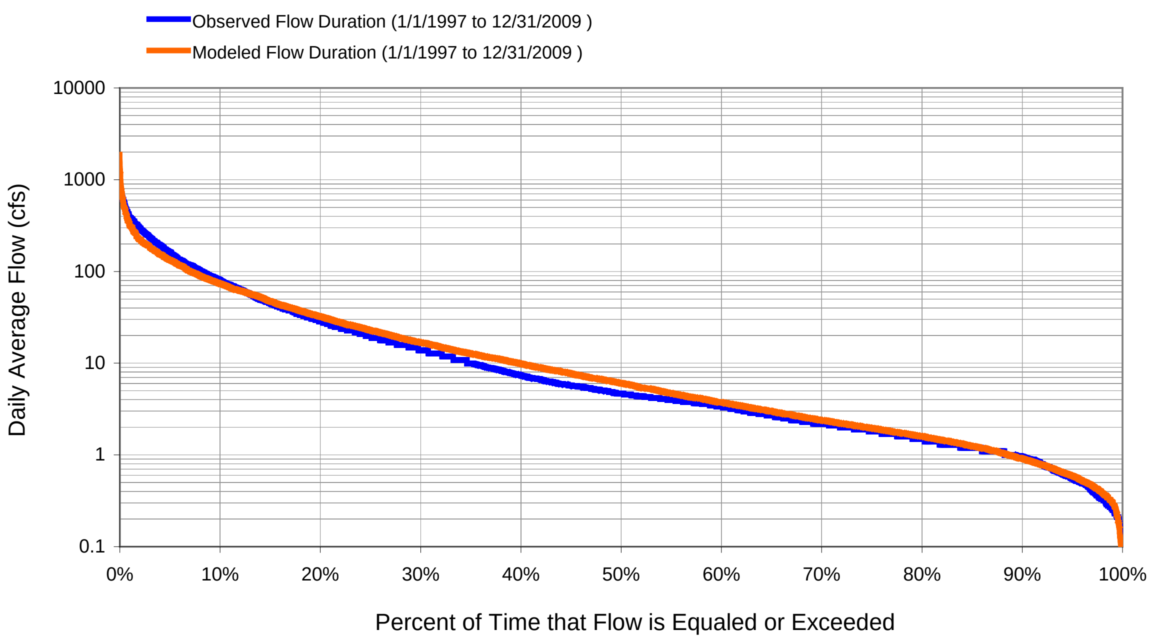

Figure C.10. Flow Exceedance: Model Outlet 120007 versus USGS 02248000 Spruce Creek near Samsula, FL

Table C.3. Summary Statistics: Model Outlet 120007 versus USGS 02248000 Spruce Creek near Samsula, FL

LSPC Simulated Flow		Observed Flow Gage		
REACH OUTFLOW FROM SUBBASIN 120007 13-Year Analysis Period: 1/1/1997 - 12/31/2009 Flow volumes are (inches/year) for upstream drainage area		USGS 02248000 SPRUCE CREEK NEAR SAMSULA, FL Hydrologic Unit Code: 3080201 Latitude: 29.05081845 Longitude: -81.0464455 Drainage Area (sq-mi): 33.4		
Total Simulated In-stream Flow:	**12.29**	Total Observed In-stream Flow:		**12.73**
Total of simulated highest 10% flows:	**7.88**	Total of Observed highest 10% flows:		**8.83**
Total of Simulated lowest 50% flows:	**0.48**	Total of Observed Lowest 50% flows:		**0.42**
Simulated Summer Flow Volume (months 7-9):	**4.75**	Observed Summer Flow Volume (7-9):		**5.91**
Simulated Fall Flow Volume (months 10-12):	**2.89**	Observed Fall Flow Volume (10-12):		**3.48**
Simulated Winter Flow Volume (months 1-3):	**2.23**	Observed Winter Flow Volume (1-3):		**2.09**
Simulated Spring Flow Volume (months 4-6):	**2.43**	Observed Spring Flow Volume (4-6):		**1.25**
Total Simulated Storm Volume:	**4.12**	Total Observed Storm Volume:		**4.58**
Simulated Summer Storm Volume (7-9):	**1.71**	Observed Summer Storm Volume (7-9):		**2.10**
Errors (Simulated-Observed)	*Error Statistics*	*Recommended Criteria*	*S core*	
Error in total volume:	-3.47	10	16	
Error in 50% lowest flows:	**15.18**	10	6	
Error in 10% highest flows:	-10.82	15	12	
Seasonal volume error - Summer:	-19.67	30	8	
Seasonal volume error - Fall:	-17.12	30	8	
Seasonal volume error - Winter:	6.64	30	8	
Seasonal volume error - Spring:	**93.90**	30	2	
Error in storm volumes:	-10.05	20	4	
Error in summer storm volumes:	-18.54	50	4	
Nash-Sutcliffe Coefficient of Efficiency, E:	0.227	Total Score	68	
Baseline adjusted coefficient (Garrick), E':	0.404	Rating	G	

The calibration of the LSPC water quality model involved comparing simulated water quality concentration and loads with the measured water quality concentrations and loads. The calibration of the water quality parameters was performed from January 1, 1997, through December 31, 2009. Water quality stations used for model calibration were co-located with hydrology stations used for model calibration.

LSPC models water quality parameters by using algorithms identical to those in HSPF. The LSPC/HSPF modules used to represent water temperature include PSTEMP (soil temperature) and HTRCH (heat exchange and water temperature). The LSPC/HSPF modules used to represent DO include PWTGAS (pervious water temperature and dissolved gas concentrations), IWTGAS (impervious water temperature and dissolved gas concentrations), and OXRX (primary DO and BOD balances). The LSPC/HSPF modules used to represent sediment include SEDMNT (pervious production and removal of sediment), SOLIDS (accumulation and removal of solids), and SEDTRN (behavior of inorganic sediment). The LSPC/HSPF module used to represent nutrients was GQUAL. A detailed description of relevant temperature algorithms is presented in the *HSPF Version 12 User's Manual* (Bicknell *et al.* 2004).

Initial water quality parameters were based on previous modeling efforts in the Chattahoochee and Flint River Basins along with information in the *BASINS Technical Note 8* (EPA 2006) and Rates, Constants, and Kinetics Formulations in Surface Water Quality Modeling (EPA 1985). Information on TN and TP loading and application rates for specific land uses was used to determine initial TN and TP accumulation rates and interflow and ground water concentrations. Water quality parameters were adjusted within accepted minimum and maximum ranges for each hydrologic soil group, land use, and reach group.

Temperature, DO, and BOD were calibrated simultaneously because the DO algorithms require water temperature, and the DO and BOD algorithms are interrelated. Temperature was calibrated by adjusting surface and interflow temperature slopes and intercepts, ground water temperature, and radiation coefficients until the simulated data closely matched the observed data. Following temperature calibration, DO and BOD were calibrated by adjusting reaeration, DO interflow and ground water concentration, BOD decay rate, BOD settling rate, and benthic oxygen demand. Sediment was calibrated by adjusting detachment, scour, and buildup/washoff coefficients. The nutrient constituents were modeled by buildup/washoff and assigning land use associated concentrations in ground water and interflow. Adjustments were made to monthly accumulation rate, monthly storage limit, interflow concentration, and ground water concentration for TN and TP until the simulated data were in range with the observed field data.

Both visual and statistical metrics were utilized during calibration. Visual calibration was accomplished by matching the trends in the measured water quality concentration data. Loading metrics, including annual loading percent error, were utilized for statistical calibration. Annual loading was only analyzed when two or more water quality samples were taken in a given year, and measured flow data were collected that year. If no measured flow data were collected but the contributing area of the water quality station had similar land uses and soil types as the contributing area of a neighboring hydrology station, weighted measured flow was used to calculate the loadings. A rating system was applied to the percent error of the average annual loadings at the calibration and validation stations to determine the overall calibration success. The average annual loading percent error was assigned a qualitative descriptor of Very Good (VG), Good (G), Fair (F), or Poor (P). Scores from ±0-40% were rated as VG, ±40 to 90% G, ±90 to 150% F, and ±150 to 500% P.

Figures C.11 through **C.22** and **Tables C.4** through **C.7** present nutrient concentration and loading calibration results.

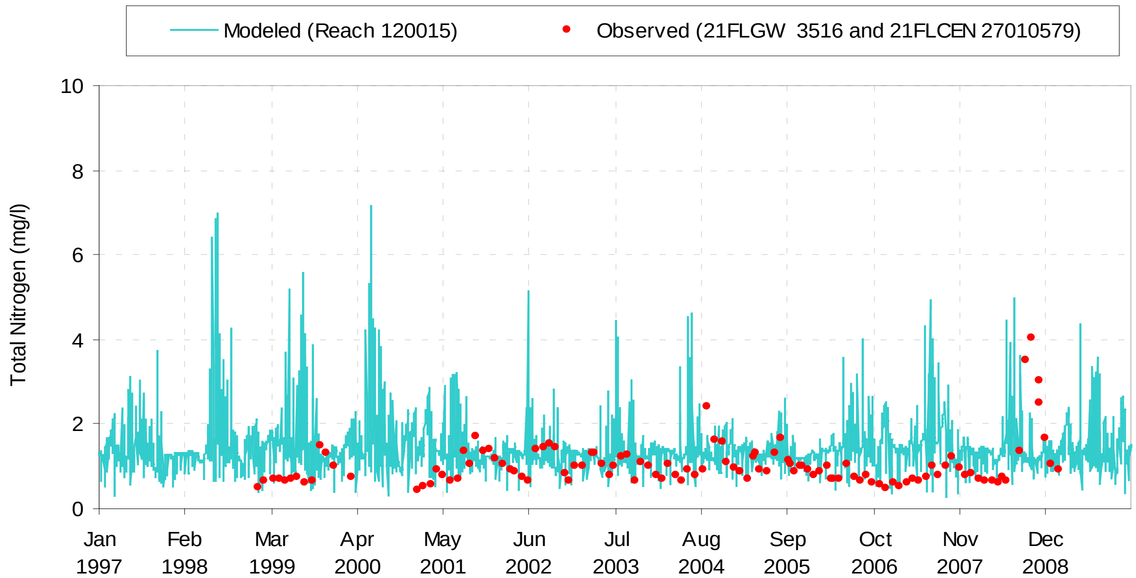

Figure C.11. Modeled versus Observed TN (mg/L) at 21FLGW 3516 and 21FLCEN 27010579

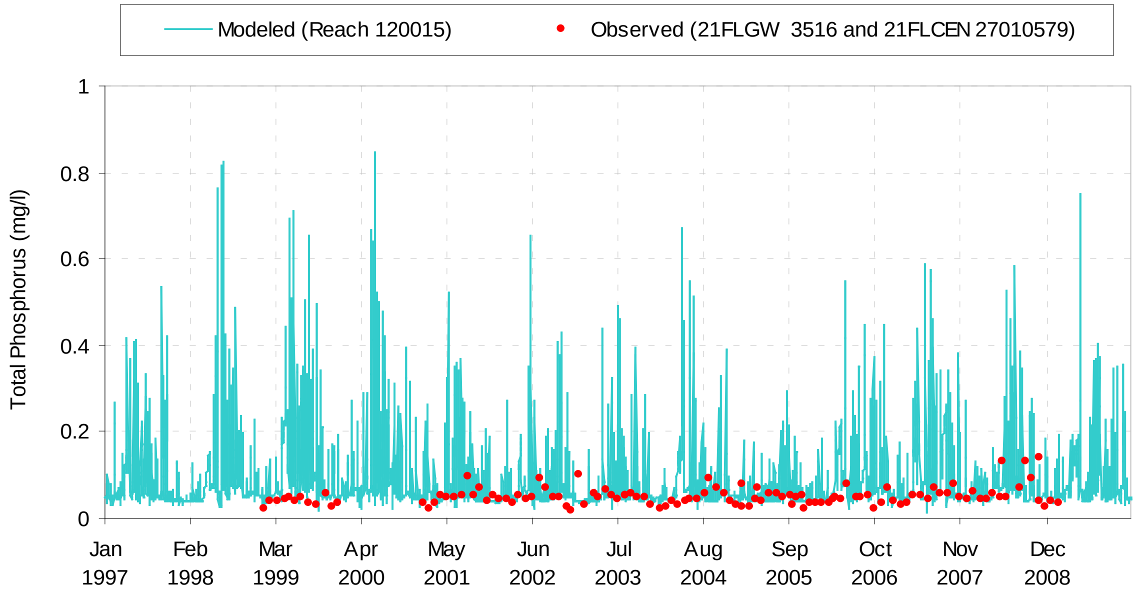

Figure C.12. Modeled versus Observed TP (mg/L) at 21FLGW 3516 and 21FLCEN 27010579

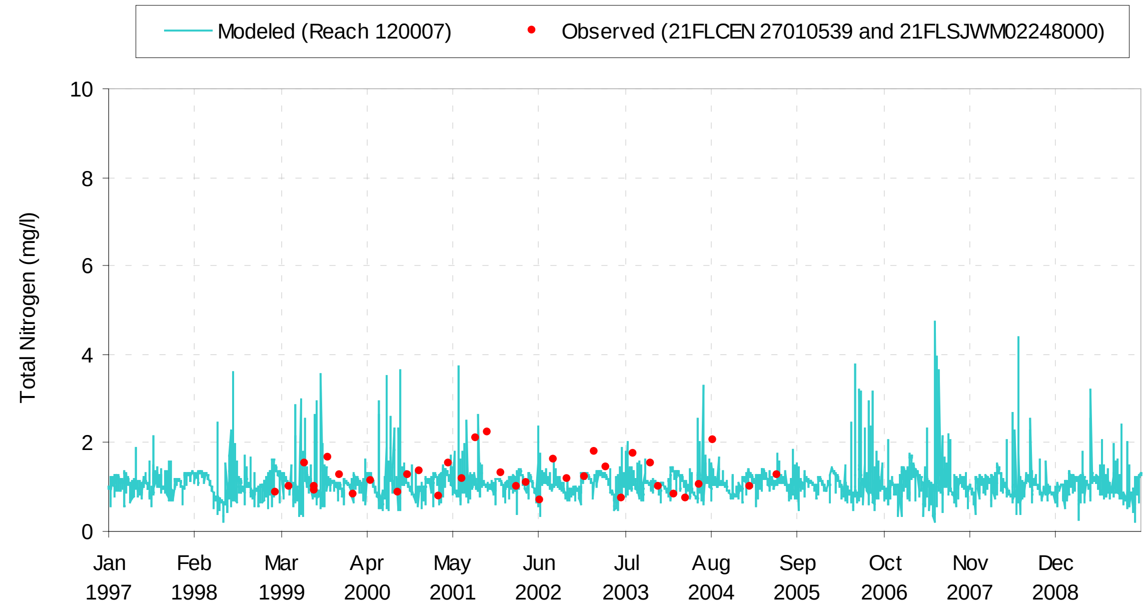

Figure C.13. Modeled versus Observed TN (mg/L) at 21FLCEN 27010539 and 21FLSJWM02248000

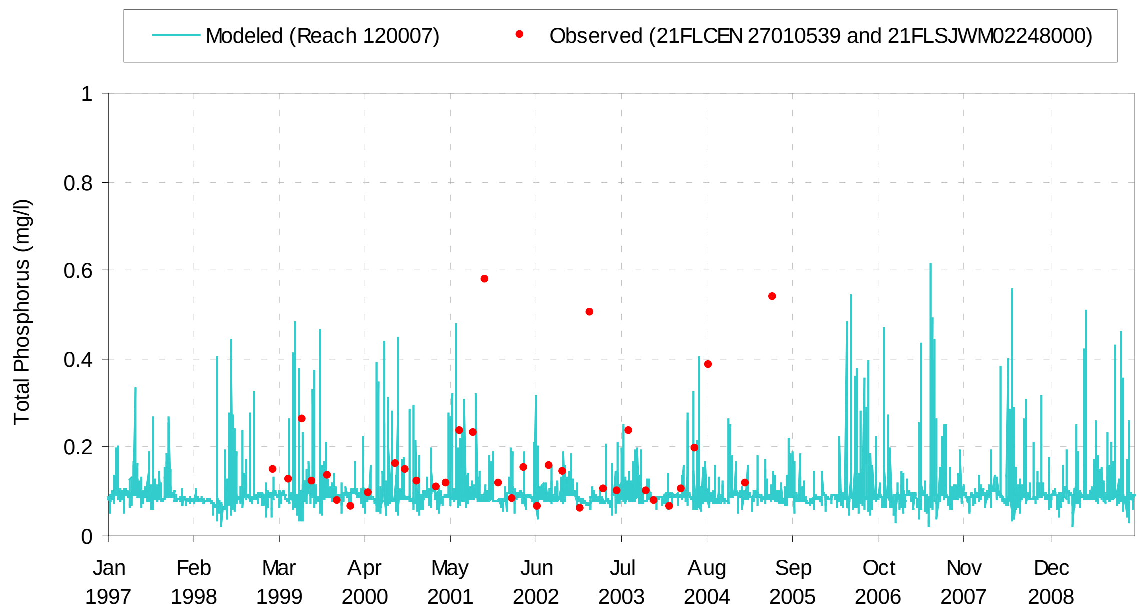

Figure C.14. Modeled versus Observed TP (mg/L) at 21FLCEN 27010539 and 21FLSJWM02248000

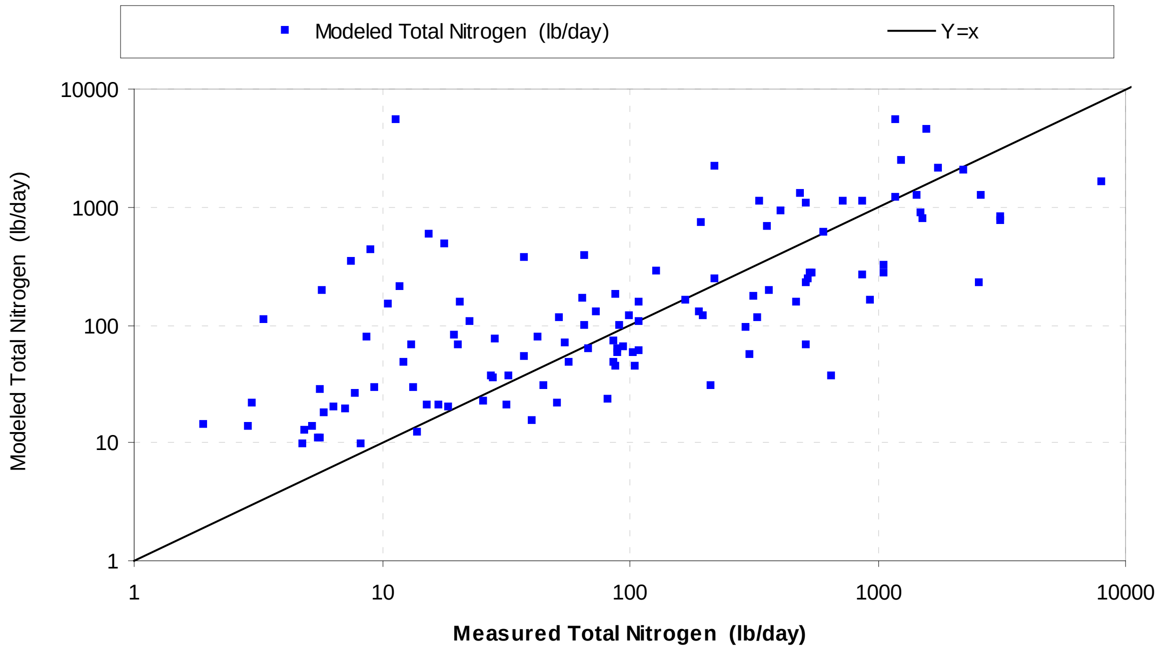

Figure C.15. TN (mg/L) Load Scatter Plot at 21FLGW 3516 and 21FLCEN 27010579

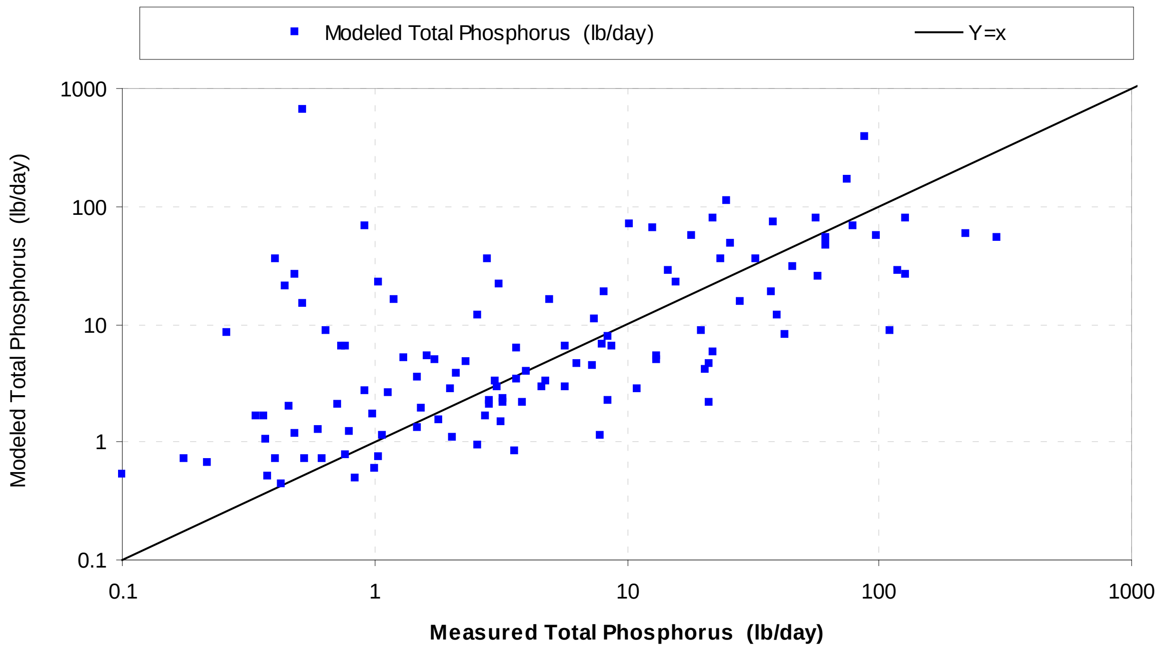

Figure C.16. TP (mg/L) Load Scatter Plot at 21FLGW 3516 and 21FLCEN 27010579

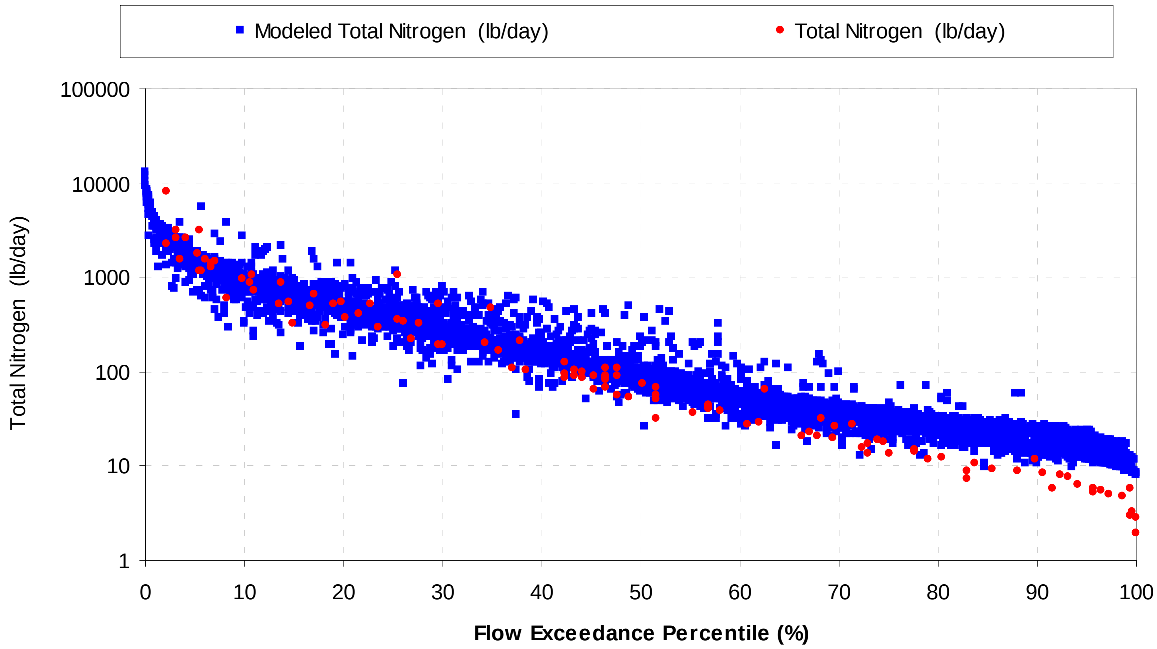

Figure C.17. TN (mg/L) Load Duration Curve at 21FLGW 3516 and 21FLCEN 27010579

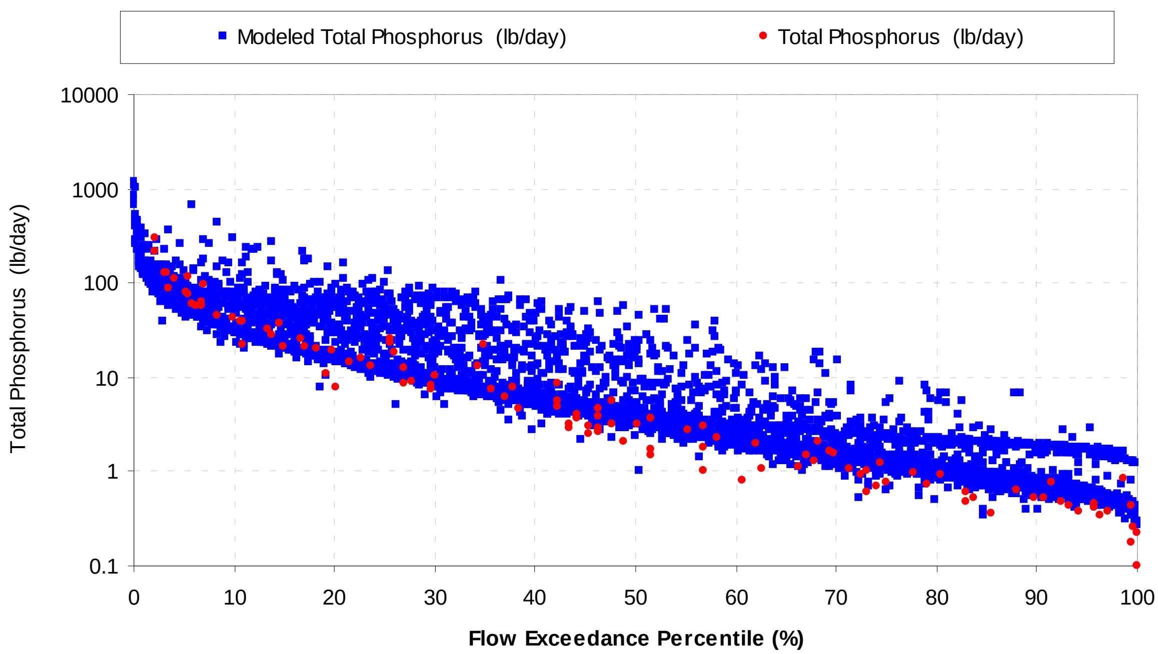

Figure C.18. TP (mg/L) Load Duration Curve at 21FLGW 3516 and 21FLCEN 27010579

Table C.4. TN (lbs/yr) Percent Error for Measured and Modeled Loading by Year at 21FLGW 3516 and 21FLCEN 27010579

- = Empty cell/no data

Year	TN (lbs/yr) Measured	TN (lbs/yr) Modeled	TN % Error
1997	-	-	-
1998	-	-	-
1999	65,823	57,694	-12.4%
2000	20,510	54,931	167.8%
2001	217,319	209,770	-3.5%
2002	170,835	126,810	-25.8%
2003	200,075	179,481	-10.3%
2004	447,592	222,788	-50.2%
2005	250,005	334,621	33.9%
2006	14,820	66,834	351.0%
2007	26,375	57,432	117.8%
2008	209,614	142,172	-32.2%
2009	103,072	124,330	20.6%
Average	**156,913**	**143,351**	**-8.6%**
Rating	**-**	**-**	**VG**

Table C.5. TP (lbs/yr) Percent Error for Measured and Modeled Loading by Year at 21FLGW 3516 and 21FLCEN 27010579

- = Empty cell/no data

Year	TP (lbs/yr) Measured	TP (lbs/yr) Modeled	TN % Error
1997	-	-	-
1998	-	-	-
1999	2,428	5,353	120.5%
2000	1,113	4,459	300.7%
2001	9,510	11,052	16.2%
2002	8,501	7,084	-16.7%
2003	9,399	8,837	-6.0%
2004	18,250	12,059	-33.9%
2005	11,603	16,828	45.0%
2006	720	4,169	478.8%
2007	1,637	4,454	172.0%
2008	7,209	7,792	8.1%
2009	3,922	7,281	85.7%
Average	**6,754**	**8,124**	**20.3%**
Rating	**-**	**-**	**VG**

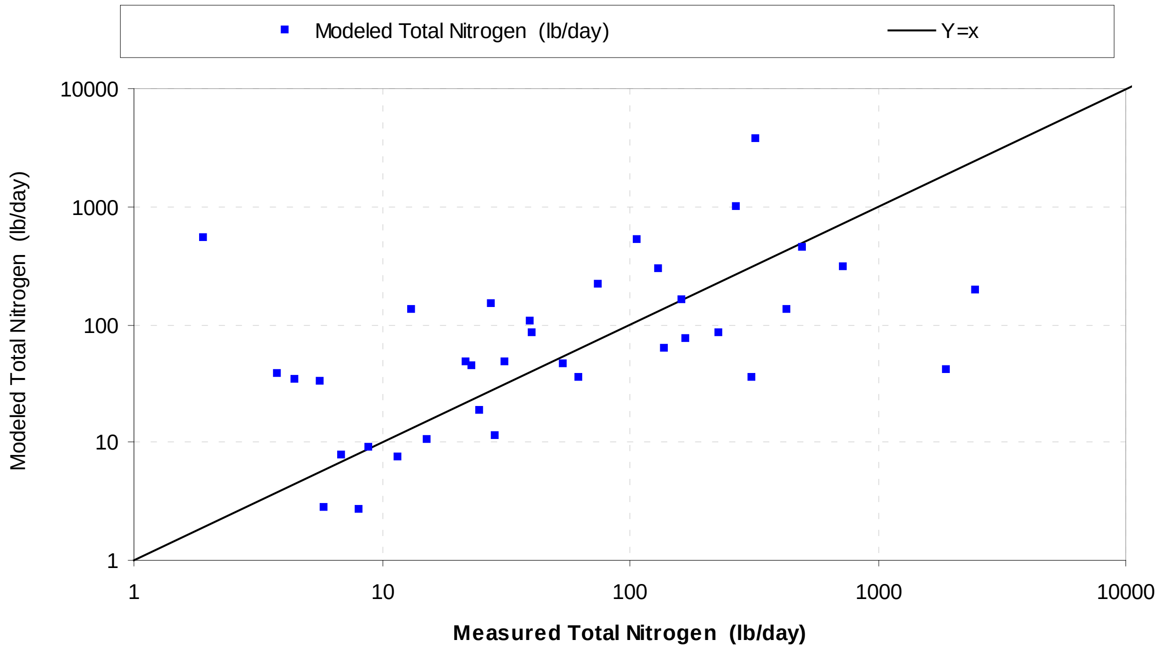

Figure C.19. TN (mg/L) Load Scatter Plot at 21FLCEN 27010539 and 21FLSJWM02248000

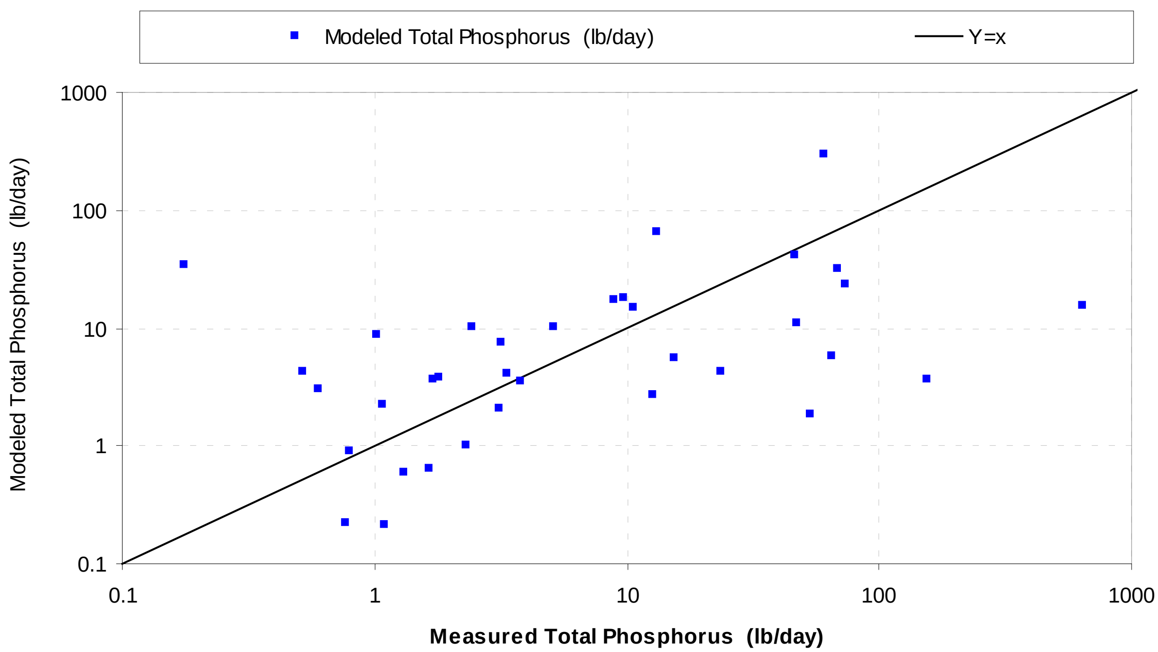

Figure C.20. TP (mg/L) Load Scatter Plot at 21FLCEN 27010539 and 21FLSJWM02248000

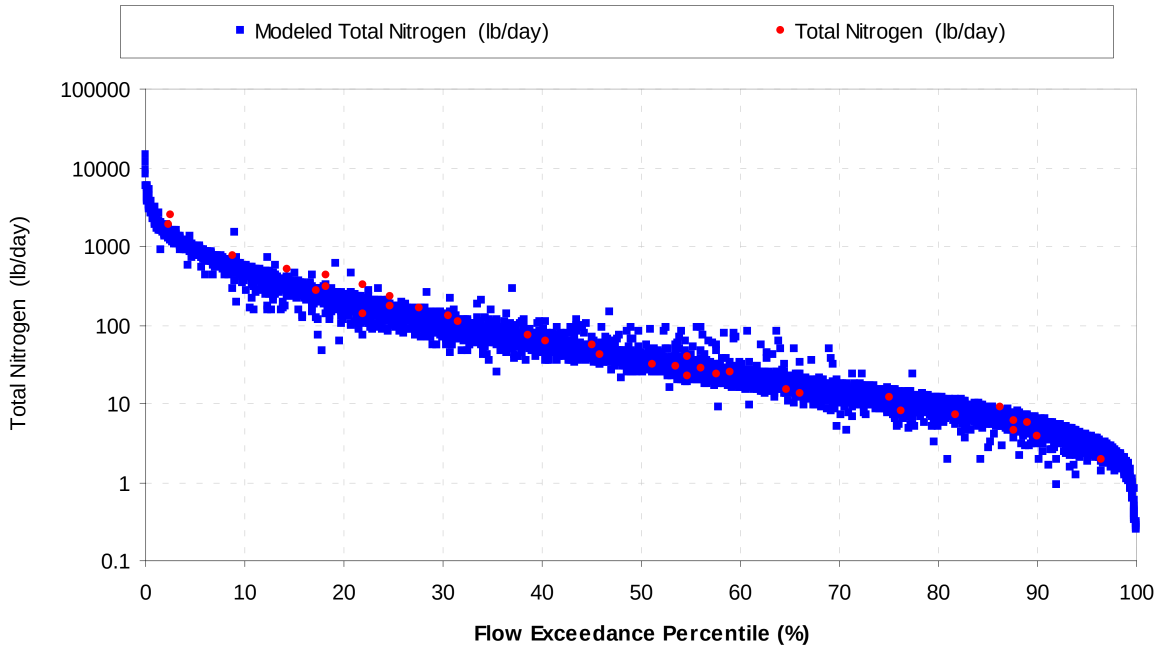

Figure C.21. TN (mg/L) Load Duration Curve at 21FLCEN 27010539 and 21FLSJWM02248000

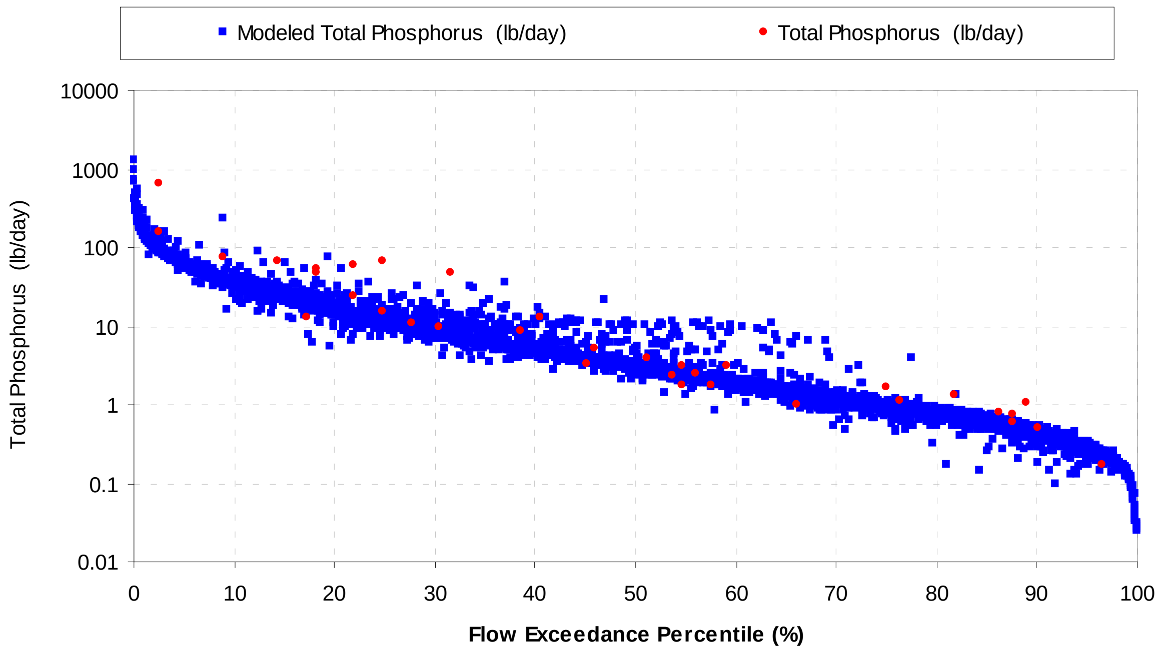

Figure C.22. TP (mg/L) Load Duration Curve at 21FLCEN 27010539 and 21FLSJWM02248000

Table C.6. TN (lbs/yr) Percent Error for Measured and Modeled Loading by Year at 21FLCEN 27010539 and 21FLSJWM02248000

- = Empty cell/no data

Year	TN (lbs/yr) Measured	TN (lbs/yr) Modeled	TN % Error
1997	-	-	-
1998	-	-	-
1999	119,768	26,204	-78.1%
2000	9,961	42,424	325.9%
2001	242,469	94,435	-61.1%
2002	60,424	74,404	23.1%
2003	118,289	108,736	-8.1%
2004	151,387	145,047	-4.2%
2005	123,844	124,677	0.7%
2006	-	-	-
2007	-	-	-
2008	-	-	-
2009	-	-	-
Average	**118,020**	**87,989**	**-25.4%**
Rating	**-**	**-**	**VG**

Table C.7. TP (lbs/yr) Percent Error for Measured and Modeled Loading by Year at 21FLCEN 27010539 and 21FLSJWM02248000

Year	TP (lbs/yr) Measured	TP (lbs/yr) Modeled	TP % Error
1997	-	-	-
1998	-	-	-
1999	11,010	2,371	-78.5%
2000	1,149	3,265	184.2%
2001	45,523	7,424	-83.7%
2002	5,675	5,882	3.7%
2003	15,842	7,964	-49.7%
2004	27,323	11,279	-58.7%
2005	52,024	9,700	-81.4%
2006	-	-	-
2007	-	-	-
2008	-	-	-
2009	-	-	-
Average	**22,649**	**6,841**	**-69.8%**
Rating	**-**	**-**	**G**

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U.S. Environmental Protection Agency. 1985. Rates, constants, and kinetics. *Formulations in surface water quality modeling (Second Edition).* EPA/600/3-85/040. Athens, GA: Environmental Research Laboratory.

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———. 2006. *BASINS Technical Note 8. Sediment parameter and calibration guidance for HSPF.* Washington, DC: Office of Water.

Appendix D: Kruskal–Wallis Analysis of CHLAC, INORGN, TN, INORGP, TP, COND, COLOR, and TSS Observations versus Season in the Halifax River

Kruskal-Wallis One-Way Analysis of Variance for 1283 cases
Dependent variable is CHLAC
Grouping variable is SEASON$

Group	Count	Rank Sum
FALL	300	171075.500
SPRING	371	290227.500
SUMMER	339	304345.500
WINTER	353	163917.500

Kruskal-Wallis Test Statistic = 258.094
Probability is 0.000 assuming Chi-square distribution with 3 df

Kruskal-Wallis One-Way Analysis of Variance for 327 cases
Dependent variable is INORGN
Grouping variable is SEASON$

Group	Count	Rank Sum
FALL	110	26471.500
SPRING	134	20447.500
SUMMER	94	21226.000
WINTER	56	9670.000

Kruskal-Wallis Test Statistic = 45.102
Probability is 0.000 assuming Chi-square distribution with 3 df

Kruskal-Wallis One-Way Analysis of Variance for 1299 cases
Dependent variable is TN
Grouping variable is SEASON$

Group	Count	Rank Sum
FALL	328	251535.500
SPRING	359	221270.000
SUMMER	321	234663.500
WINTER	291	136881.000

Kruskal-Wallis Test Statistic = 116.423
Probability is 0.000 assuming Chi-square distribution with 3 df

Kruskal-Wallis One-Way Analysis of Variance for 1117 cases
Dependent variable is INORGP
Grouping variable is SEASON$

Group Count Rank Sum

FALL	84	9746.000
SPRING	58	4872.000
SUMMER	48	7316.500
WINTER	30	2375.500

Kruskal-Wallis Test Statistic = 38.782
Probability is 0.000 assuming Chi-square distribution with 3 df

Kruskal-Wallis One-Way Analysis of Variance for 1208 cases
Dependent variable is TP
Grouping variable is SEASON$

Group	Count	Rank Sum
FALL	320	198101.000
SPRING	356	266900.500
SUMMER	334	308302.000
WINTER	333	129192.500

Kruskal-Wallis Test Statistic = 339.381
Probability is 0.000 assuming Chi-square distribution with 3 df

Kruskal-Wallis One-Way Analysis of Variance for 1666 cases
Dependent variable is COND
Grouping variable is SEASON$

Group	Count	Rank Sum
FALL	464	331040.500
SPRING	501	495097.000
SUMMER	430	360613.500
WINTER	403	430550.000

Kruskal-Wallis Test Statistic = 122.756
Probability is 0.000 assuming Chi-square distribution with 3 df

Kruskal-Wallis One-Way Analysis of Variance for 1498 cases
Dependent variable is COLOR
Grouping variable is SEASON$

Group	Count	Rank Sum
FALL	392	421324.500
SPRING	424	268798.500
SUMMER	358	271770.000
WINTER	343	189510.000

Kruskal-Wallis Test Statistic = 314.792
Probability is 0.000 assuming Chi-square distribution with 3 df

Kruskal-Wallis One-Way Analysis of Variance for 1221 cases
Dependent variable is TSS
Grouping variable is SEASON$

Group	Count	Rank Sum
FALL	363	218577.000
SPRING	349	302703.000
SUMMER	340	267861.000
WINTER	330	166512.000

Kruskal-Wallis Test Statistic = 178.190
Probability is 0.000 assuming Chi-square distribution with 3 df

Appendix E: Kruskal–Wallis Analysis of CHLAC, INORGN, TN, INORGP, TP, COND, COLOR, and TSS Observations versus Year in the Halifax River

Kruskal-Wallis One-Way Analysis of Variance for 1283 cases
Dependent variable is CHLAC
Grouping variable is YEAR

Group	Count	Rank Sum
1982	1	599.500
1983	7	2979.500
1984	29	27281.000
1985	3	1571.500
1986	8	5752.500
1987	12	10746.000
1988	4	2341.000
1989	12	8282.500
1990	10	11084.500
1991	9	8285.500
1992	71	48263.500
1993	44	26061.000
1994	103	86463.500
1995	108	60257.500
1996	105	63431.500
1997	114	68555.500
1998	102	68340.500
1999	104	84535.000
2000	42	28833.000
2001	44	20274.000
2002	27	17782.500
2003	6	3393.000
2004	36	12705.000
2005	12	6097.500
2006	29	13527.500
2007	30	12132.000
2008	61	46313.500
2009	92	57935.500
2010	50	48087.000
2011	88	77654.000

Kruskal-Wallis Test Statistic = 202.616
Probability is 0.000 assuming Chi-square distribution with 29 df

Kruskal-Wallis One-Way Analysis of Variance for 327 cases
Dependent variable is INORGN
Grouping variable is YEAR

Group	Count	Rank Sum
1968	60	14383.500
1971	24	4210.500
1973	16	4764.500
1974	12	3924.500
1975	17	5999.000
1976	11	2575.000
1977	12	3571.000
1978	1	207.000
1984	44	5534.500
1989	8	1750.000
1991	5	1279.500
1992	27	5031.500
1993	7	1123.500
1994	4	926.000
1995	5	958.500
1996	12	1291.500
1997	5	816.000
1998	6	885.000
1999	6	610.000
2000	6	1059.000
2001	7	1687.500
2002	15	1945.500
2003	33	4634.000
2004	7	1331.000
2005	6	1211.000
2006	6	1171.000
2007	6	1031.000
2008	6	989.000
2009	13	1730.000
2010	2	217.500
2011	5	967.500

Kruskal-Wallis Test Statistic = 133.953
Probability is 0.000 assuming Chi-square distribution with 30 df

Kruskal-Wallis One-Way Analysis of Variance for 1299 cases
Dependent variable is TN
Grouping variable is YEAR

Group	Count	Rank Sum
1968	62	49287.000
1971	24	16704.000
1973	16	9431.500
1974	12	8215.500
1975	17	16222.500
1976	10	7432.500
1977	12	11471.500
1978	12	9799.000
1979	11	10193.000
1980	2	902.500
1981	4	3227.500
1982	4	4093.500
1983	7	5658.000
1984	48	27917.000
1985	3	2307.000
1986	12	10013.000
1987	12	12510.000
1988	4	3417.000
1989	12	10083.500
1990	8	7198.500
1991	6	6419.500
1992	43	47695.000
1993	44	36341.500
1994	103	103205.500
1995	113	69881.000
1996	106	45515.000
1997	112	52374.500
1998	102	52919.500
1999	107	44778.000
2000	42	18026.500
2001	43	21553.000
2002	17	13270.000
2003	24	11429.500
2004	7	3621.000
2005	7	3187.000
2006	15	2676.000
2007	14	7079.500
2008	23	11780.500
2009	49	38693.000
2010	25	26238.500
2011	5	1582.000

Kruskal-Wallis Test Statistic = 459.236
Probability is 0.000 assuming Chi-square distribution with 40 df

Kruskal-Wallis One-Way Analysis of Variance for 1117 cases
Dependent variable is INORGP
Grouping variable is YEAR

Group	Count	Rank Sum
1968	64	8736.000
1971	24	1402.500
1973	16	1921.000
1974	12	2017.000
1975	17	2478.500
1976	11	1756.000
1977	9	1460.000
1991	2	176.000
1993	4	525.500
1995	3	381.000
1996	6	553.500
1997	7	542.500
1998	6	338.000
1999	6	220.500
2000	6	389.500
2001	6	443.000
2002	5	290.000
2003	6	310.500
2004	6	200.000
2005	4	169.000

Kruskal-Wallis Test Statistic = 97.316
Probability is 0.000 assuming Chi-square distribution with 19 df

Kruskal-Wallis One-Way Analysis of Variance for 1208 cases
Dependent variable is TP
Grouping variable is YEAR

Group	Count	Rank Sum
1973	16	18906.000
1974	12	14944.000
1975	17	18805.500
1976	10	8795.000
1977	12	12429.500
1978	12	9366.000
1979	11	12215.000
1980	2	1933.000
1981	4	4402.000
1982	4	4611.500
1983	7	5750.000
1984	54	45758.500
1985	3	861.500
1986	12	8500.000
1987	12	11157.500
1988	4	3101.500
1989	12	12194.000
1990	8	4112.500
1991	9	5747.000
1992	70	42911.000
1993	42	22337.000
1994	103	75274.500
1995	113	74991.000
1996	106	66294.000
1997	115	66293.500
1998	102	60685.000
1999	107	84337.500
2000	42	26172.000
2001	43	32746.000
2002	17	5949.000
2003	24	14318.000
2004	7	3341.000
2005	7	3035.000
2006	41	26417.500
2007	32	15094.500
2008	32	16690.000
2009	49	27534.000
2010	38	19130.000
2011	32	15355.500

Kruskal-Wallis Test Statistic = 231.917
Probability is 0.000 assuming Chi-square distribution with 38 df

Kruskal-Wallis One-Way Analysis of Variance for 1666 cases
Dependent variable is COND
Grouping variable is YEAR

Group	Count	Rank Sum
1968	64	13302.000
1971	24	26180.500
1973	16	12852.500
1974	12	11968.000
1975	17	14726.000
1976	11	8935.000
1977	11	11115.000
1978	12	9623.000
1979	11	4248.500
1980	2	2381.000
1981	5	5961.000
1982	4	1780.000
1983	7	3009.000
1984	53	19582.500
1985	3	1141.000
1986	12	11583.000
1987	12	10610.500
1988	4	5438.000
1989	12	14578.000
1990	10	8747.000
1991	9	10682.500
1992	78	77537.000
1993	46	50303.500
1994	97	82423.500
1995	103	82798.000
1996	102	61197.000
1997	113	83076.500
1998	101	82228.000
1999	107	132520.500
2000	42	50470.000
2001	44	43311.500
2002	29	12558.000
2003	42	23746.500
2004	77	77242.000
2005	78	63598.000
2006	72	86967.500
2007	55	52690.500
2008	61	56136.500
2009	95	95179.500
2010	56	52706.000
2011	89	142167.000

Kruskal-Wallis Test Statistic = 569.086
Probability is 0.000 assuming Chi-square distribution with 40 df

Kruskal-Wallis One-Way Analysis of Variance for 1498 cases
Dependent variable is COLOR
Grouping variable is YEAR

Group	Count	Rank Sum
1968	64	85538.000
1971	24	9863.500
1973	13	10479.000
1974	12	7503.000
1975	17	6546.500
1976	11	6441.000
1977	12	7763.000
1978	12	9820.000
1979	11	12254.500
1980	2	1049.500
1981	5	2510.500
1982	4	3418.000
1983	7	7579.000
1984	54	57311.500
1985	3	4001.500
1986	12	11638.500
1987	12	11193.500
1988	4	1796.000
1989	12	4660.500
1990	10	7218.000
1991	8	6005.500
1992	72	46217.500
1993	46	30552.500
1994	103	68095.000
1995	113	105736.000
1996	99	99066.500
1997	111	76724.000
1998	102	100543.000
1999	107	58797.000
2000	42	24164.500
2001	44	21925.500
2002	17	16142.500
2003	42	47097.500
2004	34	26579.500
2005	34	27829.000
2006	42	23268.000
2007	39	20457.500
2008	41	20492.000
2009	41	27719.500
2010	38	26402.500
2011	41	9003.000

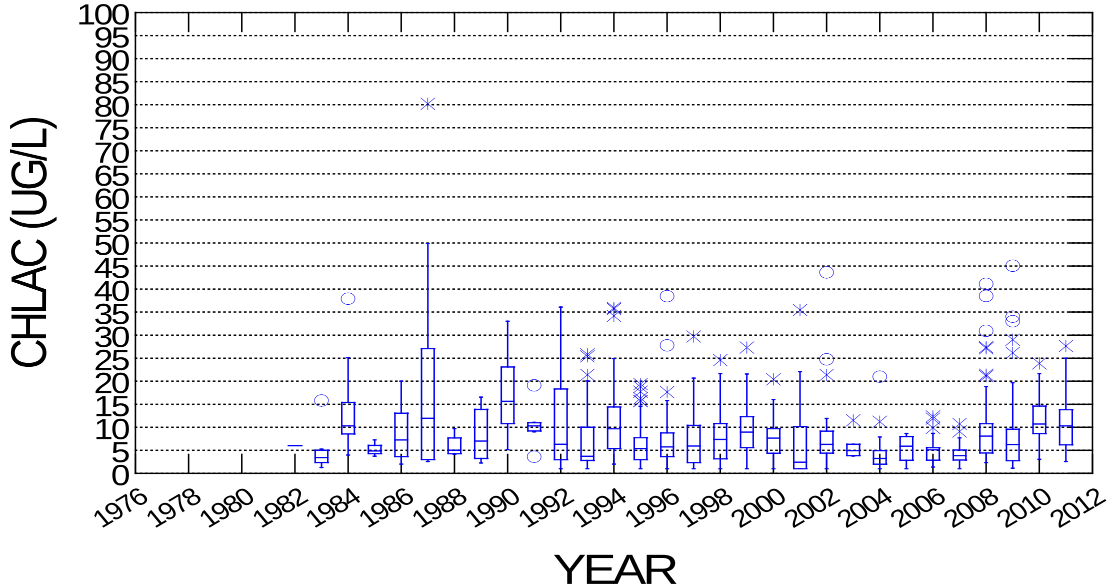
Kruskal-Wallis Test Statistic = 473.204
Probability is 0.000 assuming Chi-square distribution with 40 df

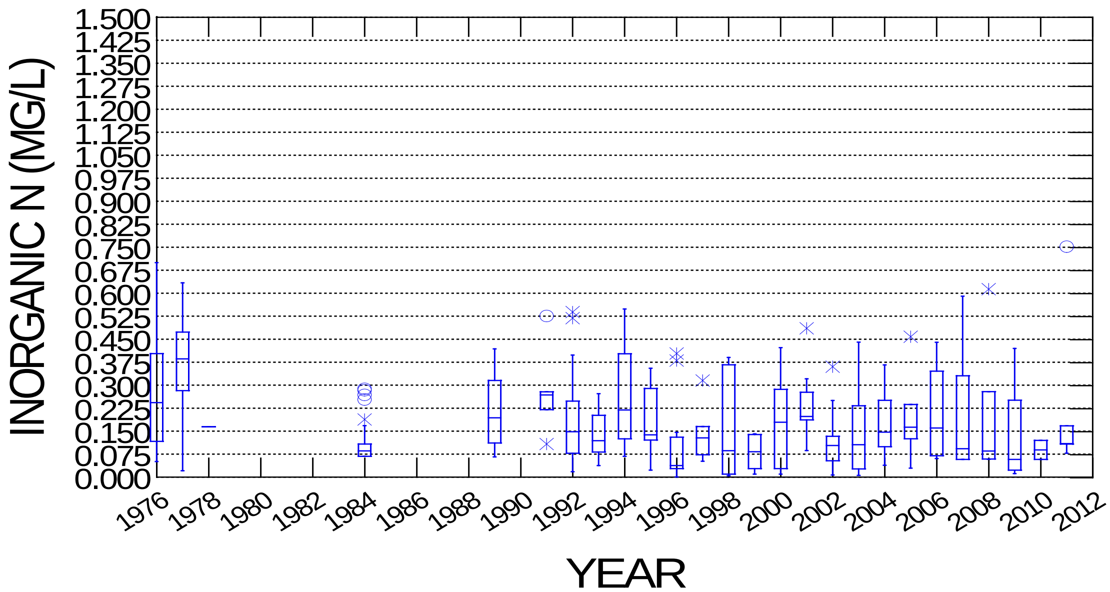
Kruskal-Wallis One-Way Analysis of Variance for 1221 cases
Dependent variable is TSS
Grouping variable is YEAR

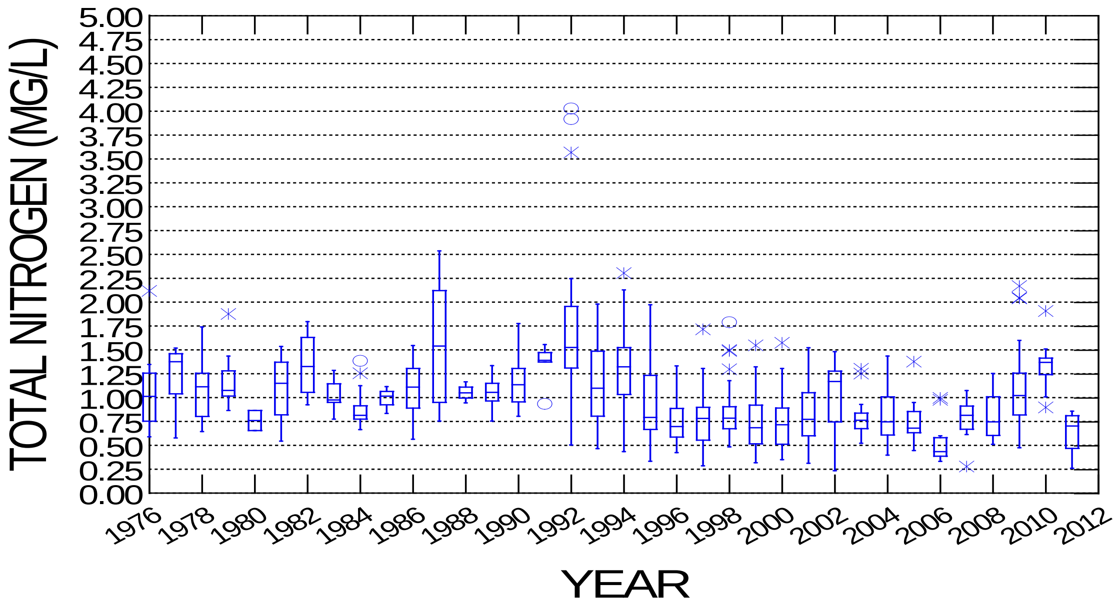
Group	Count	Rank Sum
1968	62	42062.500
1971	24	21021.500
1973	16	11571.000
1974	12	7193.500
1975	17	9056.000
1976	11	5704.000
1977	12	6552.000
1978	12	7121.500
1979	11	7149.000
1980	2	335.000
1981	4	2862.000
1982	4	2042.000
1983	7	1118.500
1984	4	1733.000
1985	1	122.000
1986	12	4928.500
1987	12	12240.000
1989	12	10396.500
1990	8	3584.000
1991	8	6286.500
1992	72	52911.500
1993	46	22580.500
1994	101	94911.000
1995	111	71014.000
1996	100	54673.500
1997	115	73649.500
1998	102	73459.000
1999	105	88043.000
2000	42	34033.500
2001	42	29464.000
2002	17	3019.000
2003	24	17364.000
2004	6	3417.000
2005	6	1687.500
2006	42	23858.000
2007	40	27928.500
2008	41	36253.500
2009	49	32295.500
2010	38	37515.000
2011	32	14496.500

Kruskal-Wallis Test Statistic = 221.822
Probability is 0.000 assuming Chi-square distribution with 39 df

Appendix F: Chart of CHLAC, INORGN TN, INORGP, TP, COND, COLOR, and TSS Observations by Year, Season, and Station, in the Halifax River



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0.75
1.00
1.25
1.50
1.75
2.00
2.25
2.50
2.75
3.00
3.25
3.50
3.75
4.00
4.25
4.50
4.75
5.00
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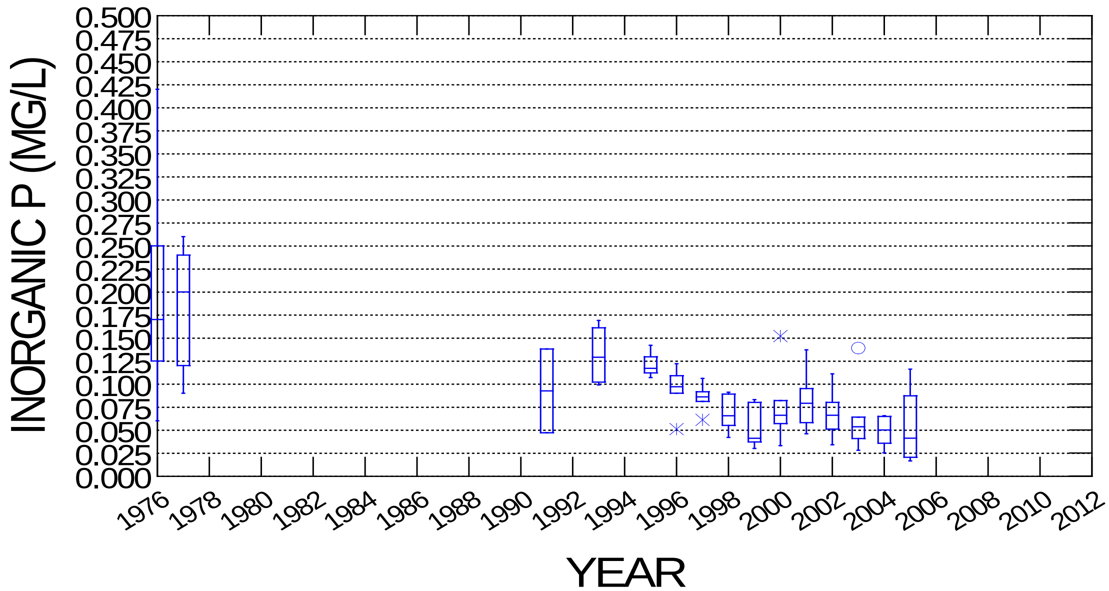
2006
2008
2010
2012
YEAR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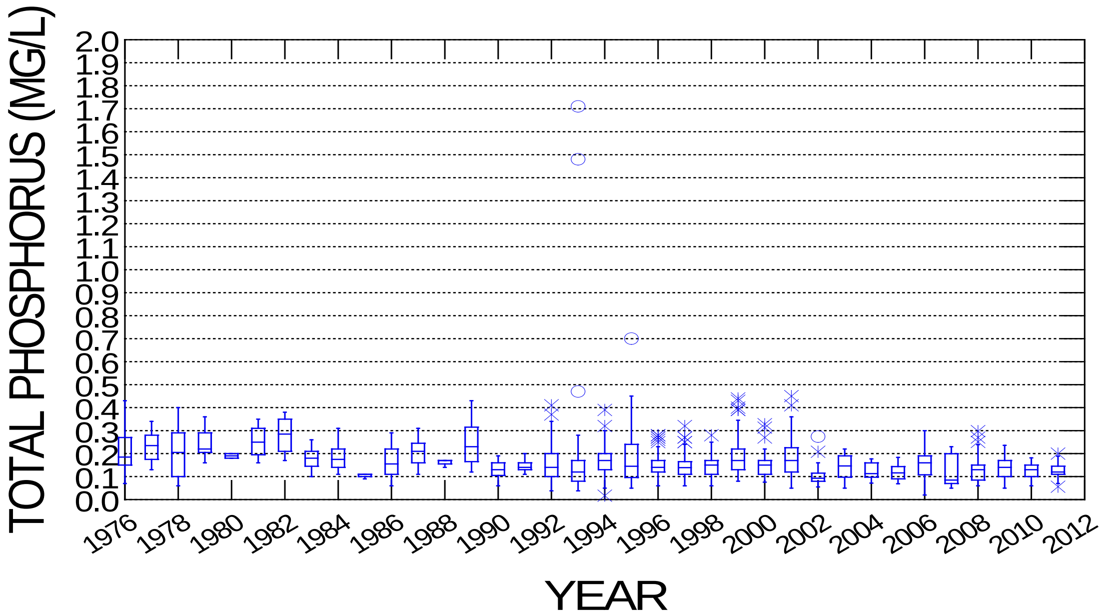
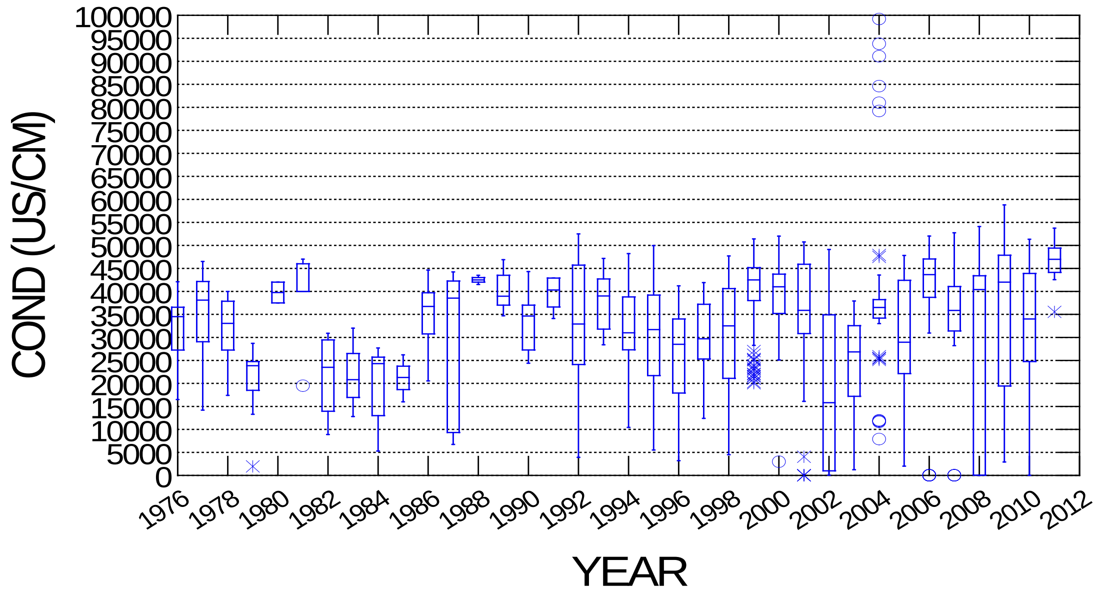
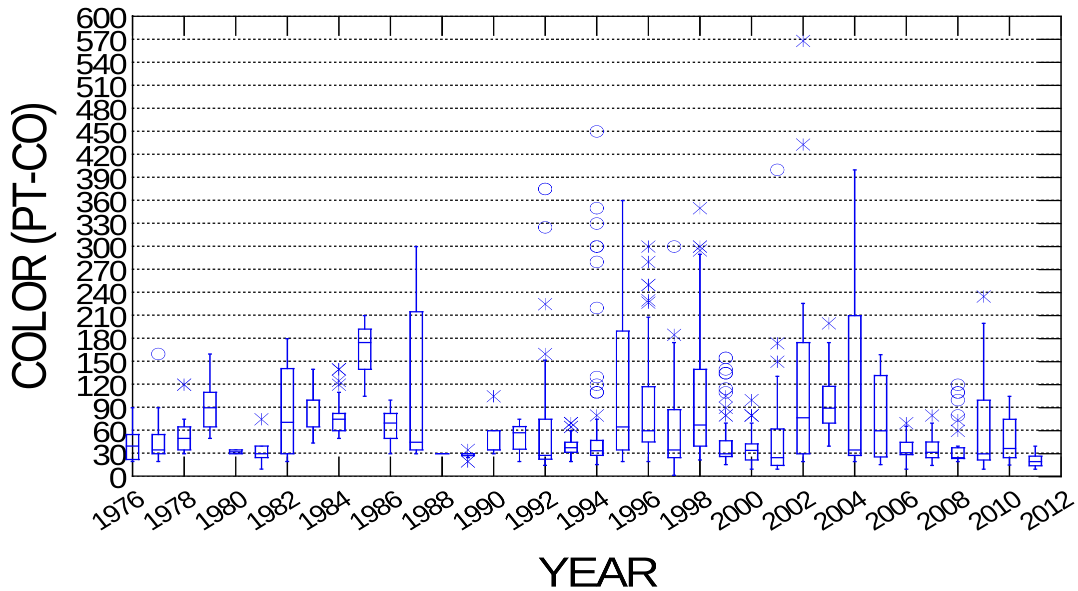
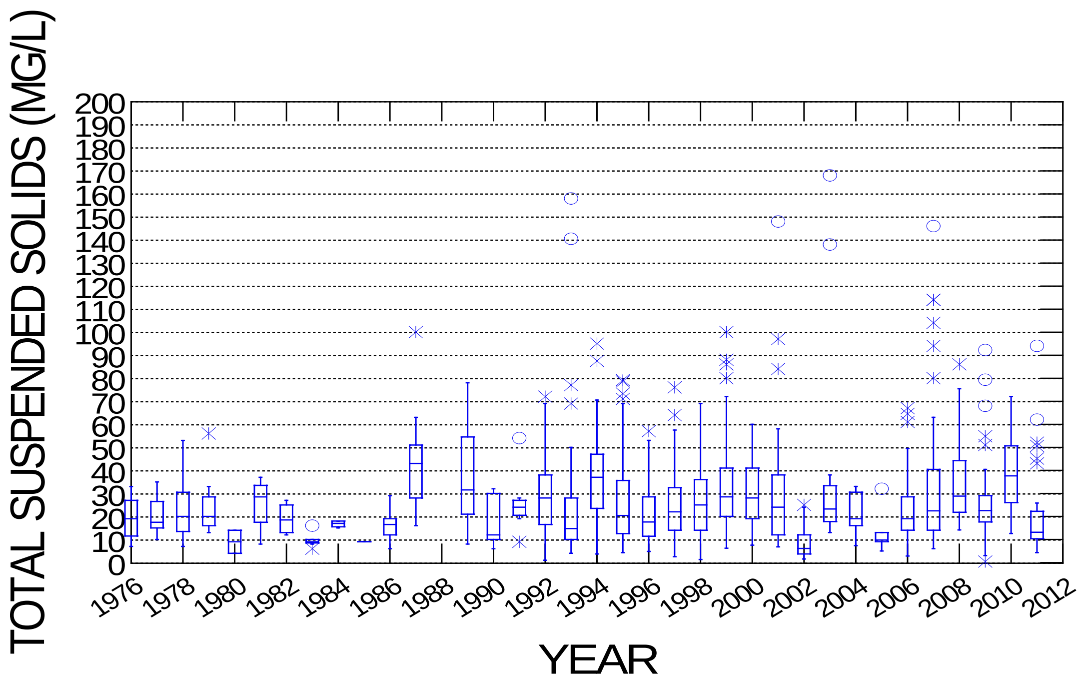
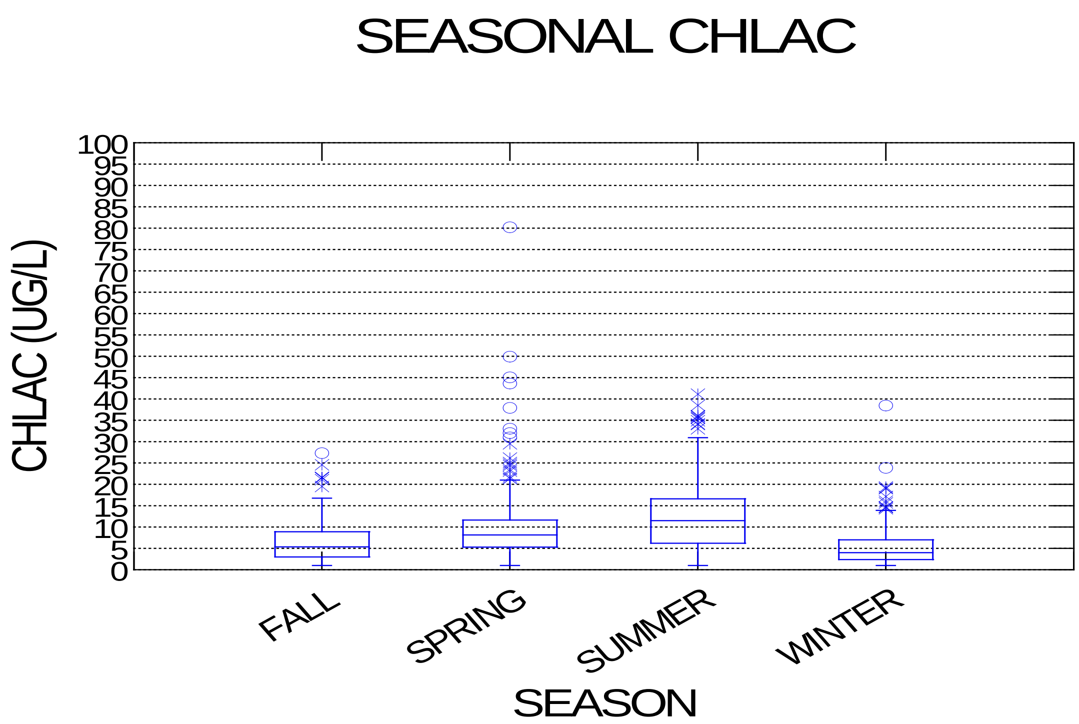
0.000
0.025
0.050
0.075
0.100
0.125
0.150
0.175
0.200
0.225
0.250
0.275
0.300
0.325
0.350
0.375
0.400
0.425
0.450
0.475
0.500
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
YEAR

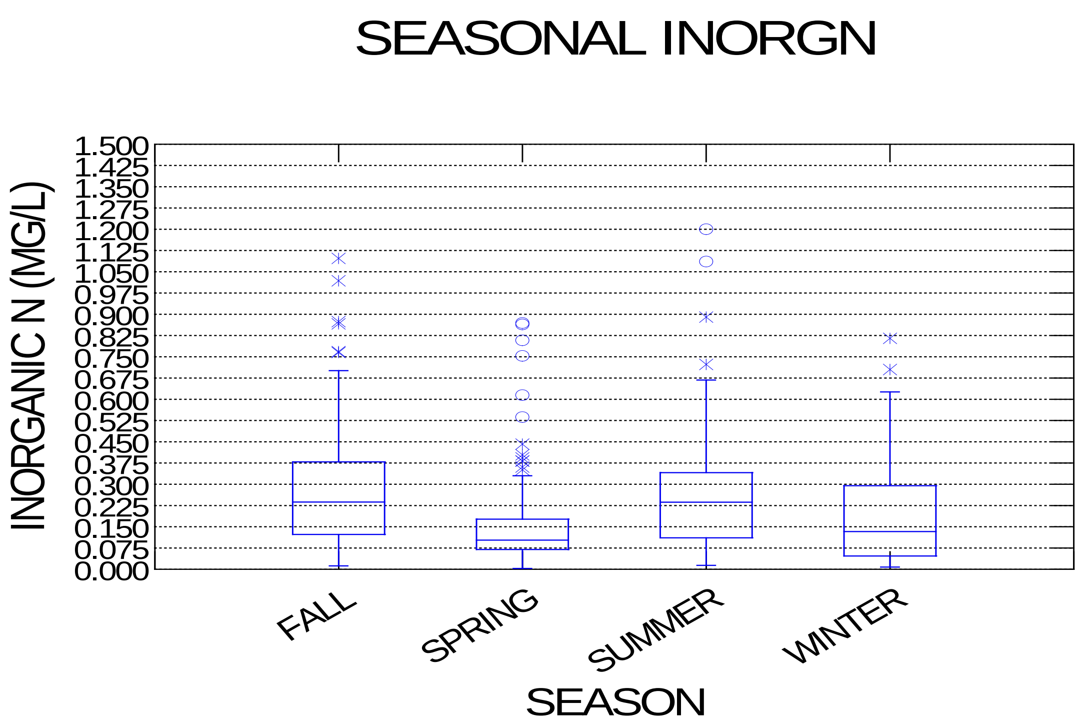

TOTAL PHOSPHORUS (MG/L)
2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
YEAR

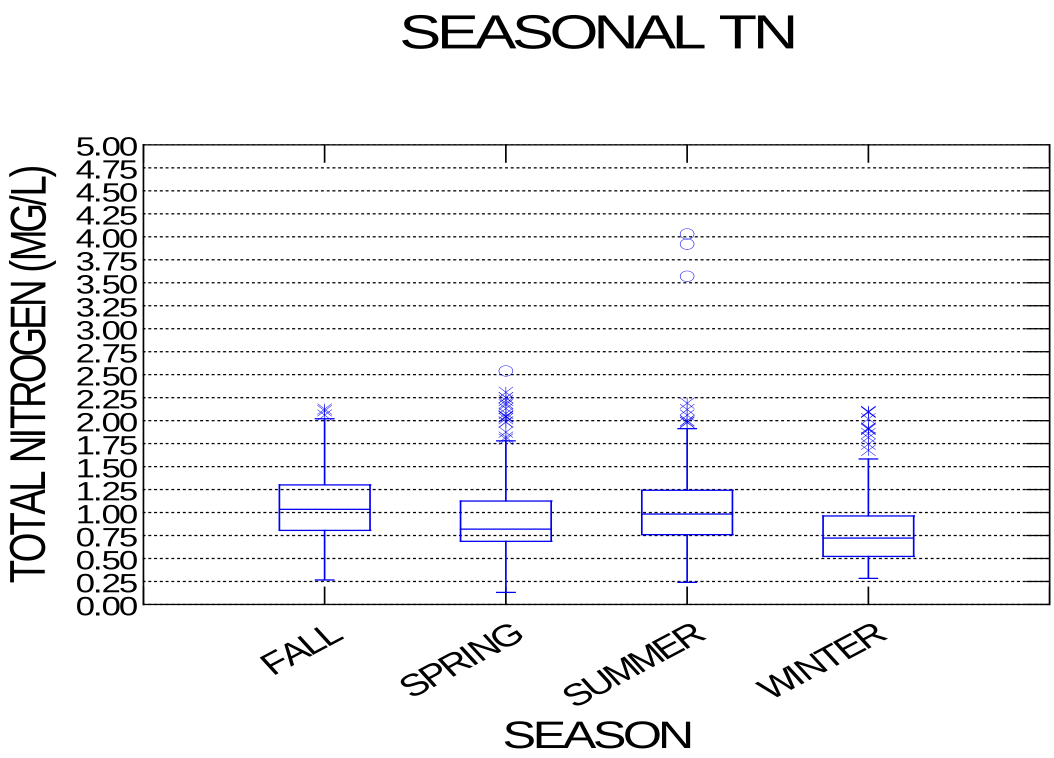

COND (US/CM)
100000
95000
90000
85000
80000
75000
70000
65000
60000
55000
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
YEAR

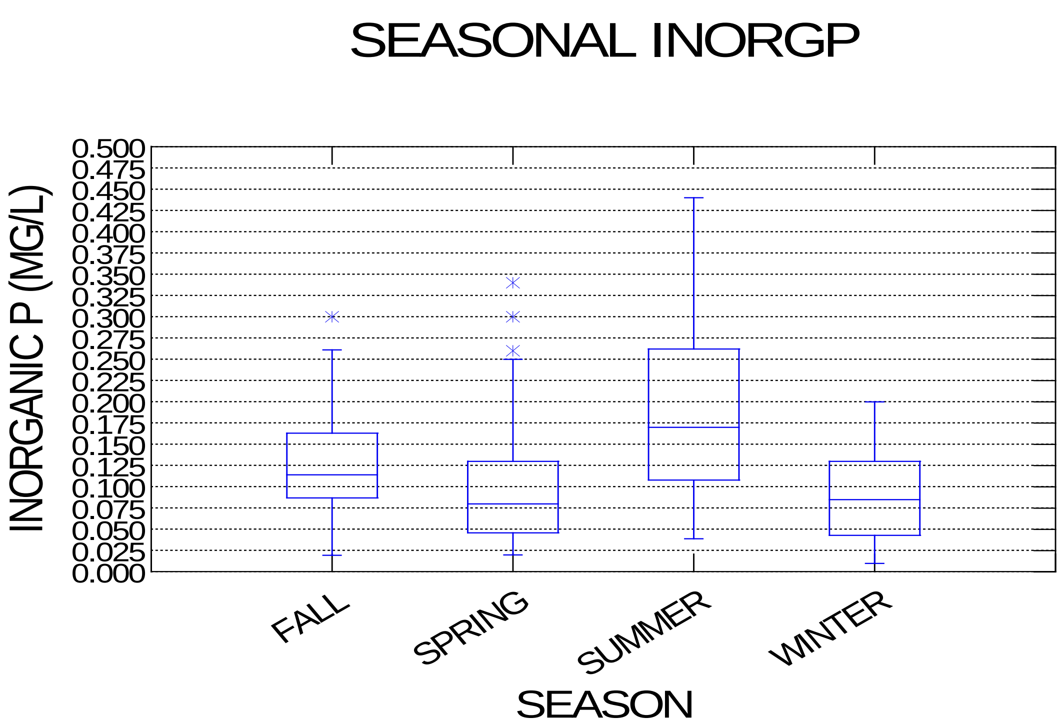

COLOR (PT-CO)
600
570
540
510
480
450
420
390
360
330
300
270
240
210
180
150
120
90
60
30
0
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
YEAR

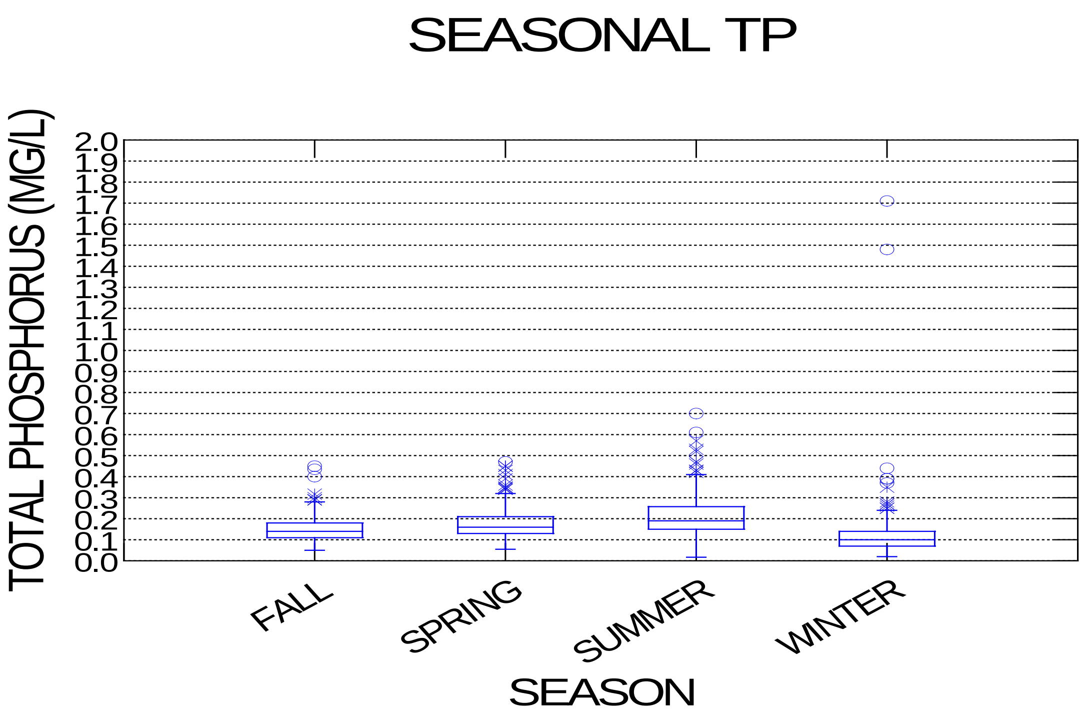

TOTAL SUSPENDED SOLIDS (MG/L)
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
YEAR

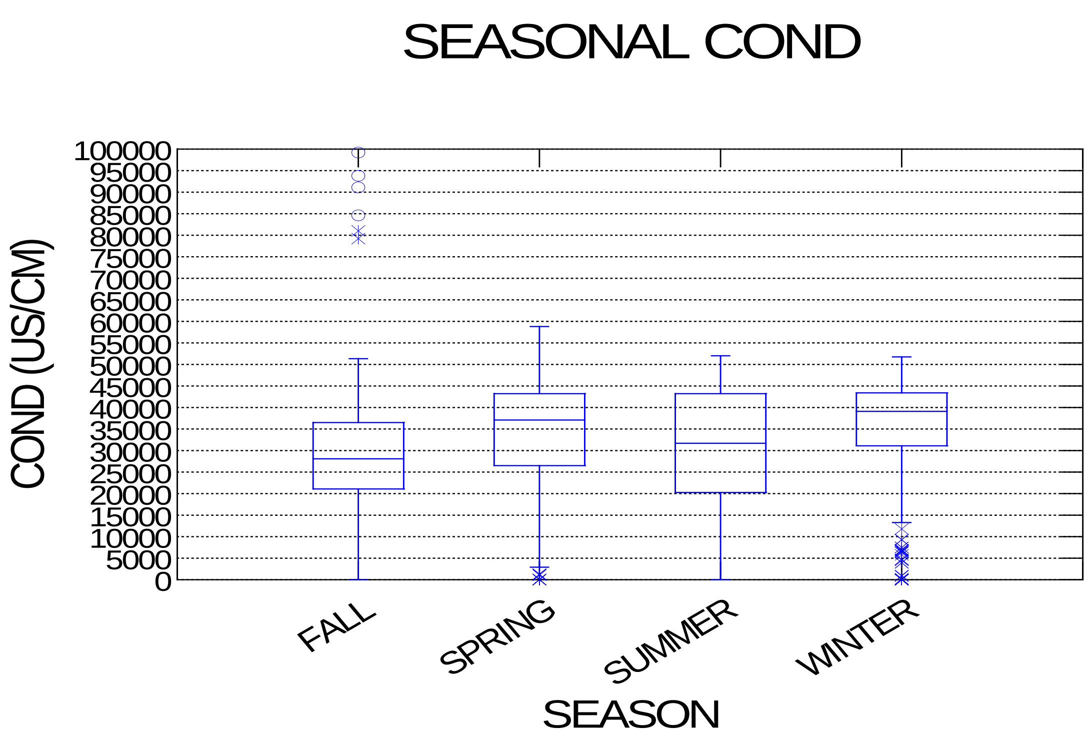

SEASONAL CHLAC
CHLAC (UG/L)
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
FALL
SPRING
SUMMER
WINTER
SEASON

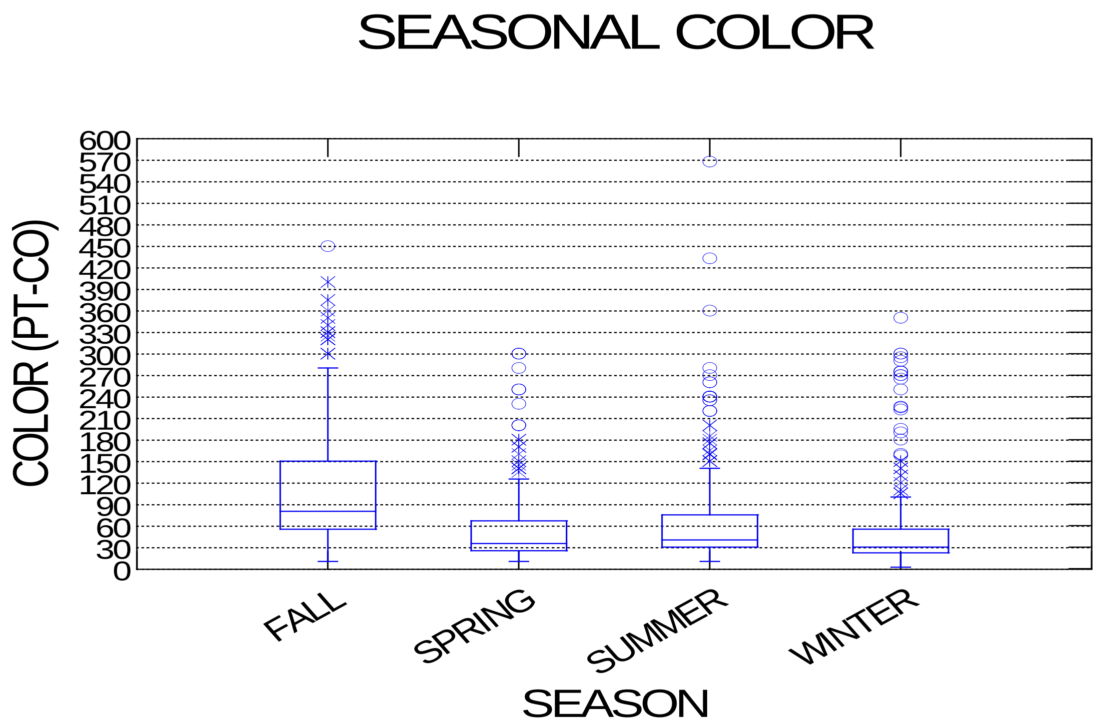

SEASONAL INORGN
INORGANIC N (MG/L)
0.000
0.075
0.150
0.225
0.300
0.375
0.450
0.525
0.600
0.675
0.750
0.825
0.900
0.975
1.050
1.125
1.200
1.275
1.350
1.425
1.500
FALL
SPRING
SUMMER
WINTER
SEASON

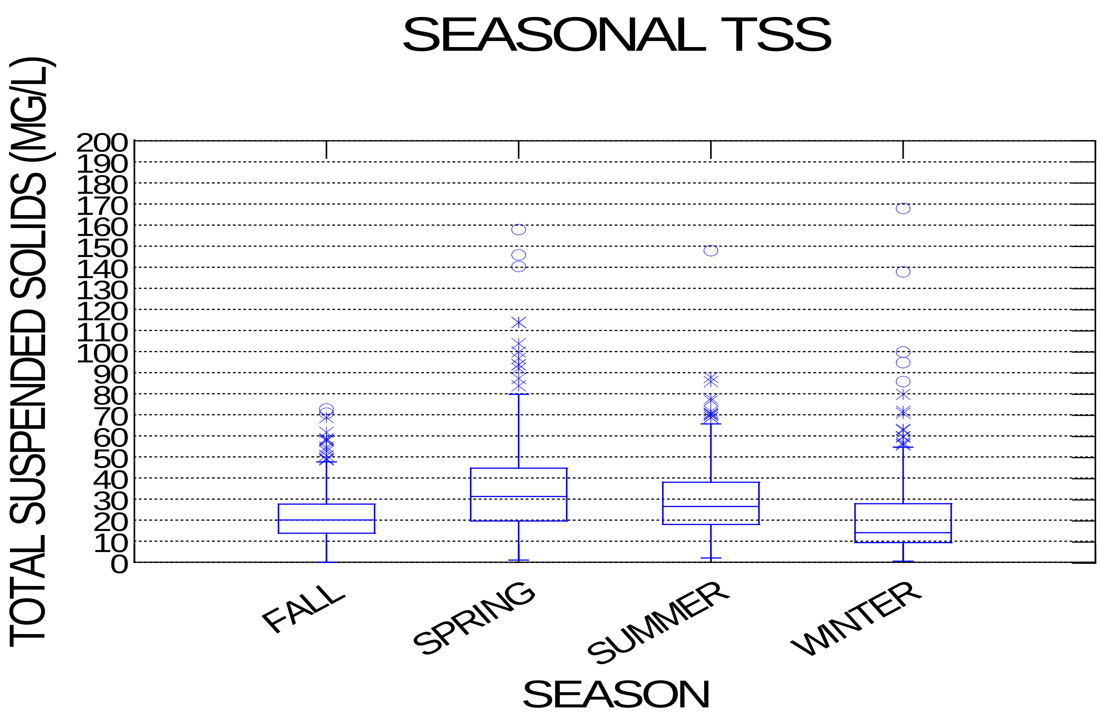

SEASONAL TN
TOTAL NITROGEN (MG/L)
5.00
4.75
4.50
4.25
4.00
3.75
3.50
3.25
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
FALL
SPRING
SUMMER
WINTER
SEASON

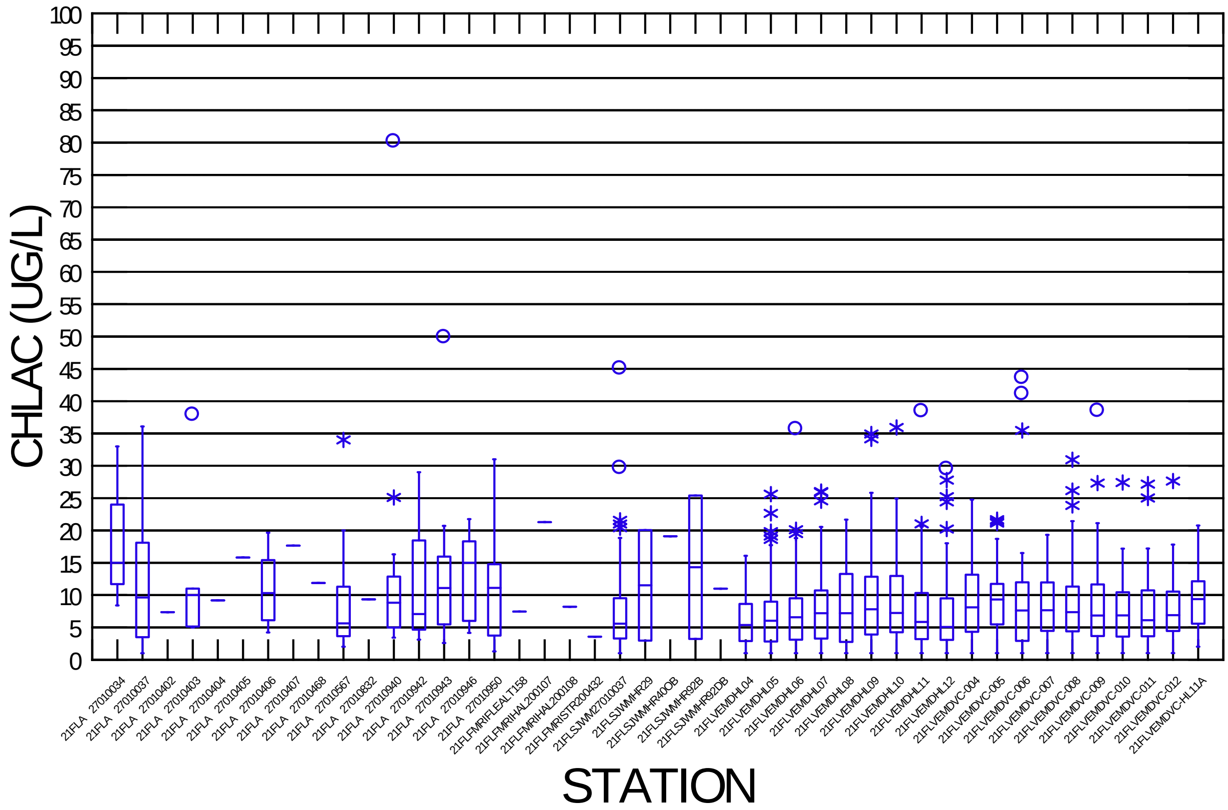

SEASONAL INORGP
INORGANIC P (MG/L)
0.500
0.475
0.450
0.425
0.400
0.375
0.350
0.325
0.300
0.275
0.250
0.225
0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
FALL
SPRING
SUMMER
WINTER
SEASON

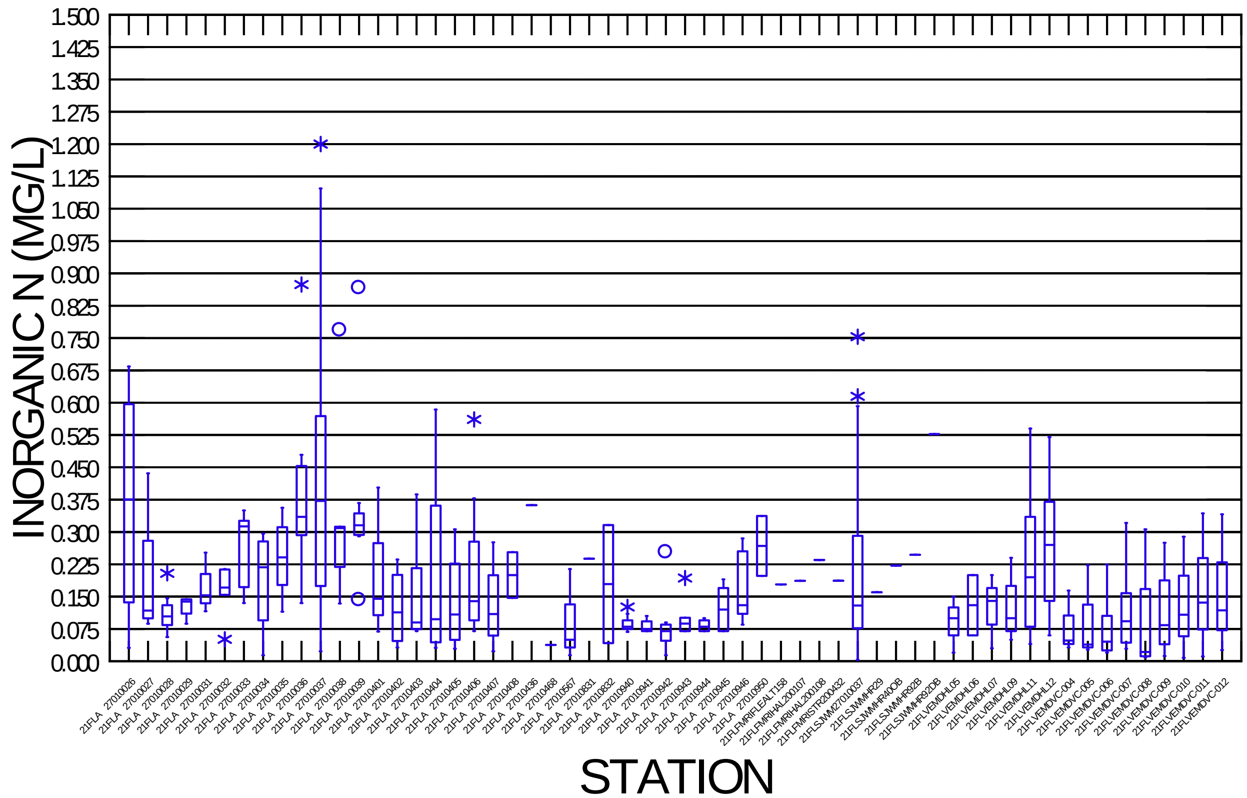

SEASONAL TP
TOTAL PHOSPHORUS (MG/L)
2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
FALL
SPRING
SUMMER
WINTER
SEASON

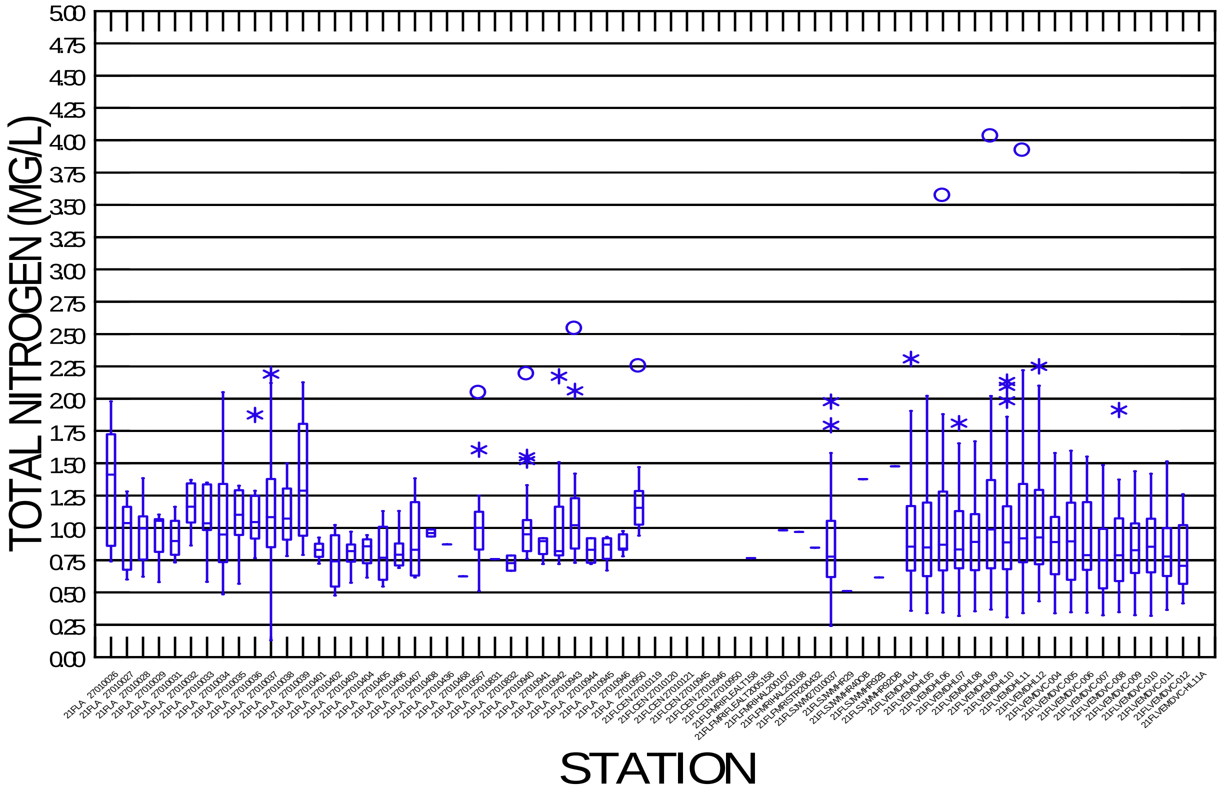

SEASONAL COND
COND (US/CM)
100000
95000
90000
85000
80000
75000
70000
65000
60000
55000
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
FALL
SPRING
SUMMER
WINTER
SEASON

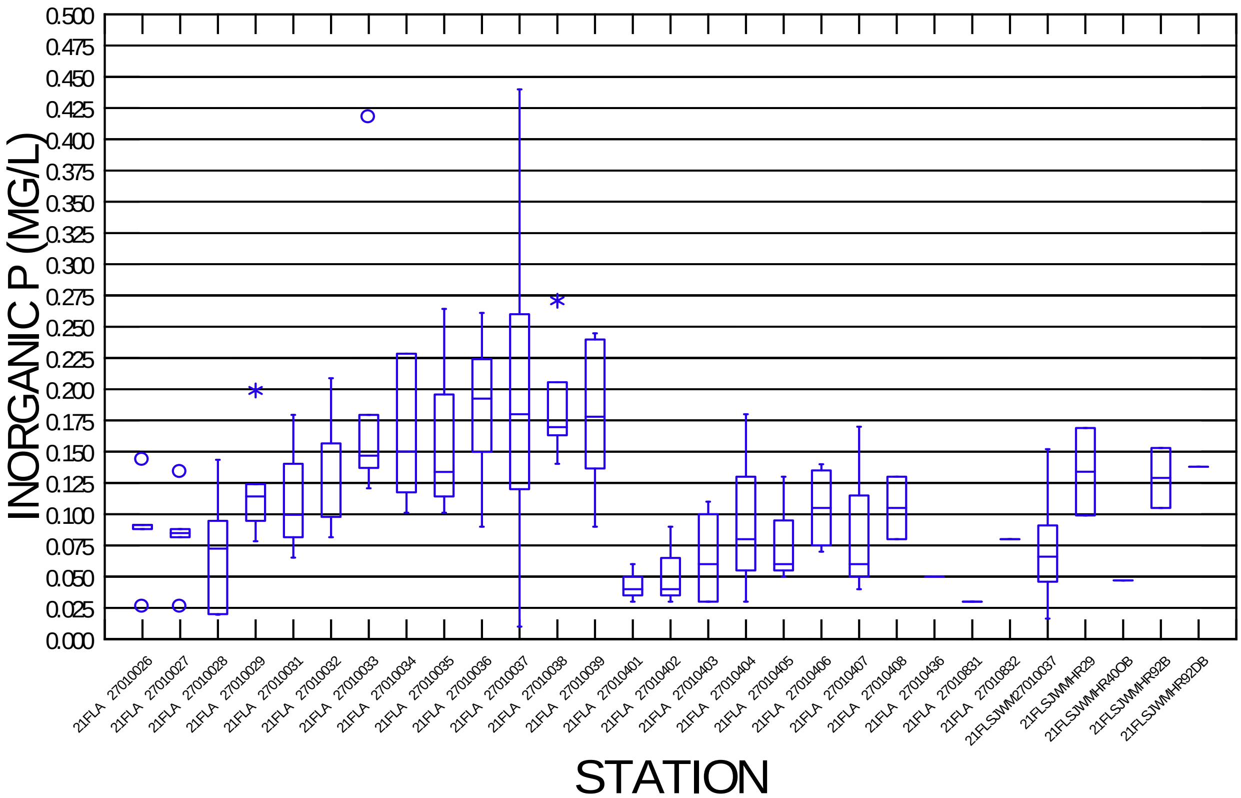

SEASONAL COLOR
COLOR (PT-CO)
0
30
60
90
120
150
180
210
240
270
300
330
360
390
420
450
480
510
540
570
600
FALL
SPRING
SUMMER
WINTER
SEASON

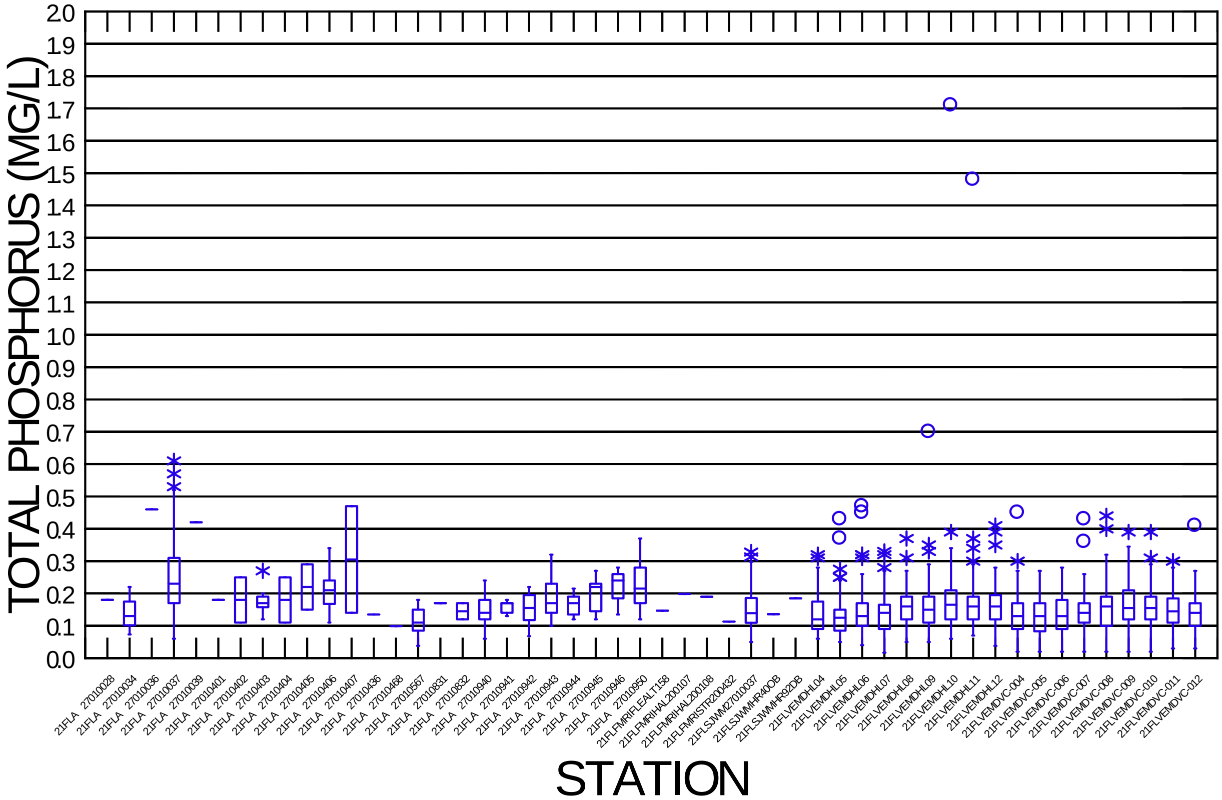

SEASONAL TSS
TOTAL SUSPENDED SOLIDS (MG/L)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
FALL
SPRING
SUMMER
WINTER
SEASON

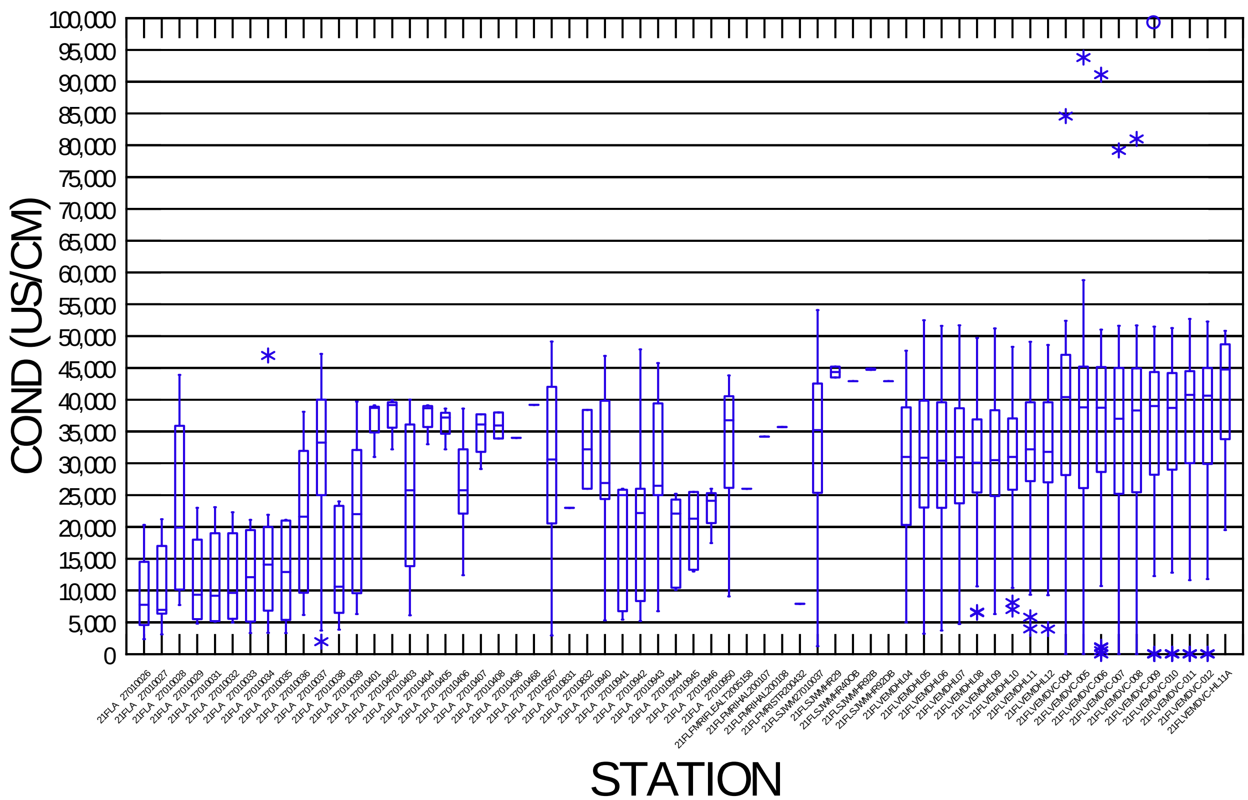

CHLAC (UG/L)
STATION

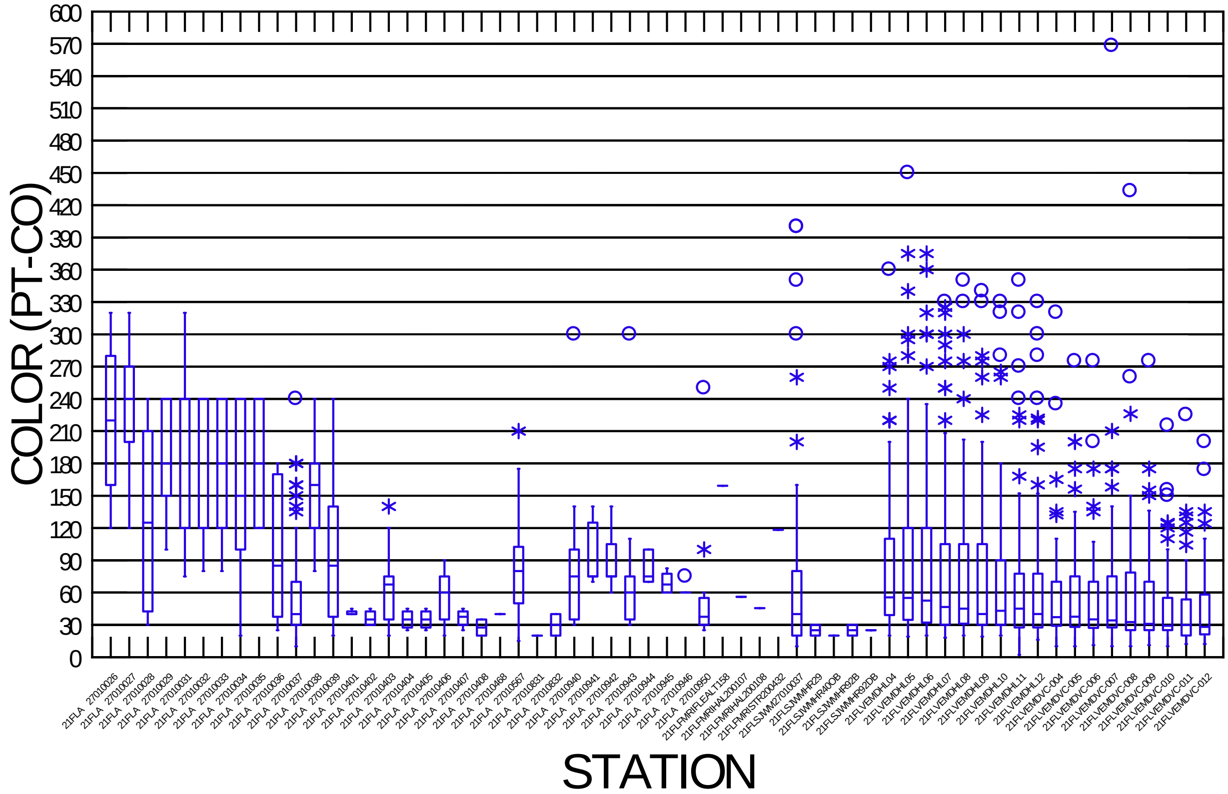

INORGANIC N (MG/L)
STATION

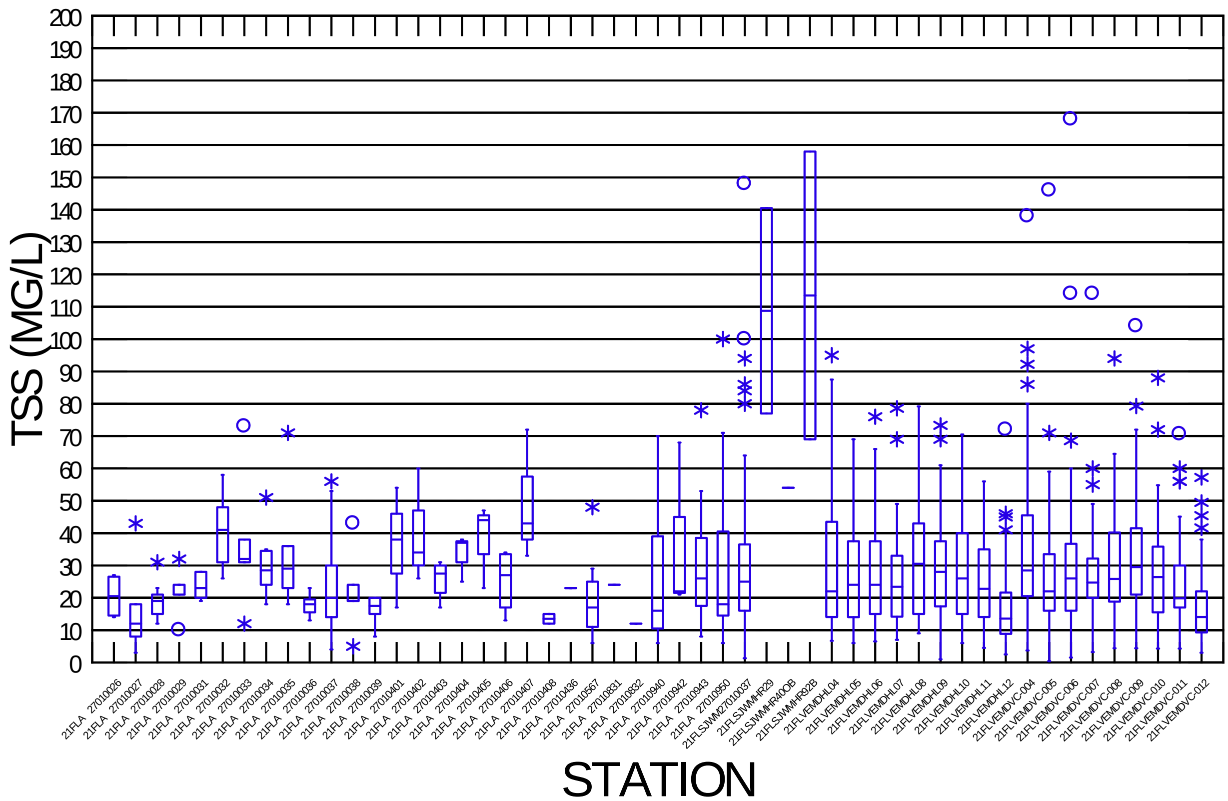

TOTAL NITROGEN (MG/L)
5.00
4.75
4.50
4.25
4.00
3.75
3.50
3.25
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
STATION


INORGANIC P (MG/L)
0.500
0.475
0.450
0.425
0.400
0.375
0.350
0.325
0.300
0.275
0.250
0.225
0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
21FLA 27010026
21FLA 27010027
21FLA 27010028
21FLA 27010029
21FLA 27010031
21FLA 27010032
21FLA 27010033
21FLA 27010034
21FLA 27010035
21FLA 27010036
21FLA 27010037
21FLA 27010038
21FLA 27010039
21FLA 27010401
21FLA 27010402
21FLA 27010403
21FLA 27010404
21FLA 27010405
21FLA 27010406
21FLA 27010407
21FLA 27010408
21FLA 27010436
21FLA 27010831
21FLA 27010832
21FLSJWM27010037
21FLSJWMHR29
21FLSJWMHR40OB
21FLSJWMHR92B
21FLSJWMHR92DB
STATION

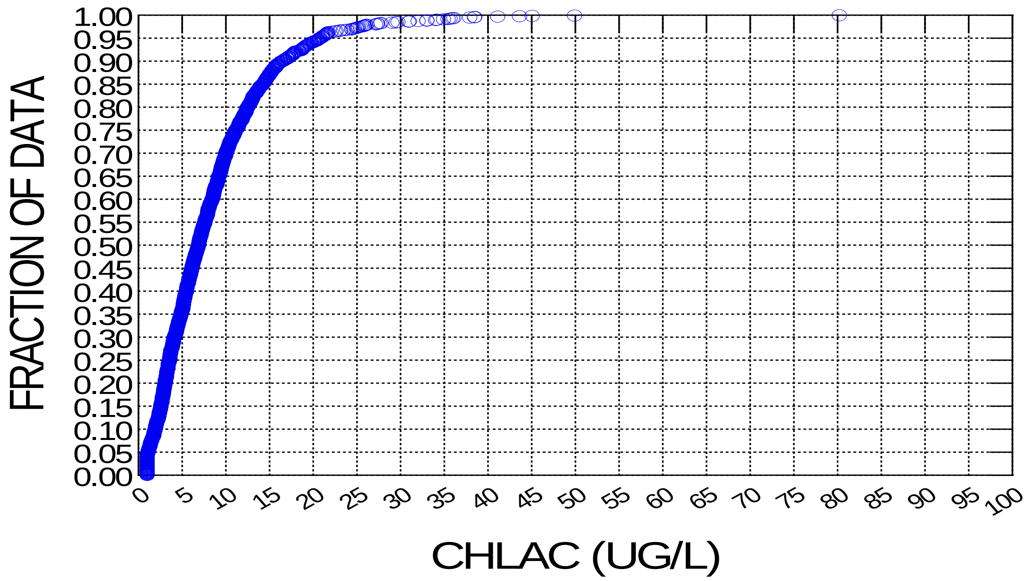

TOTAL PHOSPHORUS (MG/L)
2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
STATION


COND (US/CM)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
STATION

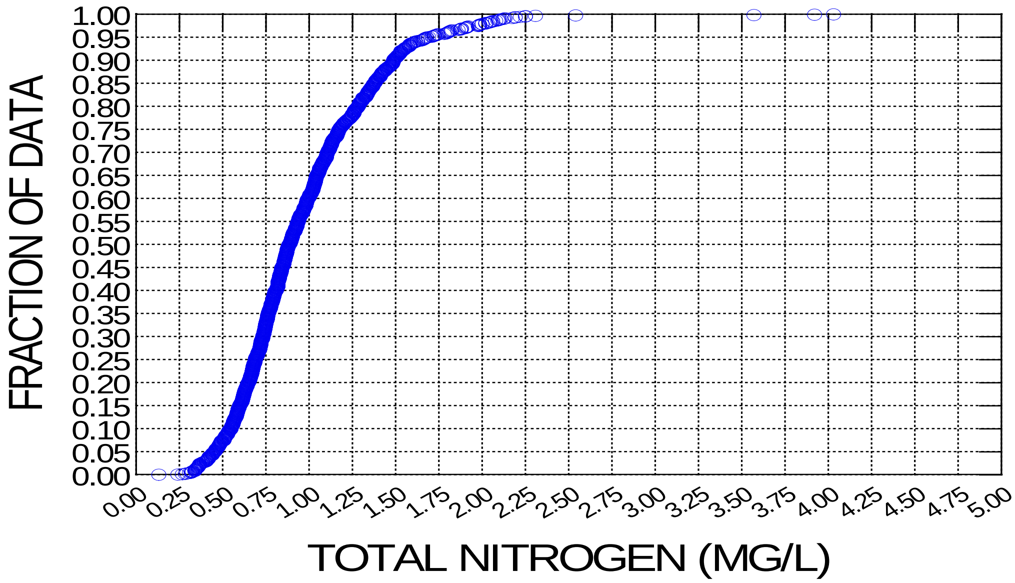

COLOR (PT-CO)
STATION

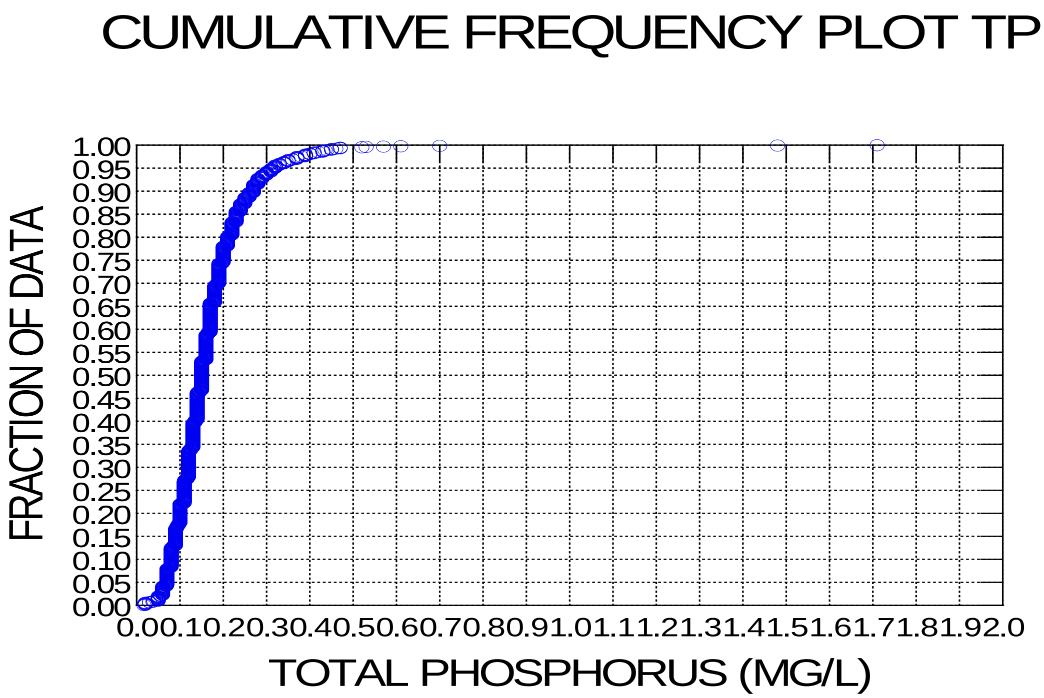

TSS (MG/L)
STATION

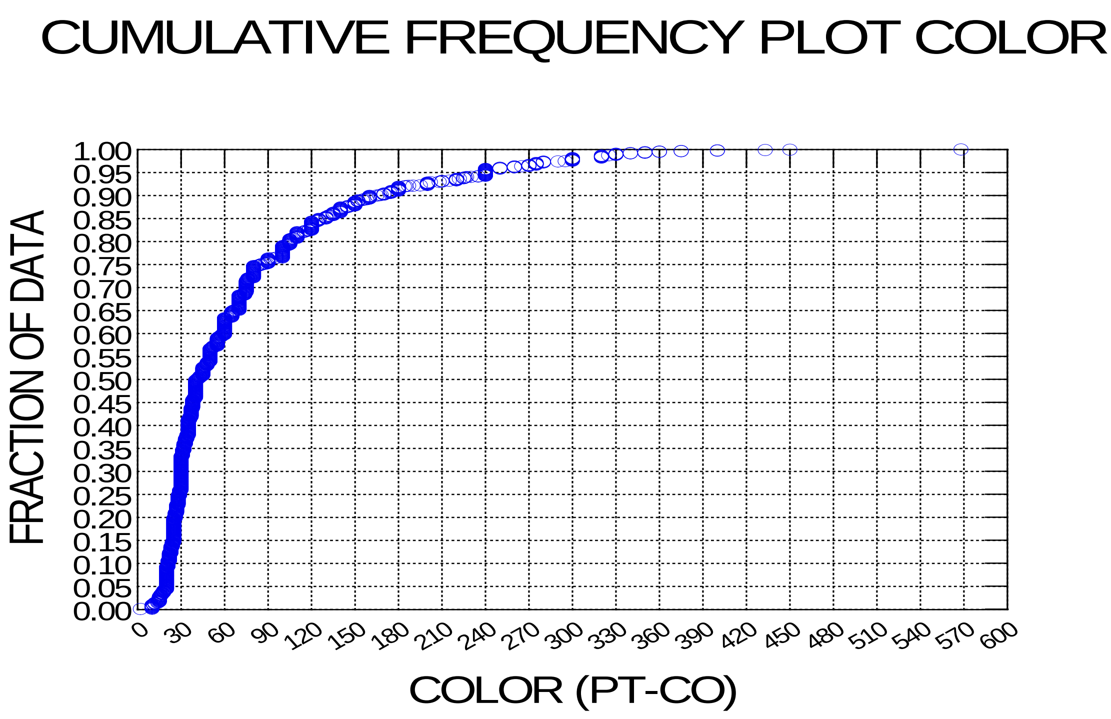
CUMULATIVE FREQUENCY PLOT CHLAC



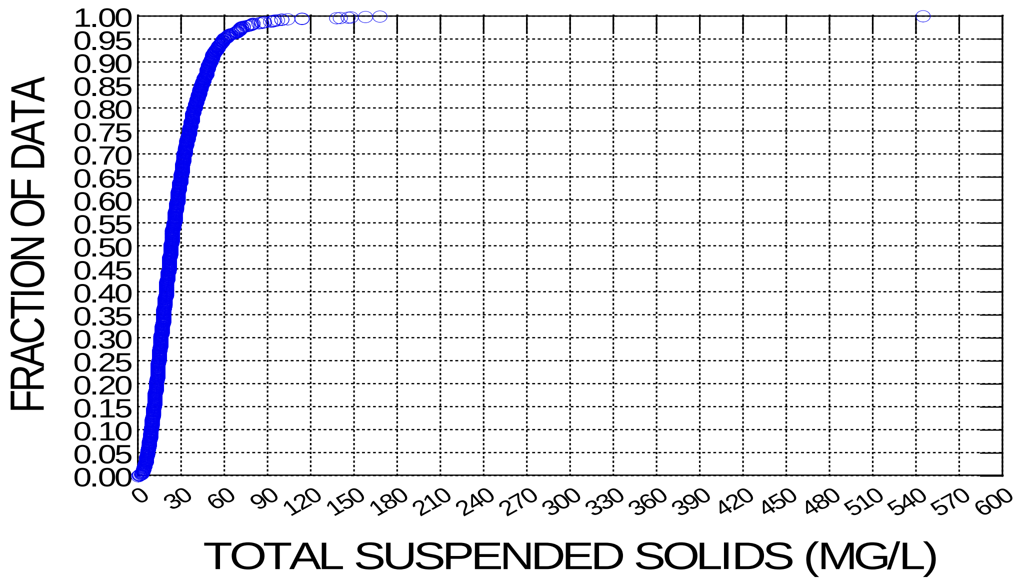
CUMULATIVE FREQUENCY PLOT TN



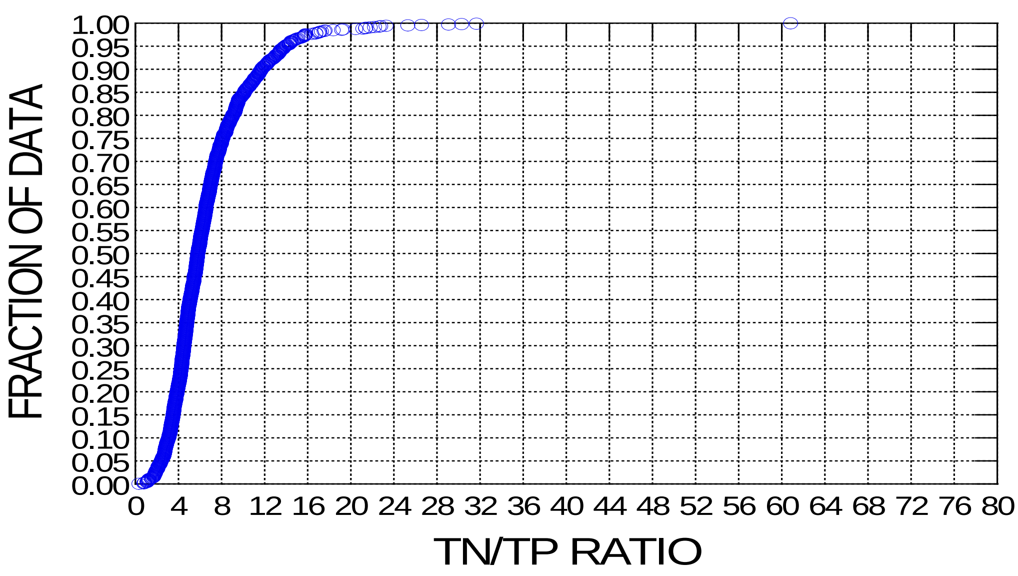

CUMULATIVE FREQUENCY PLOT TP
FRACTION OF DATA
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.00.10.20.30.40.50.60.70.80.91.01.11.21.31.41.51.61.71.81.92.0
TOTAL PHOSPHORUS (MG/L)


CUMULATIVE FREQUENCY PLOT COLOR
FRACTION OF DATA
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0 30 60 90 120 150 180 210 240 270 300 330 360 390 420 450 480 510 540 570 600
COLOR (PT-CO)

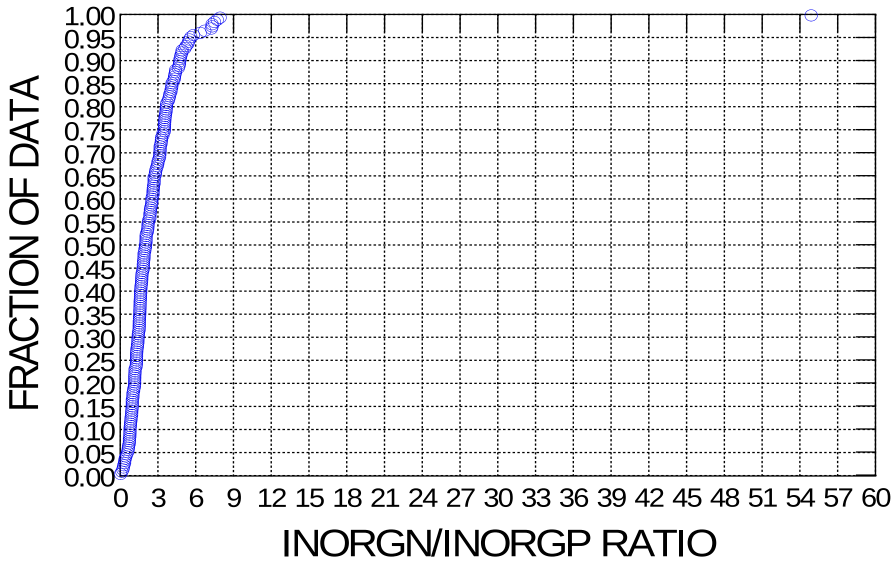
CUMULATIVE FREQUENCY PLOT TSS



CUMULATIVE FREQUENCY PLOT TN/TP RATIO



CUMULATIVE FREQUENCY PLOT INORGN/INORGP RATIO



Appendix G: Monthly and Annual Precipitation at Daytona International Airport, 1937–2011

Rainfall is in inches, and represents data from Daytona International Airport.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
1937	2.22	4.73	4.14	2.69	2.59	2.96	5.64	7.72	7.96	5.69	7.43	1.52	55.29
1938	0.73	3.18	1.69	1.04	1.96	2.84	8.36	2.82	8.14	3.23	3.93	1.37	39.29
1939	1.09	0.45	1.48	5.29	2.4	6.96	9.53	5.78	7.67	2.83	0.45	1.16	45.09
1940	1.65	2.24	1.98	2.45	0.97	5.21	8.53	4.44	8.59	0.04	0.16	4.3	40.56
1941	3.42	4.4	2.01	3.11	1.32	7.29	11.46	6.56	2.86	13.68	7.47	3.72	67.3
1942	2.15	2.52	5.68	0.98	2.35	10.12	2.38	3.73	6.54	2.67	1.06	2.22	42.4
1943	1.51	0.18	6.57	2.86	3.09	4.35	11.01	10.47	11.71	7.14	0.55	0.67	60.11
1944	1.28	0.29	7.21	2.87	0.45	8.27	14.58	9.33	6.46	4.4	0.55	0.12	55.81
1945	3.62	0.88	0.41	1.53	1.56	7	7.45	6.83	9.65	5.14	0.79	4.5	49.36
1946	1.62	2.98	1.76	0.49	2.8	4.23	8.17	10.21	10.75	3.87	2.81	0.61	50.3
1947	0.78	6.04	5.29	5.31	4.82	13.43	8.65	6.97	5.75	5.72	1.98	0.9	65.64
1948	4.52	1.22	5.13	2.37	0.49	2.4	10.43	7.33	9.82	8.29	1.07	1.93	55
1949	0.37	1.95	2.01	7.12	1.4	4.24	5.97	11.46	6.26	3.65	1.86	3.93	50.22
1950	0.15	0.59	3.53	2.79	2.13	6.45	5.56	3.88	5.86	13	0.74	2.54	47.22
1951	0.77	2.46	1.18	3.28	2.53	2.66	3.8	4.19	14.02	8.54	3.15	2.88	49.46
1952	0.66	6.76	3.01	1.66	4.39	1.35	1.25	9.02	11.92	5.41	1.96	0.71	48.1
1953	1.75	3.35	7.75	4.97	1.46	1.37	8.67	19.89	10	12.93	2.3	4.85	79.29
1954	0.37	0.86	2.33	6.29	3.21	2.35	3.5	3.04	1.88	4.91	3.98	1.24	33.96
1955	2.47	1.43	1.84	1.78	1.55	7.76	5.67	2.64	6.66	3.17	2.61	1.22	38.8
1956	2.55	0.9	0.25	2.42	2.48	7.41	3.01	4.06	1.94	5.82	0.46	0.06	31.36
1957	0.97	1.62	3.13	1.73	5.65	4.23	10.53	4.01	10.65	1.8	0.82	1.34	46.48
1958	3.94	4.73	5.52	2.24	2.27	6.06	1.96	4	2.19	8.52	1.77	1.95	45.15
1959	4.53	2.13	7.7	3.17	2.4	8.13	5.68	3.6	5.26	7.12	4.26	2.26	56.24
1960	1.16	9.13	7.52	0.76	0.62	10.75	8.7	6.84	10.96	0.97	0.53	1.24	59.18
1961	1.96	3.7	1.17	2.16	2.39	6.81	5.16	7.68	3.2	2.25	2.85	0.73	40.06
1962	0.9	0.82	1.82	0.78	0.16	7.96	10.04	8.5	8.84	3.57	2.49	0.71	46.59
1963	2.91	5.83	1.46	1.4	6.82	7.42	6.89	2.01	5.43	2.71	7.98	2.17	53.03
1964	5.29	2.65	4.84	3.61	2.58	4.73	7.67	10.81	11.39	3.54	3.13	2.52	62.76
1965	2.22	3	3.05	1	0.08	9	3.72	2.97	4.33	3.65	0.97	2.14	36.13
1966	2.89	5.58	0.36	2.56	6.77	15.19	7.09	7.93	4.49	4.6	1.19	1.6	60.25
1967	1.26	3.98	0.31	0	0.73	7.51	9.04	3.02	5.56	0.19	0	2.98	34.58
1968	0.42	1.73	1.79	0.4	4.79	14.38	6.25	11.09	6.07	7.44	2.43	1.38	58.17
1969	1.53	2.03	2.74	0.12	6.47	2.47	2.61	9.4	8.89	6.97	1.96	5.03	50.22
1970	3.94	3.79	3.59	2.08	1.68	2.62	3.65	3.61	3.54	3.87	0.31	0.72	33.4
1971	0.61	5.48	2	2.57	3.12	4.73	3.2	3.97	7.2	9.53	1.33	2.49	46.23
1972	2.37	3.97	6.66	1.41	4.02	7.06	3.22	8.29	0.42	3.08	10.96	2.48	53.94
1973	4.66	2.02	2.63	3.09	2.41	4.32	4.69	7.58	5.14	4.4	0.75	2.54	44.23
1974	0.3	1.1	3.19	0.44	2.66	8.65	6.31	9.96	10.5	1.42	0.48	2.2	47.21
1975	1.66	2.27	1.52	2.96	2.99	9	6.89	3.16	6.61	5.84	1.46	0.83	45.19
1976	0.6	0.7	2.03	4.27	12.33	11.14	1.07	3.8	5.1	1.9	3.38	6	52.32
1977	4.69	2.45	1.43	0.41	4.61	1.15	2.23	7.91	6.55	1.46	3.04	4.74	40.67
1978	2.89	5.98	2.31	3.3	0.56	7.48	5.53	7.99	4.63	8.31	0.07	4.89	53.94
1979	7.1	1.94	4.08	3.96	6.13	3.03	11.69	5.24	15.2	2.13	7.96	0.56	69.02
1980	3.75	0.76	2.41	2.54	3.62	5.57	5.82	4.13	1.83	2.42	3.12	1.39	37.36

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
1981	0.32	5.54	3	0.29	1.74	1.03	4.69	7.19	7.59	1.08	2.57	4.64	39.68
1982	2.46	2.08	5.81	6.04	4.68	8.29	5.31	3.21	4.96	3.23	1.58	2.53	50.18
1983	2.51	5.96	7.71	6.17	3.86	6.37	1.92	6.82	8.57	10.11	2.01	11.98	73.99
1984	1.46	3.44	1.31	5.29	6.04	2.84	6.77	4.02	10.73	1.09	3.52	0.2	46.71
1985	0.79	0.58	1.49	3.14	3.42	6.81	2.16	9.83	10.62	4.08	0.41	2.05	45.38
1986	7.16	1.28	1.85	0.44	0.99	3.5	14.43	3.47	3.58	3.47	5.08	2.76	48.01
1987	2.21	6.64	7.94	0.28	2.65	3.81	2.78	4.89	5.63	2.77	5.87	0.25	45.72
1988	5.36	1.72	4.57	1.68	1.78	2.39	2.94	4.79	6.81	1.24	6.7	0.93	40.91
1989	6.82	0.64	2.01	2.92	2.02	1.84	2.44	4.47	5.04	11.64	0.88	3.93	44.65
1990	1.42	5.61	1.94	1.48	1.45	2.71	5.85	7	1.61	5.88	0.83	0.34	36.12
1991	2.25	1.65	8.11	5.57	6.79	12.67	11.97	7.6	5.52	2.94	0.61	1.51	67.19
1992	2.42	1.71	2.28	2.81	3.13	10.64	0.16	8.86	6.57	5.21	2.15	0.47	46.41
1993	4.29	3.02	5.56	0.33	0.65	2.19	5.05	2.66	2.74	5.53	1.83	1.86	35.71
1994	5.6	2.66	3.44	5.05	3.09	6.54	6.91	7.08	5.93	4.72	12.91	2.71	66.64
1995	1.53	1.39	2.01	1.34	1.26	6.61	6.59	10.71	14.13	3.99	1.44	3.44	54.44
1996	5.53	1.32	12.15	2.22	2.28	11.35	1.9	5.7	3.92	11.15	0.96	2.01	60.49
1997	2.03	0.46	2.3	3.3	3.77	6.38	7.69	7.91	4.78	5.29	3.02	7.76	54.69
1998	4.33	7.25	3.97	0.14	0.16	0.83	5.63	7.56	5.79	1.84	1.66	1.35	40.51
1999	4.88	1.81	1.01	1.48	1.47	8.54	4.03	3.58	7.05	7.84	3.12	1.56	46.37
2000	1.8	0.65	8.48	1.15	0.32	3.08	5.09	3.17	13.55	0.93	1.14	0.8	40.16
2001	0.88	0.38	9.98	0.28	1.77	5.26	9.55	3.57	16.11	3.22	6.92	0.35	58.27
2002	2.01	2.76	1.51	2.53	1.66	12.3	7.35	11.56	3.86	2.94	1.85	9.61	59.94
2003	0.51	5.17	10.57	0.81	0.96	7.05	7.3	6.55	4.15	7.95	4.75	1.53	57.3
2004	1.25	4.47	1.1	1.19	0.49	5.2	10.34	17.96	16.46	1.34	0.93	2.24	62.97
2005	2.6	1.25	5.51	3.17	7.97	13.67	2.73	4.29	7.35	13.51	1.87	1.85	65.77
2006	0.24	4.33	0.08	1.11	0.78	5.72	4.48	4.81	2.97	2.53	1.1	3.21	31.36
2007	1.53	2.64	0.7	1.34	0.91	5.78	10.23	2.88	11.36	3.49	2.32	1.84	45.02
2008	1.3	2.12	3.2	1.34	0.63	3.64	9.48	10.33	4.29	4.45	0.96	0.93	42.67
2009	0.82	0.8	1.39	1.47	22.33	5.03	5.19	3.77	3.65	1.44	0.6	3.81	50.3
2010	5.92	3.92	6.2	1.04	4.74	2.86	3.88	5.83	3.49	0.18	0.95	0.38	39.39
2011	4.37	1.2	5.55	0.46	0.65	12.29	3.15	5.75	6.23	5.88	0.1	3.08	48.71
AVG	**2.44**	**2.79**	**3.62**	**2.32**	**2.99**	**6.20**	**6.15**	**6.48**	**6.98**	**4.78**	**2.52**	**2.36**	**49.63**

Appendix H: Spearman Correlation Matrix Analysis for Water Quality Parameters in the Halifax River

Spearman Correlation Matrix

- = Empty cell/no data

-	CHLAC	CHLORIDE	COLOR	COND	NH4
CHLAC	1.000	-	-	-	-
CHLORIDE	0.245	1.000	-	-	-
COLOR	-0.101	-0.837	1.000	-	-
COND	0.042	0.906	-0.782	1.000	-
NH4	-0.228	0.114	-0.197	0.055	1.000
NO3O2	-0.156	-0.475	0.395	-0.407	0.292
SALINITY	0.065	0.769	-0.804	0.910	-0.160
SD	-0.356	0.088	-0.274	0.206	-0.136
TEMPC	0.476	0.276	-0.023	-0.037	0.117
TN	0.210	-0.465	0.334	-0.416	0.311
TP	0.357	-0.045	-0.080	-0.014	0.466
TSS	0.392	0.274	-0.181	0.188	-0.093
TURB	0.436	0.169	0.016	-0.018	0.141
INORGP	-0.017	-0.464	0.195	-0.257	0.281
INORGN	-0.267	-0.338	0.021	-0.133	0.712
PRECP	0.226	-0.067	0.032	-0.073	0.099
V3DAY	0.100	-0.045	0.043	-0.077	0.254
V7DAY	0.031	-0.302	0.054	-0.128	0.173
V14DAY	0.058	-0.462	0.128	-0.245	0.280
V21DAY	0.107	-0.525	0.260	-0.315	0.263

- = Empty cell/no data

-	NO3O2	SALINITY	SD	TEMPC	TN
NO3O2	1.000	-	-	-	-
SALINITY	-0.418	1.000	-	-	-
SD	-0.204	0.222	1.000	-	-
TEMPC	0.019	-0.053	-0.325	1.000	-
TN	0.433	-0.424	-0.405	0.209	1.000
TP	0.204	-0.004	-0.327	0.554	0.246
TSS	-0.156	0.189	-0.552	0.294	0.173
TURB	0.000	-0.025	-0.741	0.416	0.296
INORGP	0.587	-0.358	0.362	0.193	0.390
INORGN	0.835	-0.188	-0.138	0.093	0.451
PRECP	0.054	-0.078	-0.221	0.320	0.188
V3DAY	0.093	-0.116	-0.162	0.209	0.133
V7DAY	0.134	-0.135	-0.114	0.209	0.179
V14DAY	0.143	-0.257	-0.150	0.220	0.245
V21DAY	0.254	-0.332	-0.248	0.278	0.309

Spearman Correlation Matrix (cont.)

Empty cell/no data

-	TP	TSS	TURB	INORGP	INORGN
TP	1.000	-	-	-	-
TSS	0.383	1.000	-	-	-
TURB	0.478	0.759	1.000	-	-
INORGP	0.783	-0.125	0.265	1.000	-
INORGN	0.513	-0.170	0.047	0.601	1.000
PRECP	0.207	0.129	0.136	0.028	0.008
V3DAY	0.171	0.132	0.161	0.221	0.180
V7DAY	0.138	0.047	0.073	0.246	0.216
V14DAY	0.051	0.037	0.132	0.155	0.219
V21DAY	0.120	0.042	0.209	0.288	0.258

- = Empty cell/no data

-	PRECP	V3DAY	V7DAY	V14DAY	V21DAY
PRECP	1.000	-	-	-	-
V3DAY	0.570	1.000	-	-	-
V7DAY	0.415	0.630	1.000	-	-
V14DAY	0.339	0.505	0.757	1.000	-
V21DAY	0.337	0.446	0.669	0.862	1.000

Pairwise Frequency Table

- = Empty cell/no data

-	CHLAC	CHLORIDE	COLOR	COND	NH4
CHLAC	1363	-	-	-	-
CHLORIDE	98	198	-	-	-
COLOR	1158	197	1517	-	-
COND	1336	195	1489	1798	-
NH4	196	193	396	403	410
NO3O2	1116	193	1385	1405	394
SALINITY	1308	73	1287	1587	228
SD	1204	14	1210	1486	147
TEMPC	1341	196	1492	1794	407
TN	1038	189	1267	1271	370
TP	1141	104	1309	1316	298
TSS	1108	194	1347	1357	324
TURB	1152	98	1228	1234	224
INORGP	67	166	216	216	215
INORGN	188	188	380	387	394
PRECP	1363	198	1517	1798	410
V3DAY	1363	198	1517	1798	410
V7DAY	1363	198	1517	1798	410
V14DAY	1363	198	1517	1798	410
V21DAY	1363	198	1517	1798	410

- = Empty cell/no data

-	NO3O2	SALINITY	SD	TEMPC	TN
NO3O2	1434	-	-	-	-
SALINITY	1203	1617	-	-	-
SD	1163	1459	1538	-	-
TEMPC	1408	1617	1514	1827	-
TN	1295	1069	1033	1273	1299
TP	1257	1201	1129	1317	1206
TSS	1280	1151	1083	1356	1228
TURB	1159	1205	1095	1238	1106
INORGP	216	42	25	218	214
INORGN	394	217	142	391	366
PRECP	1434	1617	1538	1827	1299
V3DAY	1434	1617	1538	1827	1299
V7DAY	1434	1617	1538	1827	1299
V14DAY	1434	1617	1538	1827	1299
V21DAY	1434	1617	1538	1827	1299

Pairwise Frequency Table (cont.)

- = Empty cell/no data

-	TP	TSS	TURB	INORGP	INORGN
TP	1343	-	-	-	-
TSS	1269	1381	-	-	-
TURB	1230	1192	1260	-	-
INORGP	126	216	67	220	-
INORGN	288	314	219	211	394
PRECP	1343	1381	1260	220	394
V3DAY	1343	1381	1260	220	394
V7DAY	1343	1381	1260	220	394
V14DAY	1343	1381	1260	220	394
V21DAY	1343	1381	1260	220	394

- = Empty cell/no data

-	PRECP	V3DAY	V7DAY	V14DAY	V21DAY
PRECP	1866	-	-	-	-
V3DAY	1866	1866	-	-	-
V7DAY	1866	1866	1866	-	-
V14DAY	1866	1866	1866	1866	-
V21DAY	1866	1866	1866	1866	1866

Appendix I: Linear Regression Analysis of CHLAC Observations versus COND, SALINITY, TEMPC, Nutrients, COLOR, TSS, TURBIDITY, and Rainfall in Halifax River

Dep Var: CHLAC N: 943 Multiple R: 0.048 Squared multiple R: 0.002

Adjusted squared multiple R: 0.001 Standard error of estimate: 5.934

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	8.028	0.364	0.000	-	22.083	0.000
COND	-0.000	0.000	-0.048	1.000	-1.475	0.141

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	76.571	1	76.571	2.175	0.141
Residual	33132.113	941	35.209	-	-

*** WARNING ***
Case 116 is an outlier (Studentized Residual = 5.285)
Case 566 has large leverage (Leverage = 0.570)
Case 613 is an outlier (Studentized Residual = 4.679)
Case 640 is an outlier (Studentized Residual = 6.239)
Case 1046 is an outlier (Studentized Residual = 5.214)
Case 1051 is an outlier (Studentized Residual = 5.772)
Case 1122 is an outlier (Studentized Residual = 6.399)
Case 1132 is an outlier (Studentized Residual = 4.297)
Case 1134 is an outlier (Studentized Residual = 4.454)

Durbin-Watson D Statistic 1.004
First Order Autocorrelation 0.498

Dep Var: CHLAC N: 922 Multiple R: 0.014 Squared multiple R: 0.000

Adjusted squared multiple R: 0.000 Standard error of estimate: 5.917

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	7.394	0.544	0.000	-	13.604	0.000
SALINITY	0.010	0.024	0.014	1.000	0.432	0.666

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	6.524	1	6.524	0.186	0.666
Residual	32215.034	920	35.016		

*** WARNING ***
Case 116 is an outlier (Studentized Residual = 5.289)
Case 613 is an outlier (Studentized Residual = 4.769)
Case 640 is an outlier (Studentized Residual = 6.194)
Case 1046 is an outlier (Studentized Residual = 5.282)
Case 1051 is an outlier (Studentized Residual = 5.754)
Case 1122 is an outlier (Studentized Residual = 6.517)
Case 1132 is an outlier (Studentized Residual = 4.355)
Case 1134 is an outlier (Studentized Residual = 4.542)

Durbin-Watson D Statistic 1.011
First Order Autocorrelation 0.494

Dep Var: CHLAC N: 947 Multiple R: 0.377 Squared multiple R: 0.142

Adjusted squared multiple R: 0.141 Standard error of estimate: 5.494

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	-2.782	0.848	0.000	-	-3.283	0.001
TEMPC	0.431	0.034	0.377	1.000	12.504	0.000

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	4719.447	1	4719.447	156.357	0.000
Residual	28523.611	945	30.184	-	-

*** WARNING ***
Case 116 is an outlier (Studentized Residual = 6.886)
Case 613 is an outlier (Studentized Residual = 4.781)
Case 640 is an outlier (Studentized Residual = 6.124)
Case 1046 is an outlier (Studentized Residual = 5.203)
Case 1051 is an outlier (Studentized Residual = 5.743)
Case 1122 is an outlier (Studentized Residual = 6.584)
Case 1134 is an outlier (Studentized Residual = 4.452)

Durbin-Watson D Statistic 1.142
First Order Autocorrelation 0.429

Dep Var: CHLAC N: 112 Multiple R: 0.179 Squared multiple R: 0.032

Adjusted squared multiple R: 0.023 Standard error of estimate: 8.024

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	9.935	1.054	0.000	-	9.421	0.000
NH4	-14.536	7.628	-0.179	1.000	-1.906	0.059

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	233.836	1	233.836	3.631	0.059
Residual	7083.179	110	64.393	-	-

*** WARNING ***
Case 640 is an outlier (Studentized Residual = 4.626)
Case 1038 has large leverage (Leverage = 0.243)
Case 1122 is an outlier (Studentized Residual = 5.009)

Durbin-Watson D Statistic 1.647
First Order Autocorrelation 0.173

Dep Var: CHLAC N: 799 Multiple R: 0.157 Squared multiple R: 0.025

Adjusted squared multiple R: 0.023 Standard error of estimate: 5.781

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	8.501	0.275	0.000	-	30.947	0.000
NO3O2	-13.007	2.904	-0.157	1.000	-4.479	0.000

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	670.426	1	670.426	20.059	0.000
Residual	26638.030	797	33.423	-	-

*** WARNING ***
Case 93 has large leverage (Leverage = 0.043)
Case 94 has large leverage (Leverage = 0.071)
Case 116 is an outlier (Studentized Residual = 5.349)
Case 283 has large leverage (Leverage = 0.088)
Case 613 is an outlier (Studentized Residual = 4.773)
Case 640 is an outlier (Studentized Residual = 6.254)
Case 1122 is an outlier (Studentized Residual = 6.972)
Case 1132 is an outlier (Studentized Residual = 4.298)
Case 1134 is an outlier (Studentized Residual = 4.479)

Durbin-Watson D Statistic 1.081
First Order Autocorrelation 0.459

Dep Var: CHLAC N: 112 Multiple R: 0.224 Squared multiple R: 0.050

Adjusted squared multiple R: 0.041 Standard error of estimate: 7.949

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	10.640	1.151	0.000	.	9.243	0.000
INORGN	-12.893	5.351	-0.224	1.000	-2.410	0.018

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	366.839	1	366.839	5.806	0.018
Residual	6950.176	110	63.183		

*** WARNING ***
Case 640 is an outlier (Studentized Residual = 4.595)
Case 1122 is an outlier (Studentized Residual = 5.372)

Durbin-Watson D Statistic 1.672
First Order Autocorrelation 0.160

Dep Var: CHLAC N: 763 Multiple R: 0.209 Squared multiple R: 0.044

Adjusted squared multiple R: 0.042 Standard error of estimate: 5.644

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	4.542	0.579	0.000	.	7.850	0.000
TN	3.767	0.640	0.209	1.000	5.891	0.000

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	1105.262	1	1105.262	34.700	0.000
Residual	24239.323	761	31.852		

*** WARNING ***
Case 116 is an outlier (Studentized Residual = 5.698)
Case 613 is an outlier (Studentized Residual = 4.807)
Case 1122 is an outlier (Studentized Residual = 6.327)
Case 1132 is an outlier (Studentized Residual = 4.160)
Case 1134 is an outlier (Studentized Residual = 4.212)
Case 1220 has large leverage (Leverage = 0.054)

Durbin-Watson D Statistic 1.117
First Order Autocorrelation 0.441

Dep Var: CHLAC N: 61 Multiple R: 0.059 Squared multiple R: 0.004

Adjusted squared multiple R: 0.000 Standard error of estimate: 5.759

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	6.310	1.837	0.000	.	3.434	0.001
INORGP	10.574	23.190	0.059	1.000	0.456	0.650

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	6.897	1	6.897	0.208	0.650
Residual	1957.078	59	33.171		

*** WARNING ***
Case 295 is an outlier (Studentized Residual = 4.543)

Durbin-Watson D Statistic 1.773
First Order Autocorrelation 0.095

Dep Var: CHLAC N: 806 Multiple R: 0.253 Squared multiple R: 0.064

Adjusted squared multiple R: 0.063 Standard error of estimate: 5.646

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	4.487	0.481	0.000	.	9.322	0.000
TP	21.213	2.860	0.253	1.000	7.418	0.000

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	1754.008	1	1754.008	55.020	0.000
Residual	25630.902	804	31.879		

*** WARNING ***
Case 72 has large leverage (Leverage = 0.078)
Case 116 is an outlier (Studentized Residual = 5.798)
Case 613 is an outlier (Studentized Residual = 4.495)
Case 1051 is an outlier (Studentized Residual = 6.057)
Case 1122 is an outlier (Studentized Residual = 6.466)
Case 1132 is an outlier (Studentized Residual = 4.622)
Case 1134 is an outlier (Studentized Residual = 4.846)

Durbin-Watson D Statistic 1.110
First Order Autocorrelation 0.445

Dep Var: CHLAC N: 807 Multiple R: 0.182 Squared multiple R: 0.033

Adjusted squared multiple R: 0.032 Standard error of estimate: 5.641

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	8.607	0.279	0.000	.	30.838	0.000
COLOR	-0.014	0.003	-0.182	1.000	-5.258	0.000

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	879.705	1	879.705	27.645	0.000
Residual	25615.978	805	31.821		

*** WARNING ***
Case 116 is an outlier (Studentized Residual = 5.531)
Case 613 is an outlier (Studentized Residual = 4.925)
Case 619 has large leverage (Leverage = 0.026)
Case 640 is an outlier (Studentized Residual = 6.428)
Case 649 has large leverage (Leverage = 0.057)
Case 650 has large leverage (Leverage = 0.031)
Case 755 has large leverage (Leverage = 0.026)
Case 1051 is an outlier (Studentized Residual = 5.979)
Case 1122 is an outlier (Studentized Residual = 7.051)

Durbin-Watson D Statistic 1.103
First Order Autocorrelation 0.448

Dep Var: CHLAC N: 802 Multiple R: 0.272 Squared multiple R: 0.074

Adjusted squared multiple R: 0.073 Standard error of estimate: 5.593

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	5.204	0.370	0.000	.	14.060	0.000
TSS	0.091	0.011	0.272	1.000	7.984	0.000

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	1994.435	1	1994.435	63.750	0.000
Residual	25028.177	800	31.285		

*** WARNING ***
Case 116 is an outlier (Studentized Residual = 5.895)
Case 613 is an outlier (Studentized Residual = 5.043)
Case 618 has large leverage (Leverage = 0.062)
Case 660 has large leverage (Leverage = 0.084)
Case 661 has large leverage (Leverage = 0.053)
Case 990 has large leverage (Leverage = 0.060)
Case 991 has large leverage (Leverage = 0.033)
Case 992 has large leverage (Leverage = 0.033)
Case 994 has large leverage (Leverage = 0.026)
Case 1051 is an outlier (Studentized Residual = 6.002)
Case 1122 is an outlier (Studentized Residual = 6.951)
Case 1132 is an outlier (Studentized Residual = 4.656)
Case 1134 is an outlier (Studentized Residual = 4.808)

Durbin-Watson D Statistic 1.161
First Order Autocorrelation 0.418

Dep Var: CHLAC N: 817 Multiple R: 0.313 Squared multiple R: 0.098

Adjusted squared multiple R: 0.097 Standard error of estimate: 5.515

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	4.854	0.361	0.000	.	13.435	0.000
TURB	0.250	0.027	0.313	1.000	9.394	0.000

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	2684.260	1	2684.260	88.251	0.000
Residual	24789.236	815	30.416		

*** WARNING ***
Case 116 is an outlier (Studentized Residual = 5.991)
Case 416 has large leverage (Leverage = 0.036)
Case 584 has large leverage (Leverage = 0.029)
Case 613 is an outlier (Studentized Residual = 5.081)
Case 990 has large leverage (Leverage = 0.102)
Case 991 has large leverage (Leverage = 0.067)
Case 992 has large leverage (Leverage = 0.059)
Case 993 has large leverage (Leverage = 0.046)
Case 1051 is an outlier (Studentized Residual = 5.835)
Case 1122 is an outlier (Studentized Residual = 6.565)
Case 1125 has large leverage (Leverage = 0.036)
Case 1132 is an outlier (Studentized Residual = 4.790)
Case 1134 is an outlier (Studentized Residual = 4.808)

Durbin-Watson D Statistic 1.204
First Order Autocorrelation 0.398

Dep Var: CHLAC   N: 962   Multiple R: 0.155   Squared multiple R: 0.024

Adjusted squared multiple R: 0.023   Standard error of estimate: 5.833

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	7.241	0.198	0.000	.	36.580	0.000
PRECP	3.982	0.821	0.155	1.000	4.848	0.000

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	799.709	1	799.709	23.503	0.000
Residual	32665.390	960	34.026		

*** WARNING ***
Case 77 has large leverage (Leverage = 0.027)
Case 78 has large leverage (Leverage = 0.027)
Case 79 has large leverage (Leverage = 0.027)
Case 80 has large leverage (Leverage = 0.027)
Case 81 has large leverage (Leverage = 0.027)
Case 82 has large leverage (Leverage = 0.027)
Case 83 has large leverage (Leverage = 0.027)
Case 84 has large leverage (Leverage = 0.027)
Case 85 has large leverage (Leverage = 0.027)
Case 116 is an outlier (Studentized Residual = 5.432)
Case 525 has large leverage (Leverage = 0.027)
Case 526 has large leverage (Leverage = 0.027)
Case 527 has large leverage (Leverage = 0.027)
Case 528 has large leverage (Leverage = 0.027)
Case 529 has large leverage (Leverage = 0.027)
Case 530 has large leverage (Leverage = 0.027)
Case 531 has large leverage (Leverage = 0.027)
Case 532 has large leverage (Leverage = 0.027)
Case 533 has large leverage (Leverage = 0.027)
Case 613 is an outlier (Studentized Residual = 4.894)
Case 640 is an outlier (Studentized Residual = 6.365)
Case 690 has large leverage (Leverage = 0.032)
Case 1046 is an outlier (Studentized Residual = 4.980)
Case 1051 is an outlier (Studentized Residual = 5.911)
Case 1122 is an outlier (Studentized Residual = 6.019)
Case 1134 is an outlier (Studentized Residual = 4.375)

Durbin-Watson D Statistic 1.032
First Order Autocorrelation 0.484

Dep Var: CHLAC N: 962 Multiple R: 0.066 Squared multiple R: 0.004

Adjusted squared multiple R: 0.003 Standard error of estimate: 5.891

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	7.343	0.213	0.000	.	34.423	0.000
V3DAY	0.650	0.319	0.066	1.000	2.039	0.042

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	144.373	1	144.373	4.160	0.042
Residual	33320.727	960	34.709		

*** WARNING ***
Case 48 has large leverage (Leverage = 0.022)
Case 49 has large leverage (Leverage = 0.022)
Case 50 has large leverage (Leverage = 0.022)
Case 51 has large leverage (Leverage = 0.022)
Case 52 has large leverage (Leverage = 0.022)
Case 53 has large leverage (Leverage = 0.022)
Case 54 has large leverage (Leverage = 0.022)
Case 55 has large leverage (Leverage = 0.022)
Case 56 has large leverage (Leverage = 0.022)
Case 116 is an outlier (Studentized Residual = 5.359)
Case 198 has large leverage (Leverage = 0.032)
Case 199 has large leverage (Leverage = 0.032)
Case 613 is an outlier (Studentized Residual = 4.809)
Case 640 is an outlier (Studentized Residual = 6.281)
Case 753 has large leverage (Leverage = 0.146)
Case 825 has large leverage (Leverage = 0.021)
Case 1046 is an outlier (Studentized Residual = 5.289)
Case 1051 is an outlier (Studentized Residual = 5.833)
Case 1122 is an outlier (Studentized Residual = 6.440)
Case 1132 is an outlier (Studentized Residual = 4.341)
Case 1134 is an outlier (Studentized Residual = 4.516)

Durbin-Watson D Statistic 1.016
First Order Autocorrelation 0.492

Dep Var: CHLAC N: 962 Multiple R: 0.045 Squared multiple R: 0.002

Adjusted squared multiple R: 0.001 Standard error of estimate: 5.898

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	7.362	0.230	0.000	.	31.998	0.000
V7DAY	0.179	0.130	0.045	1.000	1.381	0.168

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	66.376	1	66.376	1.908	0.168
Residual	33398.724	960	34.790		

*** WARNING ***
Case 116 is an outlier (Studentized Residual = 5.310)
Case 198 has large leverage (Leverage = 0.026)
Case 199 has large leverage (Leverage = 0.026)
Case 554 has large leverage (Leverage = 0.021)
Case 555 has large leverage (Leverage = 0.021)
Case 556 has large leverage (Leverage = 0.021)
Case 557 has large leverage (Leverage = 0.021)
Case 558 has large leverage (Leverage = 0.021)
Case 559 has large leverage (Leverage = 0.021)
Case 560 has large leverage (Leverage = 0.021)
Case 561 has large leverage (Leverage = 0.021)
Case 562 has large leverage (Leverage = 0.021)
Case 613 is an outlier (Studentized Residual = 4.762)
Case 640 is an outlier (Studentized Residual = 6.259)
Case 753 has large leverage (Leverage = 0.032)
Case 754 has large leverage (Leverage = 0.036)
Case 1046 is an outlier (Studentized Residual = 5.242)
Case 1051 is an outlier (Studentized Residual = 5.805)
Case 1122 is an outlier (Studentized Residual = 6.499)
Case 1132 is an outlier (Studentized Residual = 4.337)
Case 1134 is an outlier (Studentized Residual = 4.512)

Durbin-Watson D Statistic 1.004
First Order Autocorrelation 0.498

Dep Var: CHLAC N: 962 Multiple R: 0.084 Squared multiple R: 0.007

Adjusted squared multiple R: 0.006 Standard error of estimate: 5.884

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	7.089	0.258	0.000	.	27.527	0.000
V14DAY	0.243	0.093	0.084	1.000	2.596	0.010

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	233.364	1	233.364	6.741	0.010
Residual	33231.736	960	34.616		

*** WARNING ***

Case 77 has large leverage (Leverage = 0.030)
Case 78 has large leverage (Leverage = 0.030)
Case 79 has large leverage (Leverage = 0.030)
Case 80 has large leverage (Leverage = 0.030)
Case 81 has large leverage (Leverage = 0.030)
Case 82 has large leverage (Leverage = 0.030)
Case 83 has large leverage (Leverage = 0.030)
Case 84 has large leverage (Leverage = 0.030)
Case 85 has large leverage (Leverage = 0.030)
Case 116 is an outlier (Studentized Residual = 5.355)
Case 613 is an outlier (Studentized Residual = 4.660)
Case 640 is an outlier (Studentized Residual = 6.297)
Case 1046 is an outlier (Studentized Residual = 5.168)
Case 1051 is an outlier (Studentized Residual = 5.779)
Case 1122 is an outlier (Studentized Residual = 6.398)
Case 1132 is an outlier (Studentized Residual = 4.369)
Case 1134 is an outlier (Studentized Residual = 4.544)

Durbin-Watson D Statistic 1.009
First Order Autocorrelation 0.495

Dep Var: CHLAC N: 962 Multiple R: 0.174 Squared multiple R: 0.030

Adjusted squared multiple R: 0.029 Standard error of estimate: 5.815

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	6.488	0.269	0.000	.	24.125	0.000
V21DAY	0.369	0.068	0.174	1.000	5.459	0.000

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	1007.636	1	1007.636	29.803	0.000
Residual	32457.463	960	33.810		

*** WARNING ***
Case 77 has large leverage (Leverage = 0.023)
Case 78 has large leverage (Leverage = 0.023)
Case 79 has large leverage (Leverage = 0.023)
Case 80 has large leverage (Leverage = 0.023)
Case 81 has large leverage (Leverage = 0.023)
Case 82 has large leverage (Leverage = 0.023)
Case 83 has large leverage (Leverage = 0.023)
Case 84 has large leverage (Leverage = 0.023)
Case 85 has large leverage (Leverage = 0.023)
Case 116 is an outlier (Studentized Residual = 5.494)
Case 613 is an outlier (Studentized Residual = 4.575)
Case 640 is an outlier (Studentized Residual = 6.412)
Case 1046 is an outlier (Studentized Residual = 5.189)
Case 1051 is an outlier (Studentized Residual = 5.644)
Case 1122 has large leverage (Leverage = 0.052)
Case 1122 is an outlier (Studentized Residual = 5.445)
Case 1132 is an outlier (Studentized Residual = 4.383)
Case 1134 is an outlier (Studentized Residual = 4.560)

Durbin-Watson D Statistic 1.021
First Order Autocorrelation 0.489

Appendix J: Linear Regression Analysis of Annual Average CHLAC Observations versus COND, SALINITY, TEMPC, Nutrients, COLOR, TSS, TURBIDITY, Rainfall, and Annual Rainfall Deficits in the Halifax River for the 1995–2010 Period

Dep Var: CHLACAVE N: 16 Multiple R: 0.069 Squared multiple R: 0.005

Adjusted squared multiple R: 0.000 Standard error of estimate: 2.128

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	6.333	2.442	0.000	.	2.594	0.021
CONDAVE	0.000	0.000	0.069	1.000	0.261	0.798

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	0.307	1	0.307	0.068	0.798
Residual	63.370	14	4.526		

*** WARNING ***
Case 6 has large leverage (Leverage = 0.483)
Case 16 is an outlier (Studentized Residual = 2.755)

Durbin-Watson D Statistic 1.024
First Order Autocorrelation 0.312

Dep Var: CHLACAVE N: 16 Multiple R: 0.070 Squared multiple R: 0.005

Adjusted squared multiple R: 0.000 Standard error of estimate: 2.127

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	6.307	2.510	0.000	.	2.512	0.025
SALINITYAVE	0.031	0.118	0.070	1.000	0.264	0.796

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	0.315	1	0.315	0.070	0.796
Residual	63.362	14	4.526		

*** WARNING ***
Case 16 is an outlier (Studentized Residual = 2.753)

Durbin-Watson D Statistic 1.005
First Order Autocorrelation 0.322

Dep Var: CHLACAVE N: 16 Multiple R: 0.299 Squared multiple R: 0.089

Adjusted squared multiple R: 0.024 Standard error of estimate: 2.035

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	-12.410	16.520	0.000	.	-0.751	0.465
TEMPCAVE	0.810	0.691	0.299	1.000	1.173	0.260

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	5.696	1	5.696	1.375	0.260
Residual	57.982	14	4.142		

*** WARNING ***
Case 16 is an outlier (Studentized Residual = 3.316)

Durbin-Watson D Statistic 0.986
First Order Autocorrelation 0.290

Dep Var: CHLACAVE N: 12 Multiple R: 0.465 Squared multiple R: 0.217

Adjusted squared multiple R: 0.138 Standard error of estimate: 1.697

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	9.192	1.735	0.000	.	5.297	0.000
NH4AVE	-25.064	15.071	-0.465	1.000	-1.663	0.127

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	7.961	1	7.961	2.766	0.127
Residual	28.787	10	2.879		

*** WARNING ***
Case 14 is an outlier (Studentized Residual = 2.499)

Durbin-Watson D Statistic 1.289
First Order Autocorrelation 0.164

Dep Var: CHLACAVE N: 16 Multiple R: 0.344 Squared multiple R: 0.118

Adjusted squared multiple R: 0.055 Standard error of estimate: 2.002

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	9.337	1.808	0.000	.	5.165	0.000
NO3O2AVE	-38.805	28.298	-0.344	1.000	-1.371	0.192

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	7.540	1	7.540	1.880	0.192
Residual	56.137	14	4.010		

*** WARNING ***
Case 12 is an outlier (Studentized Residual = -3.046)

Durbin-Watson D Statistic 0.968
First Order Autocorrelation 0.391

Dep Var: CHLACAVE N: 12 Multiple R: 0.655 Squared multiple R: 0.429

Adjusted squared multiple R: 0.372 Standard error of estimate: 1.449

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	11.229	1.802	0.000	.	6.231	0.000
INORGNAVE	-27.409	9.999	-0.655	1.000	-2.741	0.021

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	15.766	1	15.766	7.514	0.021
Residual	20.982	10	2.098		

Durbin-Watson D Statistic 1.291
First Order Autocorrelation 0.177

Dep Var: CHLACAVE N: 16 Multiple R: 0.675 Squared multiple R: 0.455

Adjusted squared multiple R: 0.416 Standard error of estimate: 1.574

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	1.073	1.764	0.000	.	0.608	0.553
TNAVE	6.987	2.043	0.675	1.000	3.419	0.004

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	28.978	1	28.978	11.692	0.004
Residual	34.699	14	2.478		

*** WARNING ***
Case 16 has large leverage (Leverage = 0.524)

Durbin-Watson D Statistic 1.660
First Order Autocorrelation 0.121

Dep Var: CHLACAVE N: 8 Multiple R: 0.216 Squared multiple R: 0.047

Adjusted squared multiple R: 0.000 Standard error of estimate: 1.405

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	8.302	2.457	0.000	.	3.379	0.015
INORGPAVE	-18.646	34.440	-0.216	1.000	-0.541	0.608

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	0.579	1	0.579	0.293	0.608
Residual	11.849	6	1.975		

*** WARNING ***
Case 5 is an outlier (Studentized Residual = 2.165)

Durbin-Watson D Statistic 1.524
First Order Autocorrelation 0.115

Dep Var: CHLACAVE N: 16 Multiple R: 0.111 Squared multiple R: 0.012

Adjusted squared multiple R: 0.000 Standard error of estimate: 2.120

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	5.499	3.536	0.000	.	1.555	0.142
TPAVE	10.058	24.158	0.111	1.000	0.416	0.683

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	0.779	1	0.779	0.173	0.683
Residual	62.899	14	4.493		

*** WARNING ***
Case 16 is an outlier (Studentized Residual = 3.013)

Durbin-Watson D Statistic 1.061
First Order Autocorrelation 0.273

Dep Var: CHLACAVE N: 16 Multiple R: 0.123 Squared multiple R: 0.015

Adjusted squared multiple R: 0.000 Standard error of estimate: 2.117

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	7.547	1.385	0.000	.	5.451	0.000
COLORAVE	-0.008	0.018	-0.123	1.000	-0.463	0.650

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	0.961	1	0.961	0.215	0.650
Residual	62.716	14	4.480		

*** WARNING ***
Case 16 is an outlier (Studentized Residual = 2.715)

Durbin-Watson D Statistic 1.034
First Order Autocorrelation 0.317

Dep Var: CHLACAVE N: 16 Multiple R: 0.396 Squared multiple R: 0.156

Adjusted squared multiple R: 0.096 Standard error of estimate: 1.959

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	4.361	1.682	0.000	.	2.592	0.021
TSSAVE	0.100	0.062	0.396	1.000	1.612	0.129

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	9.965	1	9.965	2.597	0.129
Residual	53.712	14	3.837		

Durbin-Watson D Statistic 1.540
First Order Autocorrelation 0.118

Dep Var: CHLACAVE N: 16 Multiple R: 0.445 Squared multiple R: 0.198

Adjusted squared multiple R: 0.141 Standard error of estimate: 1.910

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	4.226	1.543	0.000	.	2.739	0.016
TURBAVE	0.248	0.133	0.445	1.000	1.860	0.084

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	12.616	1	12.616	3.459	0.084
Residual	51.061	14	3.647		

*** WARNING ***
Case 13 is an outlier (Studentized Residual = -2.638)
Case 16 has large leverage (Leverage = 0.436)

Durbin-Watson D Statistic 1.690
First Order Autocorrelation 0.091

Dep Var: CHLACAVE   N: 16   Multiple R: 0.272   Squared multiple R: 0.074

Adjusted squared multiple R: 0.008   Standard error of estimate: 2.052

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	9.774	2.711	0.000	.	3.606	0.003
ANNUALRAINFA	-0.056	0.053	-0.272	1.000	-1.059	0.307

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	4.724	1	4.724	1.122	0.307
Residual	58.953	14	4.211		

*** WARNING ***
Case 12 is an outlier (Studentized Residual = -2.877)

Durbin-Watson D Statistic 1.118
First Order Autocorrelation 0.297

Dep Var: CHLACAVE   N: 16   Multiple R: 0.272   Squared multiple R: 0.074

Adjusted squared multiple R: 0.008   Standard error of estimate: 2.052

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	7.009	0.516	0.000	.	13.594	0.000
ANNUALDEFICI	-0.056	0.053	-0.272	1.000	-1.059	0.307

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	4.724	1	4.724	1.122	0.307
Residual	58.953	14	4.211		

*** WARNING ***
Case 12 is an outlier (Studentized Residual = -2.877)

Durbin-Watson D Statistic 1.118
First Order Autocorrelation 0.297

Dep Var: CHLACAVE N: 16 Multiple R: 0.592 Squared multiple R: 0.350

Adjusted squared multiple R: 0.304 Standard error of estimate: 1.719

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	7.277	0.445	0.000	.	16.336	0.000
DEFICIT3YEAR	-0.060	0.022	-0.592	1.000	-2.748	0.016

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	22.309	1	22.309	7.550	0.016
Residual	41.368	14	2.955		

Durbin-Watson D Statistic 1.291
First Order Autocorrelation 0.210

Dep Var: CHLACAVE N: 16 Multiple R: 0.743 Squared multiple R: 0.552

Adjusted squared multiple R: 0.520 Standard error of estimate: 1.428

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	7.694	0.399	0.000	.	19.281	0.000
DEFICIT5YEAR	-0.068	0.017	-0.743	1.000	-4.150	0.001

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	35.122	1	35.122	17.219	0.001
Residual	28.556	14	2.040		

Durbin-Watson D Statistic 1.839
First Order Autocorrelation 0.052

Dep Var: CHLACAVE N: 13 Multiple R: 0.268 Squared multiple R: 0.072

Adjusted squared multiple R: 0.000 Standard error of estimate: 1.833

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	7.708	1.222	0.000	.	6.308	0.000
TNLOAD	-0.000	0.000	-0.268	1.000	-0.924	0.375

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	2.866	1	2.866	0.853	0.375
Residual	36.941	11	3.358		

*** WARNING ***
Case 11 has large leverage (Leverage = 0.540)

Durbin-Watson D Statistic 1.425
First Order Autocorrelation 0.259

Dep Var: CHLACAVE   N: 13   Multiple R: 0.021   Squared multiple R: 0.000

Adjusted squared multiple R: 0.000   Standard error of estimate: 1.902

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	6.818	2.047	0.000	.	3.331	0.007
TPLOAD	-0.000	0.000	-0.021	1.000	-0.069	0.946

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	0.017	1	0.017	0.005	0.946
Residual	39.789	11	3.617		

*** WARNING ***
Case 11 has large leverage (Leverage = 0.496)

Durbin-Watson D Statistic 1.254
First Order Autocorrelation 0.345

Appendix K: Precipitation at Daytona International Airport

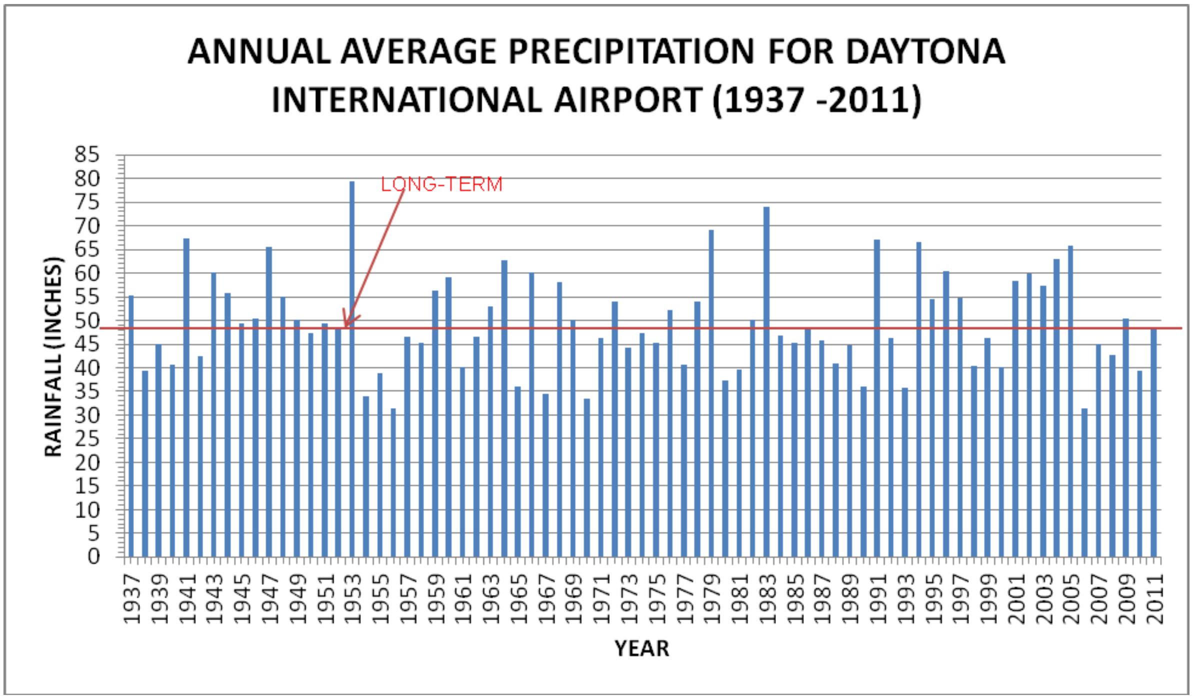


Figure K.1. Annual Average Precipitation at Daytona International Airport (1937–2011)

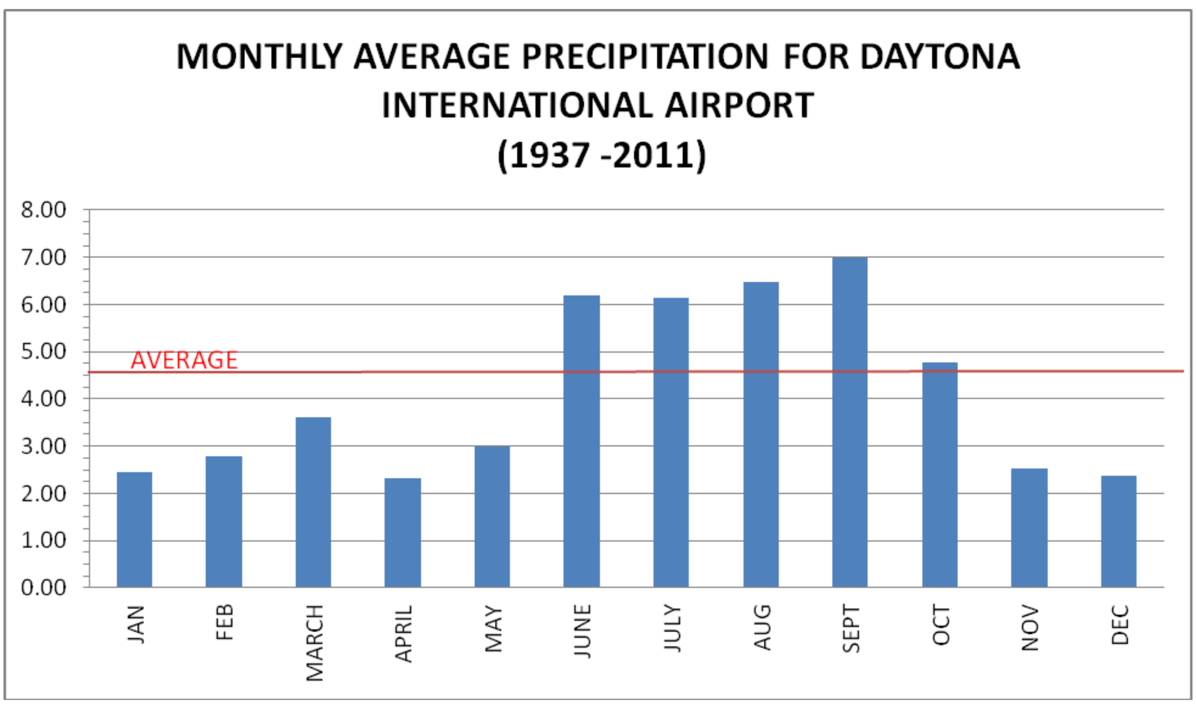


Figure K.2. Monthly Average Precipitation at Daytona International Airport (1937–2011)

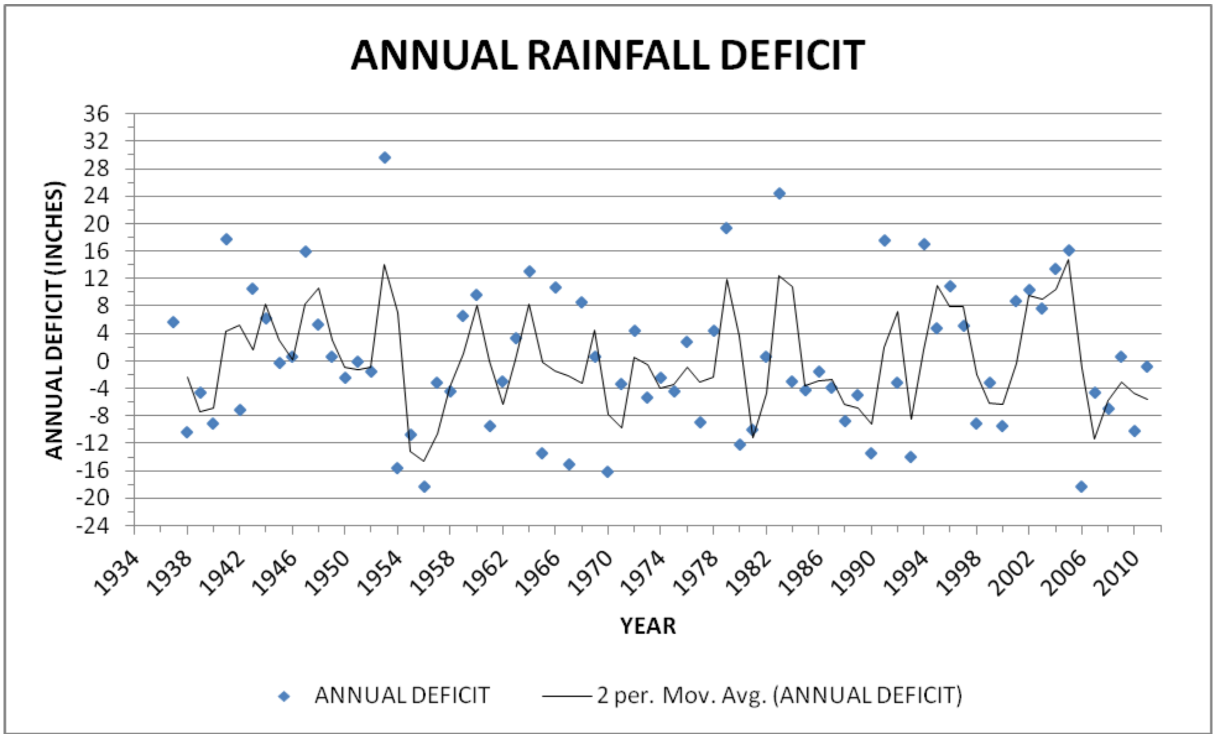


Figure K.3. Annual Rainfall Deficit at Daytona International Airport (1937–2011)

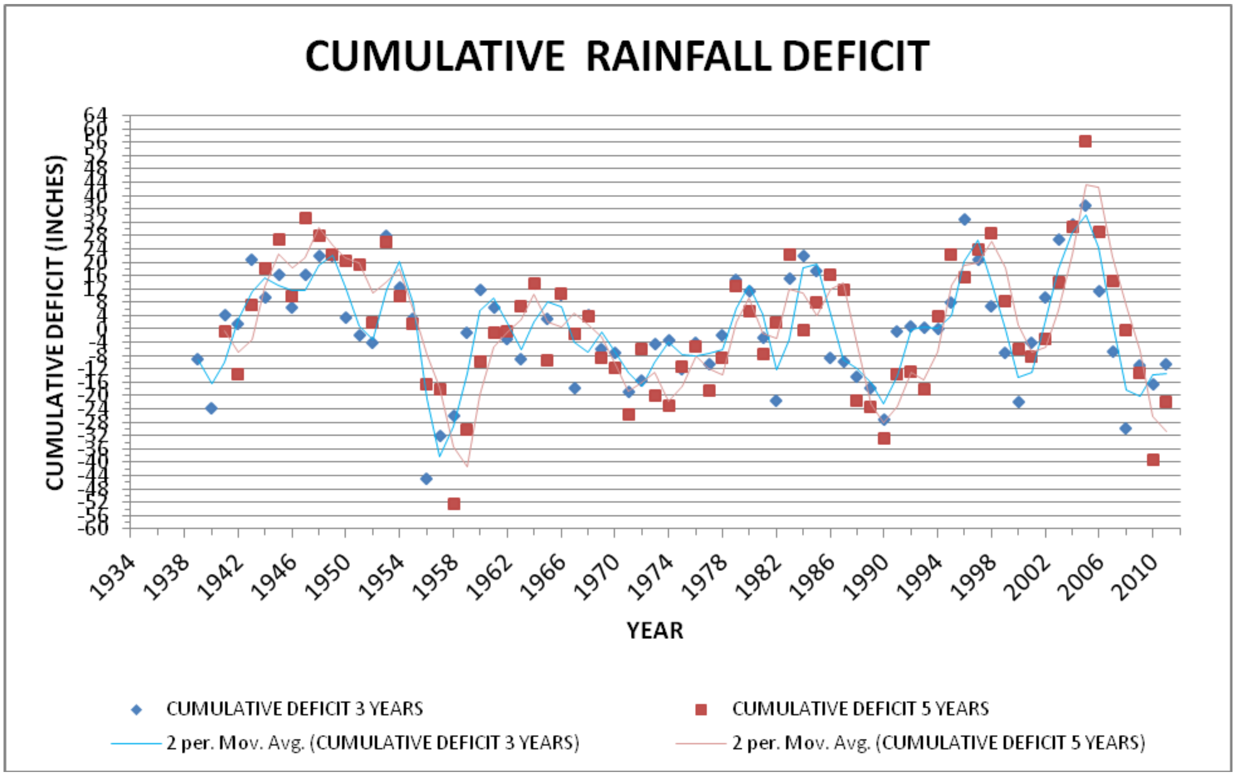


Figure K.4. Cumulative Rainfall Deficit at Daytona International Airport (1937–2011)

Table K.1. Annual Rainfall Ranks and Percentiles

Note: Ranking of years 2008 – 2010 are highlighted in yellow

Year	Annual Total (inches)	Rank	Percentile
1956	31.36	1	1.33%
2006	31.36	2	2.67%
1970	33.4	3	4.00%
1954	33.96	4	5.33%
1967	34.58	5	6.67%
1993	35.71	6	8.00%
1990	36.12	7	9.33%
1965	36.13	8	10.67%
1980	37.36	9	12.00%
1955	38.8	10	13.33%
1938	39.29	11	14.67%
2010	**39.39**	**12**	**16.00%**
1981	39.68	13	17.33%
1961	40.06	14	18.67%
2000	40.16	15	20.00%
1998	40.51	16	21.33%
1940	40.56	17	22.67%
1977	40.67	18	24.00%
1988	40.91	19	25.33%
1942	42.4	20	26.67%
2008	**42.67**	**21**	**28.00%**
1973	44.23	22	29.33%
1989	44.65	23	30.67%
2007	45.02	24	32.00%
1939	45.09	25	33.33%
1958	45.15	26	34.67%
1975	45.19	27	36.00%
1985	45.38	28	37.33%
1987	45.72	29	38.67%
1971	46.23	30	40.00%
1999	46.37	31	41.33%
1992	46.41	32	42.67%
1957	46.48	33	44.00%
1962	46.59	34	45.33%
1984	46.71	35	46.67%
1974	47.21	36	48.00%
1950	47.22	37	49.33%
1986	48.01	38	50.67%
1952	48.1	39	52.00%

Year	Annual Total (inches)	Rank	Percentile
2011	**48.71**	**40**	**53.33%**
1945	49.36	41	54.67%
1951	49.46	42	56.00%
1982	50.18	43	57.33%
1949	50.22	44	58.67%
1969	50.22	45	60.00%
1946	50.3	46	61.33%
2009	**50.3**	**47**	**62.67%**
1976	52.32	48	64.00%
1963	53.03	49	65.33%
1972	53.94	50	66.67%
1978	53.94	51	68.00%
1995	54.44	52	69.33%
1997	54.69	53	70.67%
1948	55	54	72.00%
1937	55.29	55	73.33%
1944	55.81	56	74.67%
1959	56.24	57	76.00%
2003	57.3	58	77.33%
1968	58.17	59	78.67%
2001	58.27	60	80.00%
1960	59.18	61	81.33%
2002	59.94	62	82.67%
1943	60.11	63	84.00%
1966	60.25	64	85.33%
1996	60.49	65	86.67%
1964	62.76	66	88.00%
2004	62.97	67	89.33%
1947	65.64	68	90.67%
2005	65.77	69	92.00%
1994	66.64	70	93.33%
1991	67.19	71	94.67%
1941	67.3	72	96.00%
1979	69.02	73	97.33%
1983	73.99	74	98.67%
1953	79.29	75	100.00%

Appendix L: Response to Comments Following September 2012 Workshop

No comments were received on the draft TMDL.

Following the public meeting held on September 7, 2012 Ms Kelly Young of the Volusia County Environmental Health Lab provided some updated information for the Halifax and Tomoka River draft TMDLs.

Ms. Kelly Young –Volusia County Environmental Health Lab (9/26/ 2012) email

Good afternoon!
The attached file contains data to hopefully add to, and in some cases detract from the data used to determine the Halifax and Tomoka TMDLs. It was determined that some data that could have been used to support the credibility of some data was never submitted to Storet, and a portion of that data is within the attached file. Unfortunately, much of this data is no longer available in its original form, and the only information available is from spreadsheets with no qualifier code information. Several values for chlorophyll and total nitrogen should not be used for determining TMDLs due to this lack of information. Some obvious unreliable data has been set in bold text, but please use your best scientific judgement on using the data attached. More data is to follow when I get additional results from the City of Daytona Beach Water Testing Lab. Please note that the data included in the file's tab 'City of Daytona Beach data' is from the city lab, and tabs 'Halifax' and 'Tomoka' each have a column indicating the lab that processed the sample for the particular parameter listed. The city lab collects and processes (except for chlorophyll) samples monthly from the Daytona area of the Halifax river which includes stations HL08, HL09, HL10, HL11, HL11a, HL12, HL12a, and 13a. Originally, the only data available from this monthly collection was occasionally field data and chlorophyll data (as I was the one processing these samples for chlorophyll in the VCEH lab, and I began including this data along with the other data I sent to Storet). The other tabs in the file (Halifax and Tomoka) are a group effort project. Samples from the Tomoka and Halifax were collected monthly until the year 2000. Since then, they have been collected quarterly. The City of Daytona Beach lab collected all samples for the Tomoka River and stations HL01 through HL10. The city lab also processed all samples for TP, TKN, Turbidity, and TSS. The Volusia County Environmental Health lab (VCEH) collected stations HL11-20 and processed all other parameters. I'm sorry for the format of the attached files, however I'm in the process of putting it into a more user friendly format and will send that as soon as I can. I hope to provide additional info soon. Sorry for the delay.
Sincerely,
Kelly Young

There were subsequent discussions regarding elevated TKN observations over the October 2010 through 2011 period at stations in the Halifax River. Mr. Bob Terpstra from the City of Daytona Beach Laboratory was contacted and he indicated that starting in late 2010 the laboratory had modified the procedure for preparing marine samples for analysis. The city recently conducted some comparability analyses between the previous method and the method used since late 2010. Mr. Terpstra recommended that at this time the Department not use the TKN results reported at this sites starting in October 2010 in TMDL development until additional studies are complete.

Response:

We really appreciate the time and effort Ms. Young spent compiling water quality data collected by both the City of Daytona Beach and Volusia County. The Department has used your spreadsheet to add additional water quality observations to the data base used in the draft TMDL that had not been included in Florida STORET, as well as corrected some data errors that were present in data obtained from Florida STORET. Analyses presented in the draft TMDL were re-run using the updated data base and are reflected in this revised TMDL. Per Mr. Terpstra's recommendation, TKN results reported since October 2010 were not used to calculate total nitrogen and were not used in the TMDL development.

Appendix M: Response to Comments Following April 2013 Workshop

Comments from John C. Gamble, Interim Operations Manager, Volusia County Public Works Tuesday 4/16/2013

John C. Gamble
Interim Operations Manager
Volusia County Public Works
123 W. Indiana Ave.
DeLand, FL 32720-4262
386-736-5965 X15527 DeLand

Jan & Wayne,

1. Any stormwater modeling in Volusia County done since 2007 is to use the LiDAR data collected by the county in 2006. This is a publicly available data set and is the best available data that we are aware of. Use of USGS DEMs are not acceptable for stormwater modeling in this county.

Response:
It is our understanding that the LSPC model used for the Daytona watershed developed sub-watersheds using the 12-digit hydrologic unit code (HUC 12) watershed data layer and the U.S. Geological Survey (USGS) National Hydrography Dataset (NHD). Length and slope for the main channel reach within each subwatershed were obtained using the USGS DEM and NHD data (Appendix C). The USGS DEM was from the National Elevation Dataset (http://ned.usgs.gov/). Based on the dataset viewer under the data source index, it appears that the best available NED resolution for Volusia County was 1/9-arc second (~3 meter). According to the website the hierarchy of data sources is:

NED source data are selected from an ever-growing inventory of standard production USGS Digital Elevation Model (DEMs), and also from an increasing number of datasets that are project- or agency-specific. The first consideration is always given to quality. Selections are made according to the following ranking, listed in order of descending priority:

1. High-resolution data, typically derived from lidar or digital photogrammetry, and often with edited water bodies. If collected at a ground sample distance no coarser than 5 meters, such data may also be offered within the NED at a resolution of 1/9th arc-second.

2. Moderate-resolution data, other than that compiled from cartographic contours. These data may also be derived from LiDAR or digital photogrammetry, or less often by Interferometric Synthetic Aperture Radar IFSAR. A typical ground sample distance is 10 meters, though it is commonly called “1/3 arc-second data.”

3. 10-meter DEM’s derived from cartographic contours and mapped hydrography. Most often, such data are produced by or for the USGS as a standard elevation product, and they currently account for the bulk of the NED.

4. 30-meter cartographically derived DEMs. Similar in most respects to their 10-meter counterparts, though usually of lower overall quality.

5. 30-meter photogrammetrically derived DEMs. These are the oldest DEMs in the 7.5-minute series. These data were derived directly from stereo photography, either by a human operator or by an early form of electronic image correlation. They are badly marred by production artifacts that are addressed to the greatest practical extent by digital filtering within the NED production process.
6. 2-arc-second DEMs are a standard USGS product. They are derived from cartographic contours at a scale of 1:63,360 over the state of Alaska, and a scale of 1:100,000 elsewhere.
7. 1-arc-second Shuttle Radar Topography Mission (SRTM) data, to date, are only used in preference to 3-arc-second data in the Aleutian Islands.
8. 3-arc-second DEMs are another standard USGS product, and are generally only used within the NED as a source of fill values over large water bodies.

In both the Halifax and Tomoka River nutrient TMDLs, the estimated LSPC watershed TN and TP annual loads were not used to set nutrient reductions.

2. Two studies done since the LiDAR collection, using that data, have been completed in that area: Nova Canal basin (borders on Tomoka and part of Halifax) and Daytona International Airport Stormwater Master Plan (borders on Tomoka). Both of these studies were done by CDMSmith and should define the eastern boundary of the Tomoka River basin and define part of the Halifax Basin. An additional study done by Taylor Engineering for FIRMs for FEMA, included the basin east of Nova Road in Holly Hill/Ormond Beach area.

Response:
Comment noted. That information will be provided to EPA for consideration in their watershed model of the Daytona watershed.

3. I would encourage you to closely review the water quality collected after the May 2009 Storm that dumped 20-30 inches of rain from New Smyrna Beach to Ormond Beach for a three day period. This would seem to be an extreme event and should be excluded from the calculations.

Response:
Linear regressions of annual average CHLAC concentrations versus water quality parameters considered in Appendix J were rerun with 2009 excluded. Results were similar to those presented in Appendix J. The analysis of CHLAC versus TN is presented below. Substituting the target annual average CHLAC concentration of 9 µg/L yields a TN annual average concentration of 1.11 mg/L. The previous analysis that included 2009 resulted in an annual average TN concentration of 1.13 mg/L.

Dep Var: CHLACAVE N: 15 Multiple R: 0.673 Squared multiple R: 0.453

Adjusted squared multiple R: 0.411 Standard error of estimate: 1.620

Effect	Coefficient	Std Error	Std Coef	Tolerance	t	P(2 Tail)
CONSTANT	0.816	1.895	0.000	.	0.431	0.674
TNAVE	7.355	2.242	0.673	1.000	3.281	0.006

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
Regression	28.251	1	28.251	10.767	0.006
Residual	34.111	13	2.624		

*** WARNING ***
Case 15 has large leverage (Leverage = 0.626)

Durbin-Watson D Statistic 1.357
First Order Autocorrelation 0.274

4. Tomoka River water quality testing should not be under minimum flow conditions. We believe sampling during drought conditions does not reflect discharge conditions and should not be included in the TMDL calculations. During drought conditions, there is little or no flow at the southern end. Although the water may be sampled at the bridge, should this data be used if the river is not discharging (flowing).

Response:
The impacts to receiving waters from point and nonpoint source contributions under a variety of wet and dry weather conditions are captured under the TMDL process. In the case of the Tomoka River TMDL, annual average CHLAC, TN, and TP concentrations over the 1992 – 2011 period were used to establish the TMDL. Over the 1992 through 2011 period, the long-term annual rainfall average was exceeded in 10 years and there were 10 years that were below the long-term average of 49.63 inches. If portions of a stream or river are dry and sampling occurs in isolated pools we would not consider results from such sampling events to be representative of the system. If, however, there is water throughout the stream length (whether standing or flowing) when sampling occurs, there is little justification to exclude that information from the larger data set.

Comments from Robin Cook, Regulatory Compliance Officer, Utilities Department, City of Daytona Beach Friday 4/26/2013

Robin Cook
Regulatory Compliance Officer
Utilities Department
City of Daytona Beach
386-671-8885- office
386-671-5901 - desktop fax
407-314-5743 - cell

Ms. Mandrup-Poulsen,

Thank you for the opportunity to provide comments. As such the City of Daytona Beach offers the following:

As we stated during the meeting on April 12, CODB staff was very concerned that the May 2009 significant rain event was not thoroughly considered in the evaluation of the TMDL for the Halifax River. The rain began on May 17 , 2009. As we informed FDEP staff, the rain lasted several days and left standing water for several weeks afterward. This standing water was no doubt contaminated in some way. The run-off from this event undoubtedly continued to effect water quality in the Halifax River for a period that would have been seen in the sampling event.

Response:
Please refer to the response to Comment 3 from Mr. Gamble.

Also, it seems a bit suspect that the County Landfill had zero discharge for that many years and then it started discharging and has continued to have some annual discharge every year since. What change in operations led to the change in discharge characteristics?

Response:
According to the Tomoka Farms Road Landfill permit, water from the South External Canal is pumped into the swale going east along the landfill access road. The landfill access road swale is designated as ground water discharge (G-001). The NPDES surface water discharge system designated D-001 is at the eastern end of the roadside swale where a control structure limits discharge to periods following heavy rainfall. Discharge is to a wetland area on the north side of the access road which then flows north to the headwaters of the Tomoka River. The permit authorizes only conditional surface water discharge under heavy rainfall situations (10-year 24-hour storm event (7.5 inches) or chronic rainfall event equivalent to 10 year 24 hour event). During the 2005–2010 permit cycle, the landfill access swale was partially filled into to accommodate the construction of a new Scale House.

Permit renewal information provided in support of the permit that was issued in February 2011 identified 9 separate discharge events that occurred over the May 2007 through April 2010 period. Eight of the nine discharge events occurred following large rainfall events. Discharge during one event (July 28, 2009–August 2009) was due to construction activities at the North Cell that required reductions in water levels to allow repair of the North Cell Leachate Collection System.