FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Environmental Assessment and Restoration, Bureau of Watershed Restoration

SOUTHWEST DISTRICT • TAMPA BAY BASIN

FINAL TMDL Report

Fecal Coliform TMDL for Double Branch - Estuarine Segment (WBID 1513F)

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February 2010

Acknowledgments

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Florida STORET Program

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

2008 305(b) Report

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

Criteria for Surface Water Quality Classifications

http://www.dep.state.fl.us/water/wqssp/classes.htm

Basin Status Report: Tampa Bay

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Water Quality Assessment Report: Tampa Bay

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U.S. Environmental Protection Agency

Region 4: Total Maximum Daily Loads in Florida

http://www.epa.gov/region4/water/tmdl/florida/

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Chapter 1: INTRODUCTION

1.1 Purpose of Report

This report presents the Total Maximum Daily Load (TMDL) for fecal coliform for Double Branch - Estuarine Segment, located in the Tampa Bay Basin (**Figure 1.1**). This estuarine stream was verified impaired for fecal coliform, and was included on the Verified List of impaired waters for the Tampa Bay Basin that was adopted by Secretarial Order on June 3, 2008. The TMDL establishes the allowable loadings to Double Branch - Estuarine Segment that would restore the waterbody so that it meets its applicable water quality criterion for fecal coliform.

1.2 Identification of Waterbody

To provide a more detailed geographic basis for assessing, reporting, and documenting water quality improvement projects, the Florida Department of Environmental Protection (Department) divides basin groups into smaller areas called planning units. Planning units help organize information and management strategies around prominent sub-basin characteristics and drainage features. To the extent possible, planning units were chosen to reflect sub-basins that had previously been defined by the Southwest Florida Water Management District (SWFWMD). Double Branch - Estuarine Segment is located in the Coastal Old Tampa Bay Tributary Planning Unit. For assessment purposes, the Department has divided the planning unit into water assessment polygons with a unique **w**ater**b**ody **id**entification (WBID) number for each watershed. Double Branch - Estuarine Segment is WBID 1513F (**Figure 1.1**).

1.2.1 Double Branch - Estuarine Segment

The Double Branch - Estuarine Segment watershed encompasses 2,367 acres. The predominant land uses are approximately 674 (29%) acres of urban and built-up and 823 (35%) acres of wetlands. No major human population centers exist within the watershed.

The watershed is located in Hillsborough County (**Figure 1.2**). The climate in both counties, specifically the areas surrounding the Double Branch - Estuarine Segment watershed, is subtropical, with annual rainfall averaging approximately 44.89 inches, although rainfall amounts can vary greatly from year to year (Climate Information for Management and Operational Decisions [CLIMOD], 2008). Based on data from a 30-year period (1971–2000), the average summer temperature is 89.9^{o}F, and the average winter temperature is 72.8^{o}F (CLIMOD, 2008).

The topography of the Double Branch - Estuarine Segment watershed reflects its location in the Southwestern Florida Flatwoods or Southwestern Coastal Plains ecoregion. In the downstream, or southern, part of the watershed, elevations range from around 5 to 10 feet above sea level, and in the upstream, or northern, portion around 35 to 40 feet above sea level (Department, 2001). The predominant soil type is medium-fine sand and silt (Department, 2008).

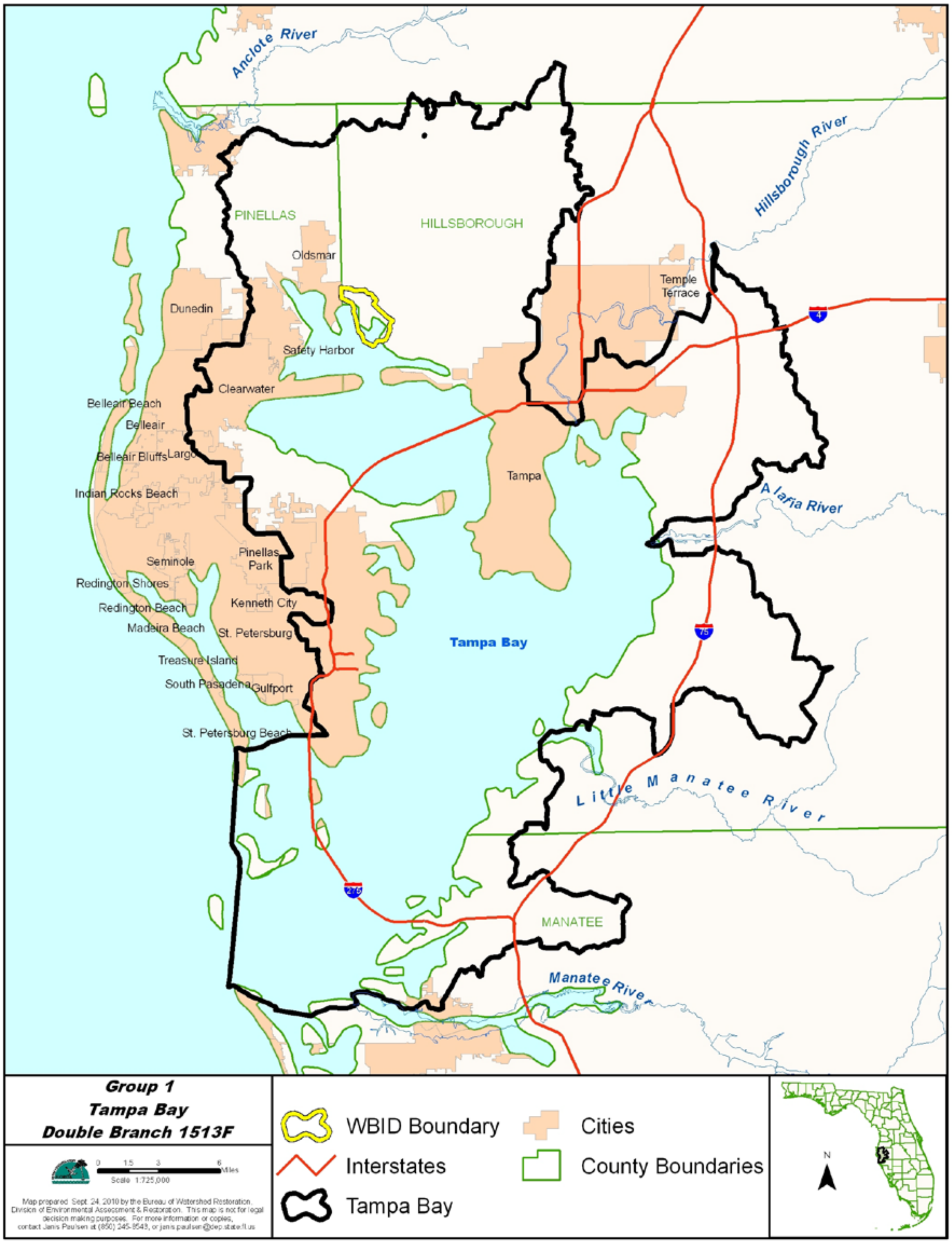

Figure 1.1. Location of the Double Branch - Estuarine Segment Watershed (WBID 1513F) in the Tampa Bay Basin with Major Geopolitical Features in the Area

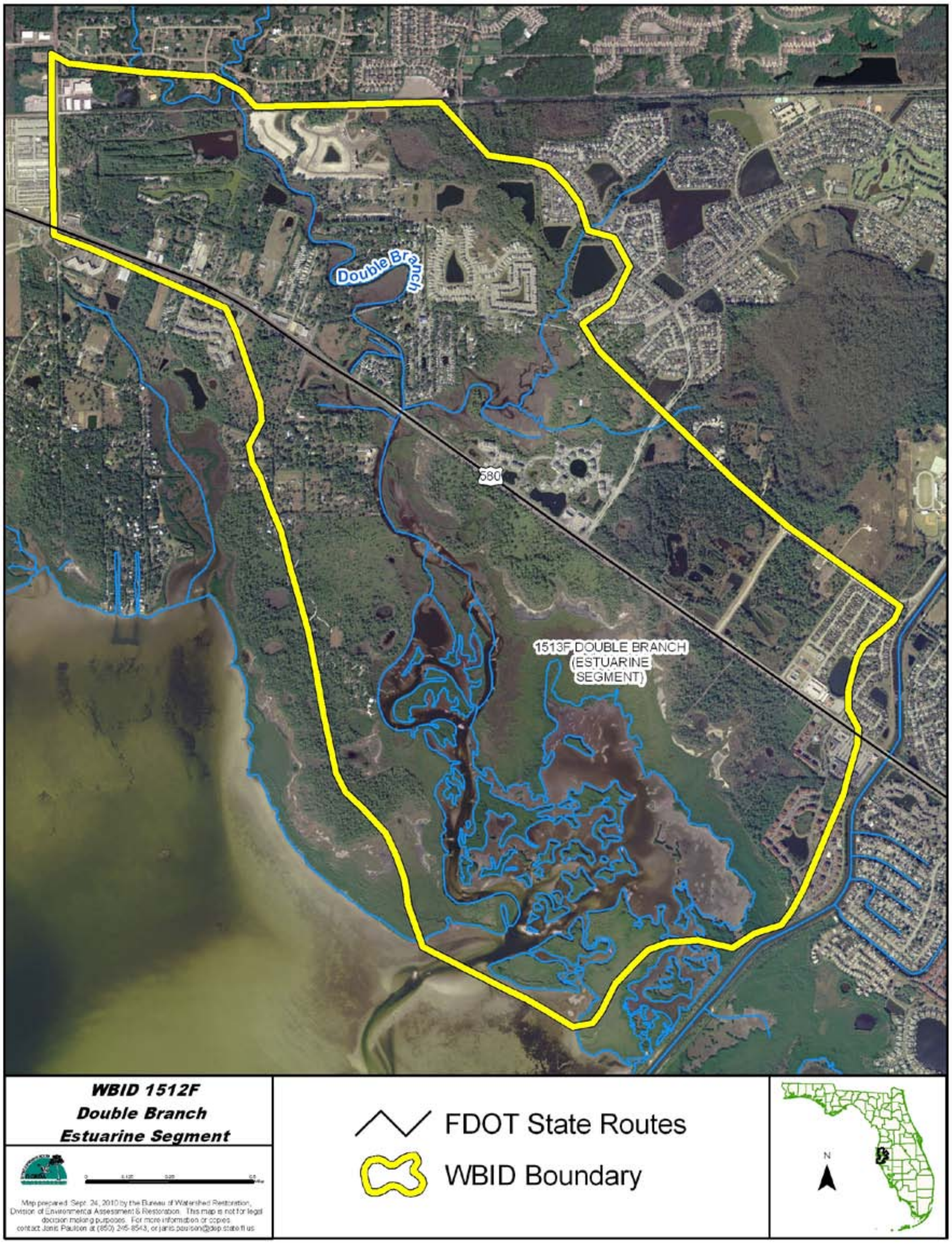

Figure 1.2. Location of the Double Branch - Estuarine Segment watershed (WBID 1513F) in Hillsborough and Pinellas Counties with Major Geopolitical Features in the Area

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.

This TMDL report may be followed by the development and implementation of a Basin Management Action Plan, or BMAP, to reduce the amount of fecal coliform that caused the verified impairment of Double Branch - Estuarine Segment. These activities will depend heavily on the active participation of the SWFWMD, local governments, businesses, and other stakeholders. The Department will work with these organizations and individuals to undertake or continue reductions in the discharge of pollutants and achieve the established TMDLs for impaired waterbodies.

Chapter 2: DESCRIPTION OF WATER QUALITY PROBLEM

2.1 Statutory Requirements and Rulemaking History

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

Florida's 1998 303(d) list contained several waterbodies in the Tampa Bay Basin, including Double Branch - Estuarine Segment. 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 Double Branch - Estuarine Segment watershed and verified the impairments for fecal coliform (**Table 2.1**). **Table 2.2** summarizes the data collected during the verified period (January 1, 2000–June 30, 2007). As shown in **Table 2.1**, the projected year for the fecal coliform bacteria TMDLs was 2008, but the Settlement Agreement between EPA and Earth justice, which drives the TMDL development schedule for waters on the 1998 303(d) list, allows an additional nine months to complete the TMDLs. As such, these TMDLs must be adopted and submitted to the EPA by September 30, 2009.

This waterbody was verified as impaired based on fecal coliform because, using the IWR methodology, more than 10 percent of the values exceeded the Class II waterbody criterion of 43 counts per 100 milliliters (counts/100mL) for fecal coliform. For Double Branch - Estuarine Segment, 87 exceedances out of 110 samples in the verified period exceeded the criterion.

The verified impairments were based on data collected by the Department's Southwest District and Hillsborough County. **Figure 5.1** shows the location of the WBID and STORET stations. **Figure 2.1** displays the fecal coliform data collected during the verified period (January 1, 2000–June 30, 2007) for Double Branch - Estuarine Segment.

Table 2.1. Verified Impairments for Double Branch - Estuarine Segment (WBID 1513F)

[1] The projected year for the fecal coliform bacteria TMDLs was 2008, but the Settlement Agreement between the EPA and Earthjustice, which drives the TMDL development schedule for waters on the 1998 303(d) list, allows an additional nine months to complete the TMDLs. As such, these TMDLs must be adopted and submitted to the EPA by September 30, 2009.

WBID	Waterbody Segment	Parameters Included on the 1998 303(d) List	Parameter Causing Impairment	Projected Year for TMDL Development[1]
1513F	Double Branch - Estuarine Segment	Fecal Coliform	Fecal Coliform	2008

Table 2.2. Summary of Fecal Coliform Data Collected During the Verified Period (January 1, 2000–June 30, 2007) for Double Branch - Estuarine Segment (WBID 1513F)

Waterbody Segment	Total Number of Samples	IWR-required Number of Exceedances for the Verified List	Number of Observed Exceedances	Number of Observed Non-exceedances	Number of Seasons Data Were Collected	Mean (counts/ 100mL)	Median (counts/ 100mL)	Minimum (counts/ 100mL)	Maximum (counts/ 100mL)
Double Branch - Estuarine Segment	110	16	87	23	4	364	200	0	4,000

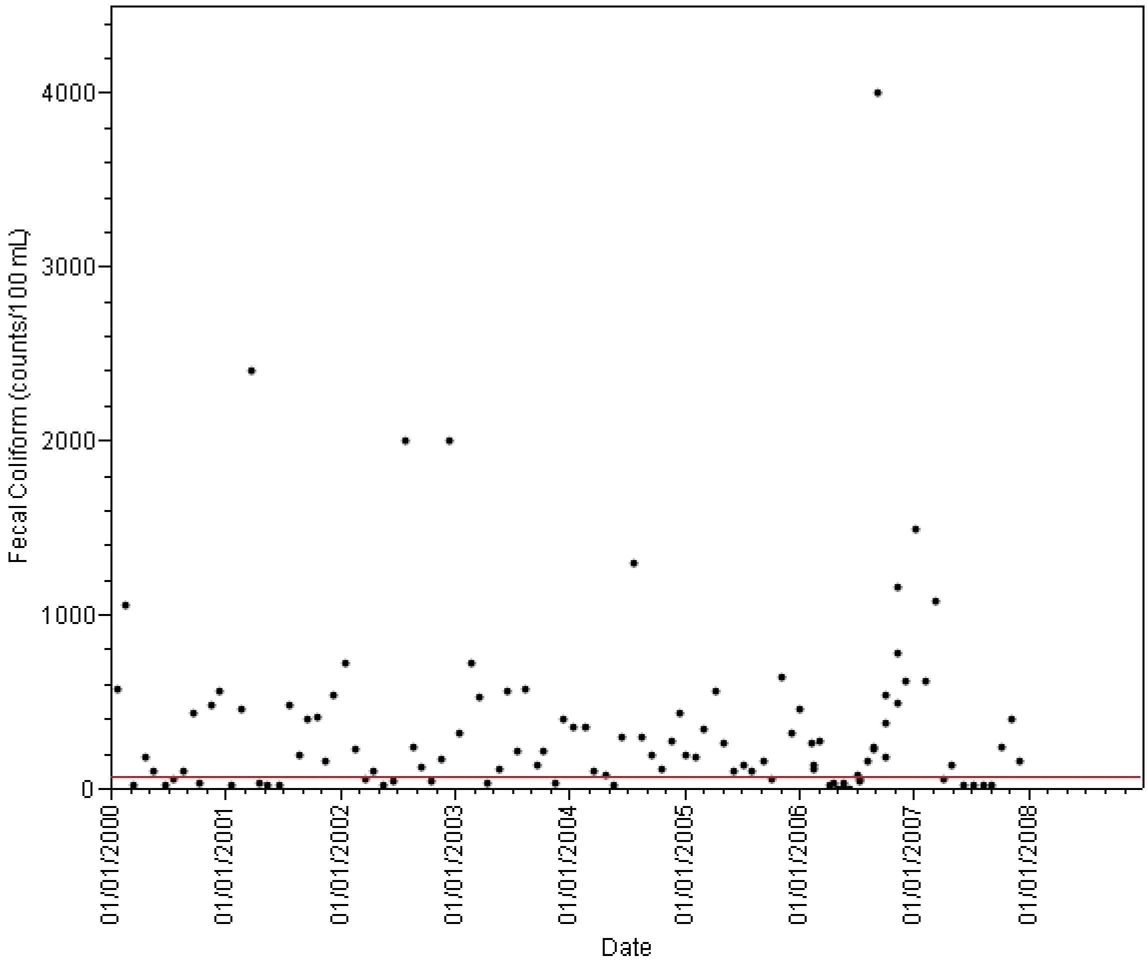

Figure 2.1. Fecal Coliform Measurements for Double Branch - Estuarine Segment (WBID 1513F) (Verified Period: January 1, 2000–June 30, 2007)

Chapter 3. DESCRIPTION OF APPLICABLE WATER QUALITY STANDARDS AND TARGETS

3.1 Classification of the Waterbody and Criteria Applicable to the TMDL

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

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

Double Branch - Estuarine Segment is a Class II waterbody, with a designated use of shellfish propagation or harvesting. The Class II water quality criterion applicable to the impairment addressed by this TMDL is fecal coliform.

3.2 Applicable Water Quality Standards and Numeric Water Quality Target

Numeric criteria for bacterial quality are expressed in terms of fecal coliform bacteria concentrations. The water quality criteria for the protection of Class II waters, as established by Rule 62-302, F.A.C., states the following:

> ***Fecal Coliform Bacteria:***
>
> *The most probable number (MPN) shall not exceed a median value of 14 with not more than 10% of the samples exceeding 43, nor exceed 800 on any one day.*

The criterion selected for the TMDL was not to exceed 43 MPN/100mL in any sampling event for fecal coliform. The 10 percent exceedance allowed by the water quality criterion for fecal coliform bacteria was not used directly in estimating the target load, but was included in the TMDL's margin of safety (as described in subsequent chapters).

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 nutrients in the Double Branch - Estuarine Segment 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 Fecal Coliform in the Double Branch - Estuarine Segment Watershed

4.2.1 Point Sources

NPDES Wastewater Facilities

There is one NPDES-permitted surface water discharge wastewater facility located in the Double Branch - Estuarine Segment watershed: Hillsborough County Northwest Regional RMF (FL0041670), permitted by the Department’s Domestic Wastewater Program. Although the facility is located in the Double Branch - Estuarine Segment watershed, it discharges fecal coliform loads to Rocky Creek. The outfall structure is approximately 1 foot long and discharges at a depth of approximately 2 feet. FL0041670 has an additional outfall that discharges effluent in response to rain events to Emerald Greens Golf Course Storage Lake, which is located in the northeast portion of the Rocky Creek watershed, at 10888 S. Mobley Road, Tampa. The facility has a permitted 5-million-gallon-per-day (mgd) flow and uses a Type I Advanced Wastewater

Treatment Plant (WWTP) (Bardenpho) process with high-level disinfection, dechlorination, and reaeration.

Municipal Separate Storm Sewer System Permittees

Municipal separate storm sewer systems (MS4s) may discharge nutrients to waterbodies in response to storm events. To address stormwater discharges, the EPA developed the NPDES stormwater permitting program. The stormwater collection systems in the Double Branch - Estuarine Segment watershed are owned and operated by Hillsborough County (#FLS 000006) and the Florida Department of Transportation (FDOT).

4.2.2 Land Uses and Nonpoint Sources

Additional fecal coliform loadings to Double Branch - Estuarine Segment are generated from nonpoint sources in the watershed. Potential nonpoint sources of coliform include loadings from surface runoff, wildlife, livestock, pets, leaking sewer lines, and leaking septic tanks.

Nonpoint source pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. Nonpoint pollution is caused by rainfall moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even underground sources of drinking water (EPA, 1994).

An exceedance under dry weather conditions could be considered as stemming primarily from baseflow, which carries the pollutant from the surficial aquifer. Baseflow pollution could result from many different sources, including failed septic tanks and sewer lines, which are covered in more detail later in this chapter. Livestock, pets, and wildlife (such as birds, raccoons, bobcats, rabbits, and deer) could also contribute to the fecal coliform exceedances in the watershed because these animals have direct access to the stream, especially under low-flow conditions.

Wildlife

Wildlife deposit coliform bacteria with their feces onto land surfaces, where they can be transported during storm events to nearby streams. Some wildlife (such as otters, beavers, raccoons, and birds) deposits their feces directly into the water. The bacterial load from naturally occurring wildlife is assumed to be background. In addition, any strategy employed to control this source would probably have a negligible impact on attaining water quality standards.

Agricultural Animals

Agricultural animals are the source of several types of coliform loading to streams. Agricultural activities, including runoff from pastureland and cattle in streams, can affect water quality. Agriculture and rangeland occupy 11.23 percent of the Double Branch - Estuarine Segment watershed. **Table 4.1** lists 2002 livestock data for Hillsborough County (U.S. Department of Agriculture [USDA], 2002).

Table 4.1. Livestock Distribution for Hillsborough County in 2002

(D) – Data withheld to avoid disclosing data for individual farms.
Source: USDA, 2002

Livestock Distribution	Hillsborough County (number of livestock)
Beef Cattle/Calves (4)	43,900
Dairy Cattle (4)	3,100
Goats (1)	680
Horses/Ponies (1)	2,273
Poultry-Broilers (1)	Undisclosed
Poultry-Layers (1)	221
Sheep (1)	888

Land Uses

The spatial distribution and acreage of different land use categories in the Double Branch - Estuarine Segment watershed were identified using the SWFWMD 2006 land use coverage contained in the Department's geographic information system (GIS) library (**Figure 4.1**). Land use categories were aggregated using the simplified Level 1 codes tabulated in **Table 4.2**. The watershed encompasses 2,367 acres. The predominant land uses are approximately 674 (29%) acres of urban and built-up and 823 (35%) acres of wetlands.

Table 4.2. Classification of Land Use Categories in the Double Branch - Estuarine Segment Watershed (WBID 1513F) in 2006

Level 1 Code	Land Use	Acreage	% Acreage
1000	Urban and Build-Up	260	11
1100	Residential Low Density	159	7
1200	Residential Medium Density	37	2
1300	Residential High Density	218	9
2000	Agriculture	54	2
3000	Rangeland	102	4
4000	Upland Forest/Rural Open	186	8
5000	Water	459	19
6000	Wetlands	823	35
7000	Barren Land	5	0
8000	Transportation, Communication, & Utilities	64	3
	TOTAL	**2367**	**100**

Empty Cell = No Data

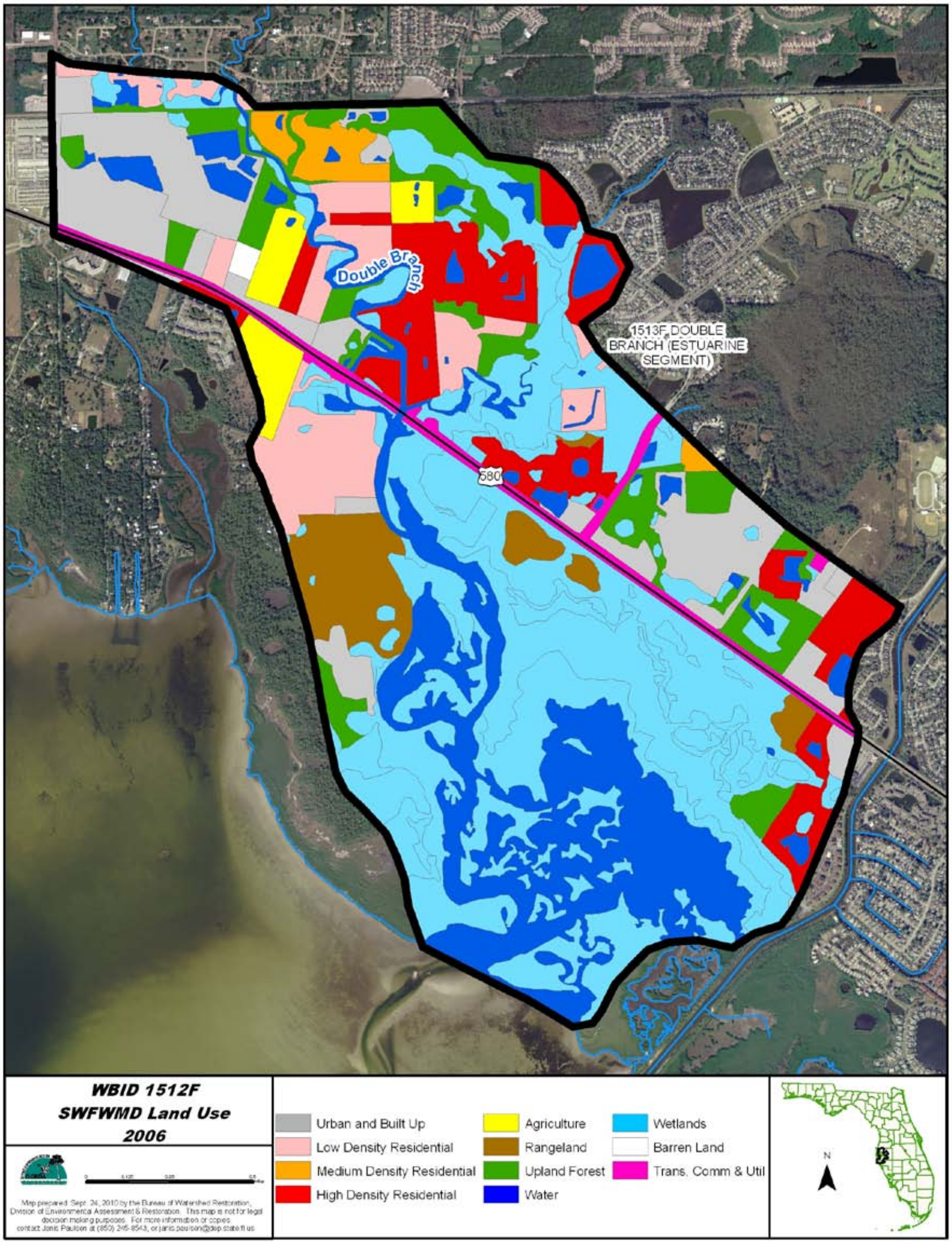

Figure 4.1. Landuse Distribution for Double Branch - Estuarine Segment (WBID 1513F)

Urban Development

Pets (especially dogs) could be a significant source of coliform pollution through surface runoff in the Double Branch - Estuarine Segment watershed. In addition to pets, other animal fecal coliform contributors commonly seen in urban areas include rats, pigeons, and sometimes raccoons.

Studies report that up to 95 percent of the fecal coliform found in urban stormwater can come from nonhuman origins (Alderiso et al., 1996; Trial et al., 1993). The most important nonhuman fecal coliform contributors appear to be dogs and cats. In a highly urbanized Baltimore catchment, Lim and Olivieri (1982) found that dog feces were the single greatest source for fecal coliform and fecal streptococcus bacteria. Trial et al. (1993) also reported that cats and dogs were the primary source of fecal coliform in urban watersheds. Using bacteria source tracking techniques, Watson (2002) found that the amount of fecal coliform bacteria contributed by dogs in Stevenson Creek in Clearwater, Florida, was as important as that from septic tanks.

According to the American Pet Products Manufacturers Association (APPMA), about 4 out of 10 U.S. households include at least 1 dog. A single gram of dog feces contains about 23 million fecal coliform bacteria (Van der Wel, 1995). Unfortunately, statistics show that about 40 percent of American dog owners do not pick up their dogs' feces.

Table 4.3 shows the fecal coliform concentrations of surface runoff measured in two urban areas (Bannerman et al., 1993; Steuer et al., 1997). While bacteria levels were widely different in the two studies, both indicated that residential lawns, driveways, and streets were the major source areas for bacteria.

Table 4.3. Concentrations (Geometric Mean Colonies/100mL) of Fecal Coliform from Urban Source Areas (Steuer et al., 1997; Bannerman et al., 1993)

Geographic Location	Marquette, Michigan	Madison, Wisconsin
Number of storms sampled	12	9
Commercial parking lot	4,200	1,758
High-traffic street	1,900	9,627
Medium-traffic street	2,400	56,554
Low-traffic street	280	92,061
Commercial rooftop	30	1,117
Residential rooftop	2,200	294
Residential driveway	1,900	34,294
Residential lawns	4,700	42,093
Basin outlet	10,200	175,106

The number of dogs in the Double Branch - Estuarine Segment watershed is not known. Therefore, this analysis used the statistics produced by APPMA to estimate the possible fecal coliform loads contributed by dogs. Using county census (population density, housing units, etc.) and area (square miles) information, the census information was extrapolated for the Double Branch - Estuarine Segment watershed. Double Branch - Estuarine Segment is located in Hillsborough County. The estimated human population in Hillsborough County (calculated from the U.S. Census Bureau in 2007) was approximately 1,174,727. The extrapolated human population in the Double Branch - Estuarine Segment watershed was approximately 4,244 people or 1,147 per square mile. According to the U.S. Census Bureau in 2007, there were 2.50 people per household in Hillsborough County. The total number of households in the Double Branch - Estuarine Segment watershed is 1,698 households. Assuming that 40 percent of the households in this area have 1 dog, the total number of dogs in the Double Branch - Estuarine Segment watershed is about 679 dogs.

According to the waste production rate for dogs and the fecal coliform counts per gram of dog wastes listed in **Table 4.4**, and assuming that 40 percent of dog owners do not pick up dog feces, the total waste produced by dogs and left on the land surface of residential areas would be 122,227 grams/day. The total fecal coliform load produced by dogs in the Double Branch - Estuarine Segment watershed is 2.6×10^{11} counts/day of fecal coliform.

It should be noted that this load only represents the fecal coliform load created in the watershed and is not intended to be used to represent a part of the existing load that reaches the receiving waterbody. The fecal coliform load that eventually reaches the receiving waterbody could be significantly less than this value due to attenuation in overland transport.

Table 4.4. Dog Population Density, Wasteload, and Fecal Coliform Density

* Number from APPMA
Source: Weiskel et al., 1996

Type	Population density (animal/household)	Wasteload (grams/an-day)	Fecal coliform density (fecal coliform/gram)
Dog	0.4*	450	2,200,000

Septic Tanks

Septic tanks are another potentially important source of coliform pollution in urban watersheds. When properly installed, most of the coliform from septic tanks should be removed within 50 meters of the drainage field (Minnesota Pollution Control Agency, 1999). However, in areas with a relatively high ground water table, the drainage field can be flooded during the rainy season, and coliform bacteria can pollute the surface water through storm runoff. Septic tanks may also cause coliform pollution when they are built too close to irrigation wells. Any well that is installed in the surficial aquifer system will cause a drawdown. If the septic tank system is built too close to the well (e.g., less than 75 feet), the septic tank discharge will be within the cone of influence of the well. As a result, septic tank effluent may go into the well and once the polluted water is used to irrigate lawns, coliform bacteria may reach the land surface and wash into surface waters during the rainy season.

A rough estimate of fecal coliform loads from failed septic tanks in each watershed can be made using **Equation 4.1**:

$$L = 37.85 * N * Q * C * F \qquad \textbf{(Equation 4.1)}$$

Where:

L is the fecal coliform daily load (counts/day);
N is the total number of septic tanks in the watershed (septic tanks);
Q is the discharge rate for each septic tank;
C is the fecal coliform concentration for the septic tank discharge; and

F is the septic tank failure rate.

Based on 2007 Florida Department of Health (FDOH) onsite sewage GIS coverage (available: http://www.doh.state.fl.us/environment/programs/EhGis/EhGisDownload.htm), about 44 housing units (*N*) were identified as being on septic tanks in the Double Branch - Estuarine Segment watershed. The Department is aware that the FDOH onsite sewage GIS coverage does not include all septic tanks and when an area converts to sewer line the septic tank information is not removed. The discharge rate from each septic tank (*Q*) was calculated by multiplying the average household size by the per capita wastewater production rate per day. Based on the information published by the U.S. Census Bureau in 2007, the average household sizes for Hillsborough County is 2.50 people/household. The same population density was assumed for the Double Branch - Estuarine Segment watershed. A commonly cited value for per capita wastewater production rate is 70 gallons/day/person (EPA, 2001). The commonly cited concentration (*C*) for septic tank discharge is $1x10^6$ counts/100mL for fecal coliform (EPA, 2001).

No measured septic tank failure rate data were available for the watershed when this TMDL analysis was conducted. Therefore the failure rate was derived from the number of septic tank and septic tank repair permits for Hillsborough and Pinellas Counties published by FDOH (available: http://www.doh.state.fl.us/environment/OSTDS/statistics/ostdsstatistics.htm). The number of septic tanks in the counties was calculated assuming that none of the installed septic tanks will be removed after being installed (**Tables 4.5**). The reported number of septic tank repair permits was also obtained from the FDOH Website (**Tables 4.5**).

Based on this information, a discovery rate of failed septic tanks for each year between 2002 and 2007 was calculated and listed in **Tables 4.5**. Using the table, the average annual septic tank failure discovery rate for Hillsborough County is about 0.81 percent. Assuming that failed septic tanks are not discovered for about 6 years, the estimated annual septic tank failure rate is about 5 times the discovery rate, or 4.03 percent for Hillsborough County. Based on **Equation 4.1**, the estimated fecal coliform loading from the failed septic tanks located in the Double Branch - Estuarine Segment watershed is approximately 1.17×10^{10} counts/day.

Table 4.5. Estimated Septic Numbers and Septic Failure Rates for Hillsborough County, 2002–07

- = Empty cell/no data
[1] The failure rate is 5 times the failure discovery rate.

-	2002	2003	2004	2005	2006	2007	Average
New installations (septic tanks)	986	1,031	1,005	1,314	1,236	487	1,010
Accumulated installations (septic tanks)	100,483	101,469	102,500	103,505	104,819	106,055	103,138
Repair permits (septic tanks)	998	929	735	815	751	754	830
Failure discovery rate (%)	0.99%	0.92%	0.72%	0.79%	0.72%	0.71%	0.81%
Failure rate (%)[1]	4.97%	4.58%	3.59%	3.94%	3.58%	3.55%	4.03%

Sanitary Sewer Overflows

Sanitary sewer overflows (SSOs) can also be a potential source of fecal bacteria pollution. Human sewage can be introduced into surface waters even when storm and sanitary sewers are separated. Leaks and overflows are common in many older sanitary sewers where capacity is exceeded, high rates of infiltration and inflow occur (i.e., outside water gets into pipes, reducing capacity), frequent blockages occur, or sewers are simply falling apart due to poor joints or pipe materials. Power failures at pumping stations are also a common cause of SSOs. The greatest risk of an SSO occurs during storm events; however, few comprehensive data are available to quantify SSO frequency and bacteria loads in most watersheds.

Fecal coliform loading from sewer line leakage can be calculated, based on the number of people in the watershed, typical per household generation rates, and the typical fecal coliform concentration in domestic sewage, assuming a leakage rate of 0.5 percent (Culver et al., 2002). Based on this assumption, a rough estimate of fecal coliform loads from leaks and SSO in the Double Branch - Estuarine Segment watershed can be made using **Equation 4.2**:

$$L = 37.85 * N * Q * C * F \quad \textbf{(Equation 4.2)}$$

Where:

- *L* is the fecal coliform daily load (counts/day);
- *N* is the number of households using sanitary sewer in the watershed;
- *Q* is the discharge rate for each household;
- *C* is the fecal coliform concentration for the domestic wastewater discharge; and
- *F* is the sewer line leakage rate.

The number of households (*N*) in the Double Branch - Estuarine Segment watershed using sewer lines is 1,654 (total households minus septic tank households, obtained from 2007 FDOH onsite sewage GIS coverage). The Department is aware that the FDOH onsite sewage GIS coverage does not include all septic tanks and when an area converts to sewer line the septic tank information is not removed. The discharge rate through the sewer line from each household (*Q*) was calculated by multiplying the average household size by the per capita wastewater production rate per day (70 gallons). The commonly cited concentration (*C*) for domestic wastewater is 1×10^6 counts/100mL for fecal coliform (EPA, 2001). Of the total number of households using the sewer line, 0.5 percent (*F*) was assumed as the sewer line leakage rate (Culver et al., 2002). Based on **Equation 4.2**, the estimated fecal coliform loading from sewer line leakage in the Double Branch - Estuarine Segment watershed is approximately 5.48×10^{10} counts/day.

Chapter 5: DETERMINATION OF ASSIMILATIVE CAPACITY

5.1 Determination of Loading Capacity

Typically, there are continuous flow measurements in a watershed that can be used to develop a fecal coliform TMDL. However, since the Double Branch - Estuarine Segment watershed is tidally influenced, this fecal coliform TMDL was developed using the "percent reduction" approach. For this method, the percent reduction needed to meet the applicable criterion is calculated for each value above the criterion. Then a median percent reduction is calculated.

5.1.1 Data Used in the Determination of the TMDL

The data used to develop this TMDL were mainly provided by the Department's Southwest District Office (Stations: 21FLTPA280131008237838 and 21FLTPA280147008238030) and Hillsborough County (Station: 21FLHILL101). **Figure 5.1** displays the locations of the water quality stations where fecal coliform data was collected for Double Branch - Estuarine Segment. **Appendix B** contains the fecal coliform data used in this analysis, and **Figure 2.1** provides a graphical representation of the data.

5.1.2 TMDL Development Process

As described in **Section 5.1**, the percent reduction needed to meet the fecal coliform criterion was determined for each individual exceedance using the following equation:

$$\frac{[\text{measured exceedance} - \text{criterion}]*100}{\text{measured exceedance}} \qquad \textbf{(Equation 5.1)}$$

The fecal coliform TMDL was calculated as the median of the percent reductions needed over the data range where exceedances occurred (see **Appendix C** for the calculations). The median percent reduction for this data period (January 2000–June 2007) was 85 percent for Double Branch - Estuarine Segment.

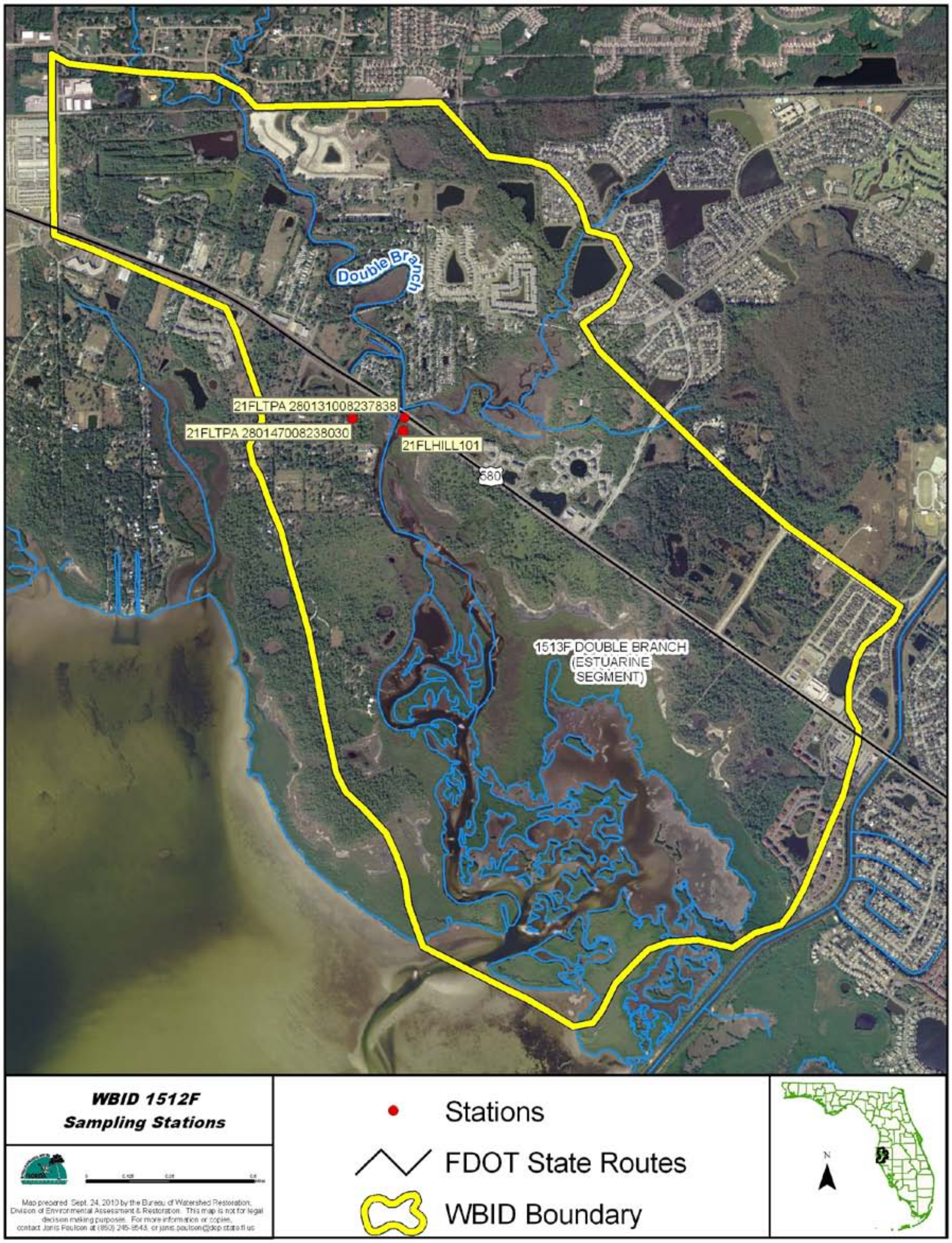

Figure 5.1. Water Quality Sampling Stations in Double Branch - Estuarine Segment (WBID 1513F)

Define the Critical Condition

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

Based on the dominant type of land use (urban land and agriculture) in this watershed, it is likely that many of the exceedances are from nonpoint sources and MS4s entering the waters through surface runoff. This could indicate that fecal coliform builds up on the land during dry periods and washes off into local waters during rain events.

5.1.3 Temporal Patterns

Measurements were sorted by month to determine whether there was a temporal pattern of exceedances. Monthly average rainfall data from Tampa WSCMO Airport (088788) for the Double Branch - Estuarine Segment watershed were obtained and included in the analysis. **Table 5.1** contains summary statistics by month for fecal coliform and rainfall measurements, and **Figure 5.2** provides a graphical representation. As shown in **Figure 5.2**, exceedances of the fecal coliform criterion in the watershed occur across the entire span of the average monthly rainfall record and throughout all seasons, implying potential fecal coliform bacteria sources during both baseflow and surface runoff events.

Table 5.1. Summary Statistics of Fecal Coliform and Rainfall Data for Double Branch - Estuarine Segment (WBID 1513F) by Month

Month	Number of Cases	Minimum	Maximum	Median	Mean	Number of Exceedances	% Fecal Exceedances	Rainfall Mean
1	8	20	1,500	410	520	7	87.50	2.44
2	10	110	1,060	310	414	10	100.00	2.63
3	8	20	2,400	310	601	7	87.50	2.58
4	10	20	560	50	114	5	50.00	1.97
5	10	0	260	25	72	4	40.00	2.86
6	8	0	560	35	134	4	50.00	5.28
7	10	20	2,000	110	440	8	80.00	6.92
8	10	20	580	215	217	9	90.00	7.61
9	8	20	4000	180	686	7	87.50	6.01
10	10	40	540	200.5	225	9	90.00	2.56
11	10	40	1,160	440	461	9	90.00	1.68
12	8	160	2,000	490	630	8	100.00	2.35

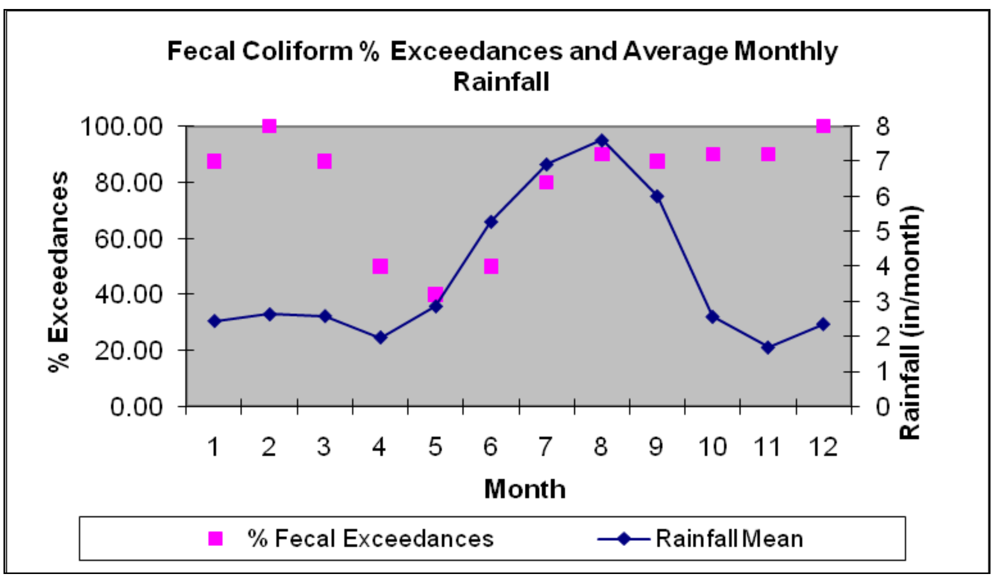

Figure 5.2. Fecal Coliform Exceedances and Rainfall for Double Branch - Estuarine Segment (WBID 1513F) by Month

5.1.4 Spatial Patterns

A spatial analysis of the stations in Double Branch - Estuarine Segment revealed that station 21FLHILL101 had the highest fecal coliform concentrations (counts/100mL). Refer to **Table 5.2** and **Figure 5.3**. However, this may be an artifact of station 21FLHILL101 being sampled more than the other two stations. Station 21FLHILL101 was sampled 78 times. While stations 21FLTPA131008237838 and 21FLTPA 280147008238030 were sampled 5 and 4 times, respectively.

Table 5.2. Summary Statistics of the Fecal Coliform Exceedances by Station in Double Branch - Estuarine Segment (WBID 1513F) (Verified Period: January 1, 2000–June 30, 2007)

Station	Number	Minimum (counts/ 100mL)	Maximum (counts/ 100mL)	Median (counts/ 100mL)	Mean (counts/ 100mL)
21FLHILL101	78	50	4000	290	470
21FLTPA 280131008237838	5	60	780	230	344
21FLTPA 280147008238030	4	140	500	210.5	265

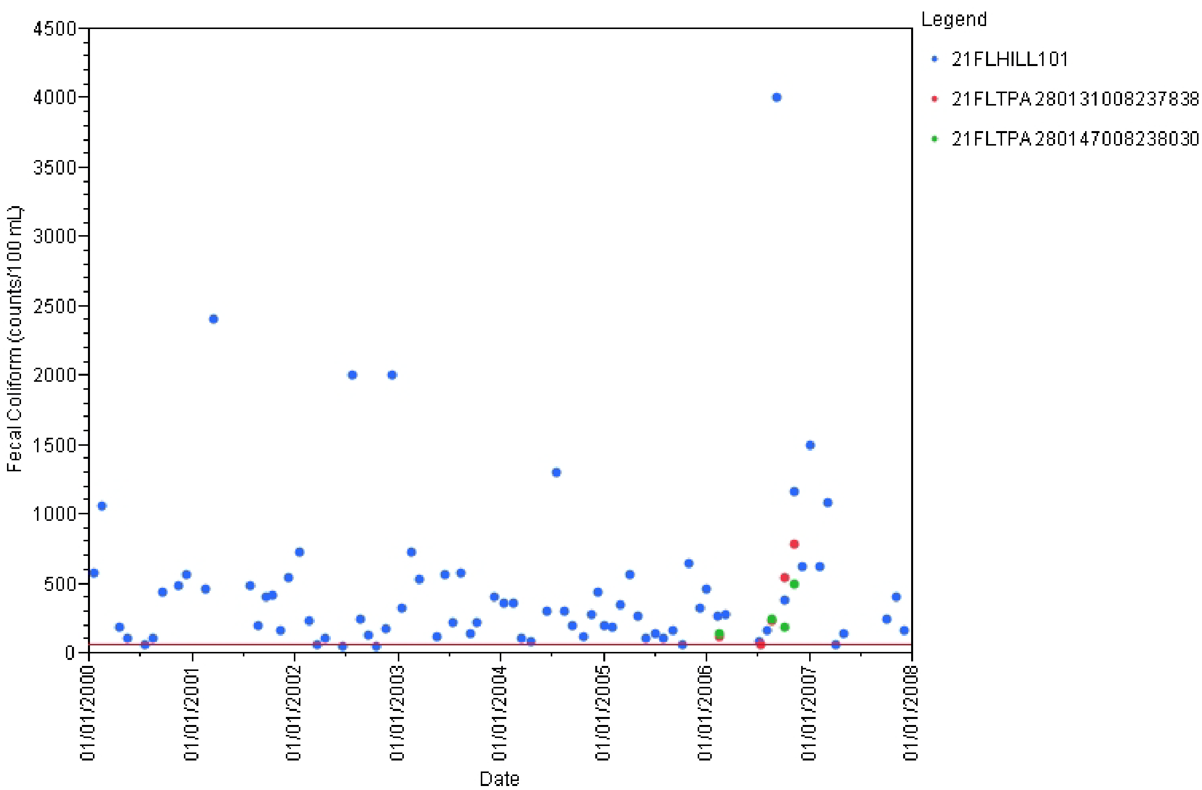

Figure 5.3. Fecal Coliform Exceedances by Station for Double Branch - Estuarine Segment (WBID 1513F) (Verified Period: January 1, 2000–June 30, 2007)

Chapter 6: DETERMINATION OF THE TMDL

6.1 Expression and Allocation of the TMDL

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

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

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

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

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

WLAs for stormwater discharges are typically expressed as “percent reduction” because it is very difficult to quantify the loads from MS4s (given the numerous discharge points) and to distinguish loads from MS4s from other nonpoint sources (given the nature of stormwater transport). The permitting of stormwater discharges also differs from the permitting of most wastewater point sources. Because stormwater discharges cannot be centrally collected, monitored, and treated, they are not subject to the same types of effluent limitations as wastewater facilities, and instead are required to meet a performance standard of providing treatment to the “maximum extent practical” through the implementation of 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 Double Branch - Estuarine Segment (WBID 1513F) is expressed in terms of MPN/day and percent reduction, and represents the maximum daily fecal coliform and total coliform loads the stream can assimilate and maintain the fecal coliform criterion (**Table 6.1**).

Table 6.1. TMDL Components for Fecal Coliform in Double Branch - Estuarine Segment (WBID 1513F)

WBID	Parameter	TMDL (counts/day)	WLA for Wastewater (counts/day)	WLA for NPDES Stormwater (% reduction)	LA (% reduction)	MOS
1513F	Fecal Coliform	400/100mL	Point sources must meet permit limits	85%	85%	Implicit

6.2 Load Allocation

A fecal coliform reduction of 85 percent for Double Branch - Estuarine Segment is needed from nonpoint sources. It should be noted that the LA includes loading from stormwater discharges regulated by the Department and the water management districts that are not part of the NPDES Stormwater Program (see **Appendix A**).

6.3 Wasteload Allocation

6.3.1 NPDES Wastewater Discharges

A fecal coliform reduction of 85 percent for Double Branch - Estuarine Segment is needed from point sources. As mentioned previously, the NPDES wastewater facility located in the Double Branch - Estuarine Segment watershed and permitted by the Department's Domestic Wastewater Program currently has potential discharge sites. The state already requires all NPDES point source dischargers to meet bacteria criteria at the end of the pipe. It is the Department's current practice not to allow mixing zones for bacteria. Any point sources that may discharge in the watershed in the future will also be required to meet end-of-pipe standards for coliform bacteria.

6.3.2 NPDES Stormwater Discharges

A fecal coliform reduction of 85 percent for Double Branch - Estuarine Segment is needed from point sources. The stormwater collection systems in the watershed are owned and operated by Hillsborough County (#FLS 000006), Pinellas County (#FLS 000005), the city of Oldsmar (Pinellas County co-permittee: #FLS 000005), and FDOT. It should be noted that any future MS4 permittee is only responsible for reducing the anthropogenic 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 meeting the water quality criterion of 400 colonies/100mL, while the actual criterion allows for a 10 percent exceedance over that level.

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 on 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. BMAPs 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 that 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; and*
- *Stakeholder statements of commitment (typically a local government resolution).*

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

7.2 Other TMDL Implementation Tools

However, in some basins, and for some parameters, particularly those with fecal coliform impairments, the development of a BMAP using the process described above will not be the most efficient way to restore a waterbody, such that it meets its designated uses. This is because fecal coliform impairments result from the cumulative effects of a multitude of potential sources, both natural and anthropogenic. Addressing these problems requires good old-fashioned detective work that is best done by those in the area.

A multitude of assessment tools is available to assist local governments and interested stakeholders in this detective work. The tools range from the simple (such as Walk the WBIDs and GIS mapping) to the complex (such as bacteria source tracking). Department staff will provide technical assistance, guidance, and oversight of local efforts to identify and minimize fecal coliform sources of pollution. Based on work in the Lower St Johns River Tributaries and the Hillsborough Basin, the Department and local stakeholders have developed a logical process and tools to serve as a foundation for this detective work. In the near future, the Department will be releasing these tools to assist local stakeholders with the development of local implementation plans to address fecal coliform impairments. In such cases, the Department will **rely on these local initiatives** as a more cost-effective and simplified approach to identify the actions needed to put in place a road map for restoration activities, while still meeting the requirements of Subsection 403.067(7), F.S.

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Appendices

Appendix A: Background Information on Federal and State Stormwater Programs

In 1982, Florida became the first state in the country to implement statewide regulations to address the issue of nonpoint source pollution by requiring new development and redevelopment to treat stormwater before it is discharged. The Stormwater Rule, as authorized in Chapter 403, F.S., was established as a technology-based program that relies on the implementation of BMPs that are designed to achieve a specific level of treatment (i.e., performance standards) as set forth in Rule 62-40, F.A.C.

The rule 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, they 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 stormwater permitting program to designate certain stormwater discharges as "point sources" of pollution. 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 has implemented Phase 1 of the MS4 permitting program on a countywide basis, which brings in all cities (incorporated areas), Chapter 298 urban water control districts, and the FDOT throughout the 15 counties meeting the population criteria.

An important difference between the federal and state stormwater permitting programs is that the federal program covers both new and existing discharges, while the state program focuses on new discharges. Additionally, Phase 2 of the NPDES Program will expand the need for these permits to construction sites between 1 and 5 acres, and to local governments with as few as 10,000 people. The revised rules require that these additional activities obtain permits by 2003. 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. The Department recently accepted delegation from the EPA for the stormwater part of the NPDES Program. It should be noted that most MS4 permits issued in Florida include a reopener clause that allows permit revisions to implement TMDLs once they are formally adopted by rule.

Appendix B: Fecal Coliform Data for Double Branch - Estuarine Segment (WBID 1513F) during the Verified Period (January 2000–June 2007)

Station	Date	Result (counts/100 mL)
21FLHILL101	1/18/2000	580
21FLHILL101	2/15/2000	1060
21FLHILL101	3/14/2000	20
21FLHILL101	4/18/2000	180
21FLHILL101	5/16/2000	100
21FLHILL101	6/20/2000	20
21FLHILL101	7/18/2000	60
21FLHILL101	8/15/2000	100
21FLHILL101	9/19/2000	440
21FLHILL101	10/10/2000	40
21FLHILL101	11/14/2000	480
21FLHILL101	12/12/2000	560
21FLHILL101	1/16/2001	20
21FLHILL101	2/20/2001	460
21FLHILL101	3/20/2001	2400
21FLHILL101	4/17/2001	40
21FLHILL101	5/15/2001	20
21FLHILL101	6/19/2001	20
21FLHILL101	7/24/2001	480
21FLHILL101	8/21/2001	200
21FLHILL101	9/18/2001	400
21FLHILL101	10/16/2001	420
21FLHILL101	11/13/2001	160
21FLHILL101	12/11/2001	540
21FLHILL101	1/15/2002	720
21FLHILL101	2/19/2002	230
21FLHILL101	3/19/2002	60
21FLHILL101	4/16/2002	100
21FLHILL101	5/14/2002	20
21FLHILL101	6/18/2002	50
21FLHILL101	7/23/2002	2000
21FLHILL101	8/20/2002	240
21FLHILL101	9/17/2002	130
21FLHILL101	10/15/2002	50
21FLHILL101	11/19/2002	170
21FLHILL101	12/10/2002	2000
21FLHILL101	1/14/2003	320

21FLHILL101	2/18/2003	720
21FLHILL101	3/18/2003	530
21FLHILL101	4/15/2003	40
21FLHILL101	5/20/2003	120
21FLHILL101	6/17/2003	560
21FLHILL101	7/15/2003	220
21FLHILL101	8/12/2003	580
21FLHILL101	9/16/2003	140
21FLHILL101	10/7/2003	220
21FLHILL101	11/18/2003	40
21FLHILL101	12/9/2003	400
21FLHILL101	1/13/2004	360
21FLHILL101	2/17/2004	360
21FLHILL101	3/16/2004	100
21FLHILL101	4/20/2004	80
21FLHILL101	5/18/2004	20
21FLHILL101	6/15/2004	300
21FLHILL101	7/20/2004	1300
21FLHILL101	8/17/2004	300
21FLHILL101	9/14/2004	200
21FLHILL101	10/19/2004	120
21FLHILL101	11/16/2004	280
21FLHILL101	12/14/2004	440
21FLHILL101	1/4/2005	200
21FLHILL101	2/2/2005	180
21FLHILL101	3/1/2005	340
21FLHILL101	4/6/2005	560
21FLHILL101	5/4/2005	260
21FLHILL101	6/2/2005	100
21FLHILL101	7/5/2005	140
21FLHILL101	8/2/2005	100
21FLHILL101	9/6/2005	160
21FLHILL101	10/5/2005	60
21FLHILL101	11/2/2005	640
21FLHILL101	12/7/2005	320
21FLHILL101	1/3/2006	460
21FLHILL101	2/8/2006	260
21FLTPA 280131008237838	2/13/2006	110
21FLTPA 280147008238030	2/13/2006	140
21FLHILL101	3/7/2006	280
21FLHILL101	4/5/2006	20

21FLTPA 280131008237838	4/18/2006	30
21FLTPA 280147008238030	4/18/2006	30
21FLHILL101	5/3/2006	0
21FLTPA 280131008237838	5/22/2006	10
21FLTPA 280147008238030	5/22/2006	30
21FLHILL101	6/7/2006	0
21FLHILL101	7/5/2006	80
21FLTPA 280131008237838	7/11/2006	60
21FLTPA 280147008238030	7/11/2006	43
21FLHILL101	8/2/2006	160
21FLTPA 280131008237838	8/21/2006	230
21FLTPA 280147008238030	8/21/2006	240
21FLHILL101	9/5/2006	4000
21FLTPA 280131008237838	10/3/2006	540
21FLTPA 280147008238030	10/3/2006	181
21FLHILL101	10/4/2006	380
21FLHILL101	11/8/2006	1160
21FLTPA 280131008237838	11/8/2006	780
21FLTPA 280147008238030	11/8/2006	500
21FLHILL101	12/6/2006	620
21FLHILL101	1/3/2007	1500
21FLHILL101	2/7/2007	620
21FLHILL101	3/7/2007	1080
21FLHILL101	4/4/2007	60
21FLHILL101	5/1/2007	140
21FLHILL101	6/6/2007	20
21FLHILL101	7/11/2007	20
21FLHILL101	8/8/2007	20
21FLHILL101	9/5/2007	20
21FLHILL101	10/3/2007	240
21FLHILL101	11/7/2007	400
21FLHILL101	12/5/2007	160

Appendix C: Fecal Coliform Percent Reduction for Double Branch - Estuarine Segment (WBID 1513F) during the Verified Period (January 2000–June 2007)

Station	Date	Result	Class II Criterion	Percent Reduction
21FLHILL101	6/18/2002	50	43	14
21FLHILL101	10/15/2002	50	43	14
21FLHILL101	7/18/2000	60	43	28
21FLHILL101	3/19/2002	60	43	28
21FLHILL101	10/5/2005	60	43	28
21FLHILL101	4/4/2007	60	43	28
21FLTPA 280131008237838	7/11/2006	60	43	28
21FLHILL101	4/20/2004	80	43	46
21FLHILL101	7/5/2006	80	43	46
21FLHILL101	5/16/2000	100	43	57
21FLHILL101	8/15/2000	100	43	57
21FLHILL101	4/16/2002	100	43	57
21FLHILL101	3/16/2004	100	43	57
21FLHILL101	6/2/2005	100	43	57
21FLHILL101	8/2/2005	100	43	57
21FLTPA 280131008237838	2/13/2006	110	43	61
21FLHILL101	5/20/2003	120	43	64
21FLHILL101	10/19/2004	120	43	64
21FLHILL101	9/17/2002	130	43	67
21FLHILL101	9/16/2003	140	43	69
21FLHILL101	7/5/2005	140	43	69
21FLHILL101	5/1/2007	140	43	69
21FLTPA 280147008238030	2/13/2006	140	43	69
21FLHILL101	11/13/2001	160	43	73
21FLHILL101	9/6/2005	160	43	73
21FLHILL101	8/2/2006	160	43	73
21FLHILL101	12/5/2007	160	43	73
21FLHILL101	11/19/2002	170	43	75
21FLHILL101	4/18/2000	180	43	76
21FLHILL101	2/2/2005	180	43	76
21FLTPA 280147008238030	10/3/2006	181	43	76
21FLHILL101	8/21/2001	200	43	79
21FLHILL101	9/14/2004	200	43	79
21FLHILL101	1/4/2005	200	43	79
21FLHILL101	7/15/2003	220	43	80
21FLHILL101	10/7/2003	220	43	80

21FLHILL101	2/19/2002	230	43	81
21FLTPA 280131008237838	8/21/2006	230	43	81
21FLHILL101	8/20/2002	240	43	82
21FLHILL101	10/3/2007	240	43	82
21FLTPA 280147008238030	8/21/2006	240	43	82
21FLHILL101	5/4/2005	260	43	83
21FLHILL101	2/8/2006	260	43	83
21FLHILL101	11/16/2004	280	43	85
21FLHILL101	3/7/2006	280	43	85
21FLHILL101	6/15/2004	300	43	86
21FLHILL101	8/17/2004	300	43	86
21FLHILL101	1/14/2003	320	43	87
21FLHILL101	12/7/2005	320	43	87
21FLHILL101	3/1/2005	340	43	87
21FLHILL101	1/13/2004	360	43	88
21FLHILL101	2/17/2004	360	43	88
21FLHILL101	10/4/2006	380	43	89
21FLHILL101	9/18/2001	400	43	89
21FLHILL101	12/9/2003	400	43	89
21FLHILL101	11/7/2007	400	43	89
21FLHILL101	10/16/2001	420	43	90
21FLHILL101	9/19/2000	440	43	90
21FLHILL101	12/14/2004	440	43	90
21FLHILL101	2/20/2001	460	43	91
21FLHILL101	1/3/2006	460	43	91
21FLHILL101	11/14/2000	480	43	91
21FLHILL101	7/24/2001	480	43	91
21FLTPA 280147008238030	11/8/2006	500	43	91
21FLHILL101	3/18/2003	530	43	92
21FLHILL101	12/11/2001	540	43	92
21FLTPA 280131008237838	10/3/2006	540	43	92
21FLHILL101	12/12/2000	560	43	92
21FLHILL101	6/17/2003	560	43	92
21FLHILL101	4/6/2005	560	43	92
21FLHILL101	1/18/2000	580	43	93
21FLHILL101	8/12/2003	580	43	93
21FLHILL101	12/6/2006	620	43	93
21FLHILL101	2/7/2007	620	43	93
21FLHILL101	11/2/2005	640	43	93
21FLHILL101	1/15/2002	720	43	94
21FLHILL101	2/18/2003	720	43	94

21FLTPA 280131008237838	11/8/2006	780	43	94
21FLHILL101	2/15/2000	1060	43	96
21FLHILL101	3/7/2007	1080	43	96
21FLHILL101	11/8/2006	1160	43	96
21FLHILL101	7/20/2004	1300	43	97
21FLHILL101	1/3/2007	1500	43	97
21FLHILL101	7/23/2002	2000	43	98
21FLHILL101	12/10/2002	2000	43	98
21FLHILL101	3/20/2001	2400	43	98
21FLHILL101	9/5/2006	4000	43	99
			Median	85

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