FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Water Resource Management, Bureau of Watershed Management

NORTHWEST DISTRICT • OCHLOCKONEE–ST. MARKS BASIN

Final TMDL Report

Fecal Coliform TMDL for Black Creek, WBID 1024

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September 29, 2008

Acknowledgments

This analysis could not have been accomplished without significant contributions from staff in the Florida Department of Environmental Protection's Watershed Assessment Section. Editorial assistance was provided by Jan Mandrup-Poulsen and Linda Lord. Map production assistance was provided by Erin Wilcox.

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Web sites

Florida Department of Environmental Protection, Bureau of Watershed Management

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

2006 305(b) Report

http://www.dep.state.fl.us/water/tmdl/docs/2006_Integrated_Report.pdf

Criteria for Surface Water Quality Classifications

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

Basin Status Report

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

Water Quality Assessment Report

http://www.dep.state.fl.us/water/basin411/stmarks/assessment.htm

U.S. Environmental Protection Agency

National STORET Program

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

Region 4: Total Maximum Daily Loads in Florida

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

Chapter 1: INTRODUCTION

1.1 Purpose of Report

This report presents the Total Maximum Daily Load (TMDL) for fecal coliform for Black Creek in the Ochlockonee–St. Marks Basin. The creek was verified as impaired for fecal coliform, and was included on the Verified List of impaired waters for the Ochlockonee–St. Marks Basin that was adopted by Secretarial Order in June 2008. The TMDL establishes the allowable loadings to Black Creek that would restore the waterbody so that it meets its applicable water quality criterion for fecal coliform.

1.2 Identification of Waterbody

The Black Creek Watershed, located in Leon and Wakulla Counties, has an 18.4-square-mile (mi^2) drainage area (U.S. Geological Survey [USGS], 1981). However, this analysis uses18.2 mi^2 for all the flow calculations. This is because most of the violations were located at an old USGS gage site (USGS # 02330028). The watershed is located in the southwestern end of Leon County and the northwestern part of Wakulla County (**Figure 1.1**). Only a small portion of the watershed is located in Wakulla County and is not assessed in this TMDL.

The watershed contains Black Creek, which discharges directly to the Ochlockonee River, and Unnamed Run, which flows into Black Creek (**Figure 1.2**). The Black Creek Watershed has a water surface area of approximately 0.06 square miles. Additional information about the watershed's hydrology and geology are available in the Basin Assessment Report for the Ochlockonee–St. Marks Basin (Florida Department of Environmental Protection [Department], 2003).

For assessment purposes, the Department has divided the Ochlockonee–St. Marks Basin into water assessment polygons with a unique **w**ater**b**ody **id**entification (WBID) number for each watershed or stream reach. The Black Creek Watershed has been divided into two segments, as shown in **Figure 1.2,** and this TMDL addresses potential sources of bacteria in Black Creek (WBID 1024) and Unnamed Run (WBID 1025).

Figure 1.1. Black Creek Watershed in Florida, and Major Geopolitical Features

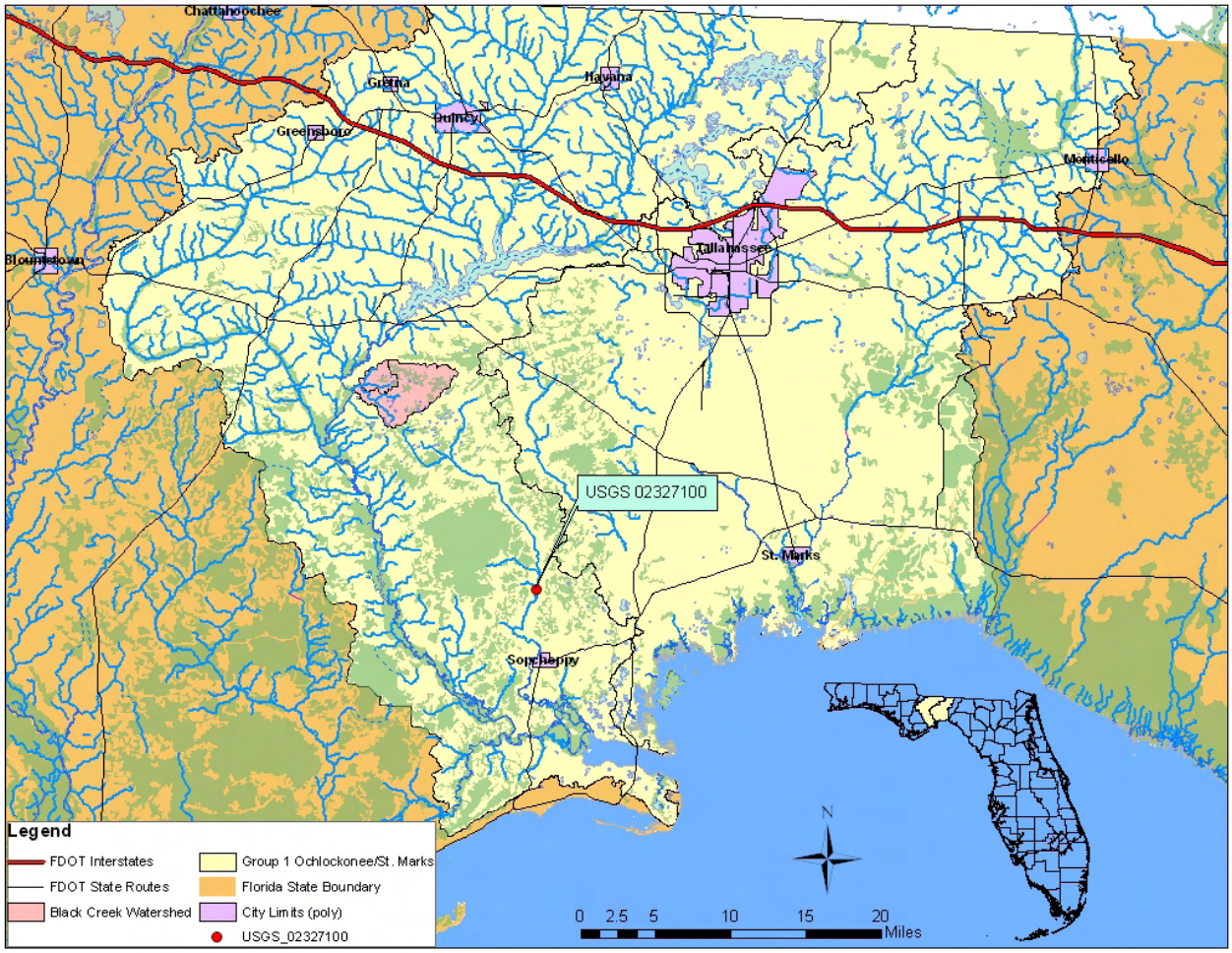
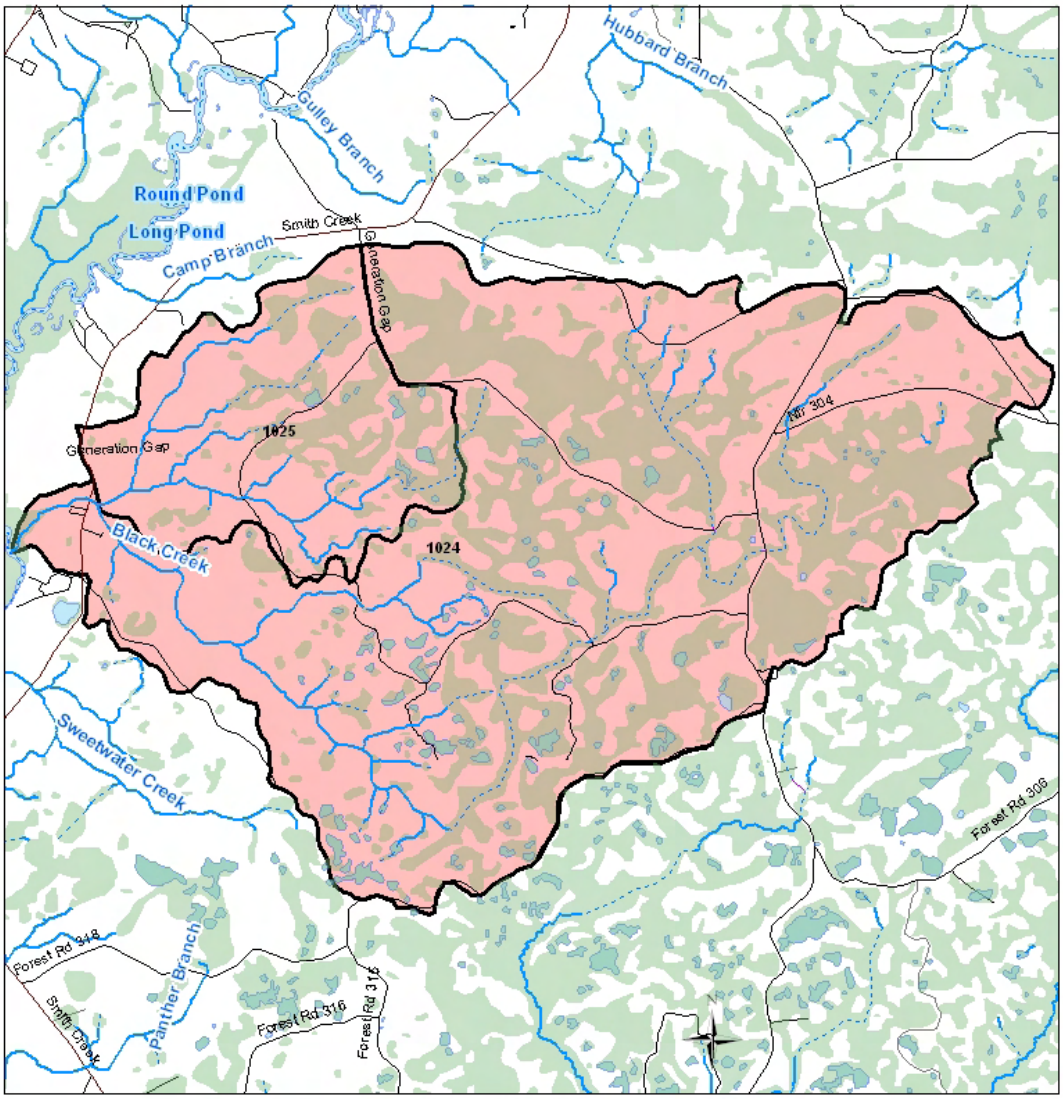


Figure 1.2. Black Creek Watershed, WBIDs 1024 and 1025



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) (also see **Appendix A** for background information on the federal and state stormwater programs).

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 will 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 the Black Creek Watershed. These activities will depend heavily on the active participation of the Northwest Water Management District (NWFWMD), 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) a list 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.]), and the state's 303(d) list is amended annually to include basin updates.

Florida's 1998 303(d) list included 24 waterbodies in the Ochlockonee–St. Marks 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 updated in 2006 and 2007.

2.2 Information on Verified Impairment

The Department used the IWR to assess water quality impairments in the Ochlockonee–St. Marks Basin and has verified the impairments listed in **Table 2.1**. **Table 2.2** provides selected assessment results for fecal coliform for each waterbody segment in the Black Creek Watershed within the verification period, which was January 1, 2000, through June 30, 2007.

This TMDL addresses the fecal coliform impairment in the Black Creek Watershed. There were a total of 20 fecal coliform samples collected within the verified period. The samples used in the TMDL calculation range from 20 counts/100mL to 1,600 counts/100mL.

Table 2.1. Verified Impaired Segments in the Ochlockonee–St. Marks Basin

WBID	Waterbody Segment	Parameters Assessed using the IWR*	Priority for TMDL Development	Projected Year of TMDL Development
427	Swamp Creek	Fecal Coliform	Low	2008
563	Unnamed Drain	Fecal Coliform, Turbidity	Low	2018
582	Lake Jackson Outlet	Unionized Ammonia	Low	2014
628	Black Creek	Fecal Coliform	Low	2018
647	Alford Arm	DO	Medium	2008
682	Juniper Creek	DO, Fecal Coliform	Medium	2008
684	Mule Creek	Fecal Coliform	Low	2018
689	Lake Overstreet Drain	Fecal Coliform	Low	2018
716	Caney Branch	Fecal Coliform	Low	2018
756	Lake Lafayette Drain	DO	Medium	2008
757	Bear Creek	Fecal Coliform	Low	2018
807	Munson Slough (below Lake Munson)	DO, Unionized Ammonia	Medium	2013
808	Copeland Sink Drain	DO	Low	2014
809	Megginnis Arm Run	Fecal Coliform	Low	2018
820	Godby Ditch	Fecal Coliform	Low	2018
879	Hammock Creek	DO	Low	2014
896	Polk Creek	Fecal Coliform	Low	2018
913	Big Creek	Fecal Coliform	Low	2018
919	Unnamed Slough	Fecal Coliform	Low	2018
921	Harvey Creek	Fecal Coliform	Low	2018
965	Sweetwater Branch	Fecal Coliform	Low	2018
971	Chicken Branch	Fecal Coliform	Low	2018
977	Moore Branch	Fecal Coliform	Low	2018
1006	Wakulla River	Biology	Medium	2008
1024	**Black Creek**	**Fecal Coliform**	**Low**	**2008**
1028	McBride Slough	Fecal Coliform	Low	2018
1049	Big Branch	Fecal Coliform	Low	2018
1054	Black Creek	DO	Low	2014
1124	Big Boggy Branch	Fecal Coliform	Low	2018
1300	Telogia Creek	Fecal Coliform, Iron	Medium	2008
1303	Quincy Creek	Fecal Coliform, Iron	Low	2018
8026	Coastapalach Gulf West	Shellfish	Medium	2008
8999	Gulf Coast	Mercury (in Fish Tissue)	Low	2011
1248B	Ochlockonee Bay	Fecal Coliform	Low	2018
1248C	Ochlockonee Bay	Fecal Coliform	Low	2018

WBID	Waterbody Segment	Parameters Assessed using the IWR*	Priority for TMDL Development	Projected Year of TMDL Development
1297B	Ochlockonee River	Iron	Medium	2013
1297C	Lake Talquin	DO, TSI	Medium	2013
1297D	Lake Talquin	TSI	Medium	2013
1297E	Ochlockonee River	Iron	Medium	2013
1297F	Ochlockonee River	Iron	Medium	2013
540A	Tallavanna Lake	TSI	Medium	2008
756A	Upper Lake Lafayette	Fecal Coliform, DO	Low	2018
756B	Lake Piney Z	DO, TSI	Medium	2008
756C	Lower Lake Lafayette	DO, TSI	Medium	2008
791N	Lake Miccosukee	TSI	Low	2014
8025B	Mashes Island	Bacteria	High	2008
8026B	Shell Point	Bacteria	Low	2018
807C	Lake Munson	DO, TSI, Turbidity	Medium	2008
807D	Munson Slough (above Lake Munson)	DO, Fecal Coliform, Turbidity	Low	2008
971B	Lake Weeks	DO	Medium	2008

Note: The parameters listed in **Table 2.1** provide a complete picture of the impairment in the Ochlockonee–St. Marks Basin, but this TMDL only addresses non-nutrient impairment in the Black Creek watershed.

* DO – Dissolved oxygen
TSI – Trophic State Index

Table 2.2. Summary of Fecal Coliform Data for Black Creek, WBIDs 1024 and 1025, 2000–07

WBID	Station Number	Date	Time	Result (counts/100mL)	Remark Code*
1025	21FLGW 8669	6/21/2000	1400	200	Q
1024	21FLGW 8641	9/11/2000	1100	40	Q
1024	21FLWQA 301932208441363	2/22/2006	1355	28	B
1024	21FLLEONLCOC3032584638	2/28/2006	945	76	
1024	21FLLEONLCOC3032584638	5/16/2006	1015	28	B
1024	21FLLEONLCOC3032584638	8/1/2006	1005	40	
1024	21FLLEONLCOC3032584638	8/8/2006	1132	220	
1024	21FLLEONLCOC3032584638	10/17/2006	1359	1,600	
1024	21FLLEONLCOC3032584638	10/25/2006	1005	30	B
1024	21FLLEONLCOC3032584638	1/22/2007	1154	540	
1024	21FLPNS 301932708441365	4/26/2007	1215	410	
1024	21FLPNS 301932208441442	4/26/2007	1255	636	B
1024	21FLPNS 301932708441365	5/1/2007	1205	690	B
1024	21FLLEONLCOC3032584638	5/1/2007	850	920	
1024	21FLPNS 301932208441442	5/1/2007	1240	560	
1024	21FLPNS 301932208441442	6/4/2007	1325	66	Q
1024	21FLPNS 301932708441365	6/4/2007	1240	68	Q
1024	21FLPNS 301932208441442	6/12/2007	1315	220	
1024	21FLPNS 301932708441365	6/12/2007	1230	250	
1024	21FLPNS 301932708441365	6/21/2007	1045	54	

Note: The table includes examples of data within the verified period for Group 1 (January 1, 2000–June 30, 2007), obtained from the Department's IWR Run 31. **Appendix G** contains a complete table of all existing data.

* B – Results based on colony counts outside the acceptable range.
Q – Sample held beyond normal holding time.

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)**

The Black Creek Watershed contains two Class III fresh waterbodies, Black Creek and Unnamed Run. The Class III waterbodies have a designated use of recreation, propagation, and the maintenance of a healthy, well-balanced population of fish and wildlife. The water quality criterion applicable to the impairment addressed by this TMDL is the Class III criterion for 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 criterion for the protection of Class III waters, as established by Rule 62-302, F.A.C., states the following:

> ***Fecal Coliform Bacteria:***
> *The most probable number (MPN) or membrane filter (MF) counts per 100 mL of fecal coliform bacteria shall not exceed a monthly average of 200, nor exceed 400 in 10 percent of the samples, nor exceed 800 on any one day.*

The criterion states that monthly averages shall be expressed as geometric means based on a minimum of 10 samples taken over a 30-day period. However, during the development of load curves for the impaired streams (as described in subsequent sections), there were insufficient data (fewer than 10 samples in a given month) available to evaluate the geometric mean criterion for fecal coliform bacteria. Therefore, the criterion selected for the TMDL was not to exceed 400 in 10 percent of the samples.

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

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

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

4.2 Potential Sources of Coliform in the Black Creek Watershed

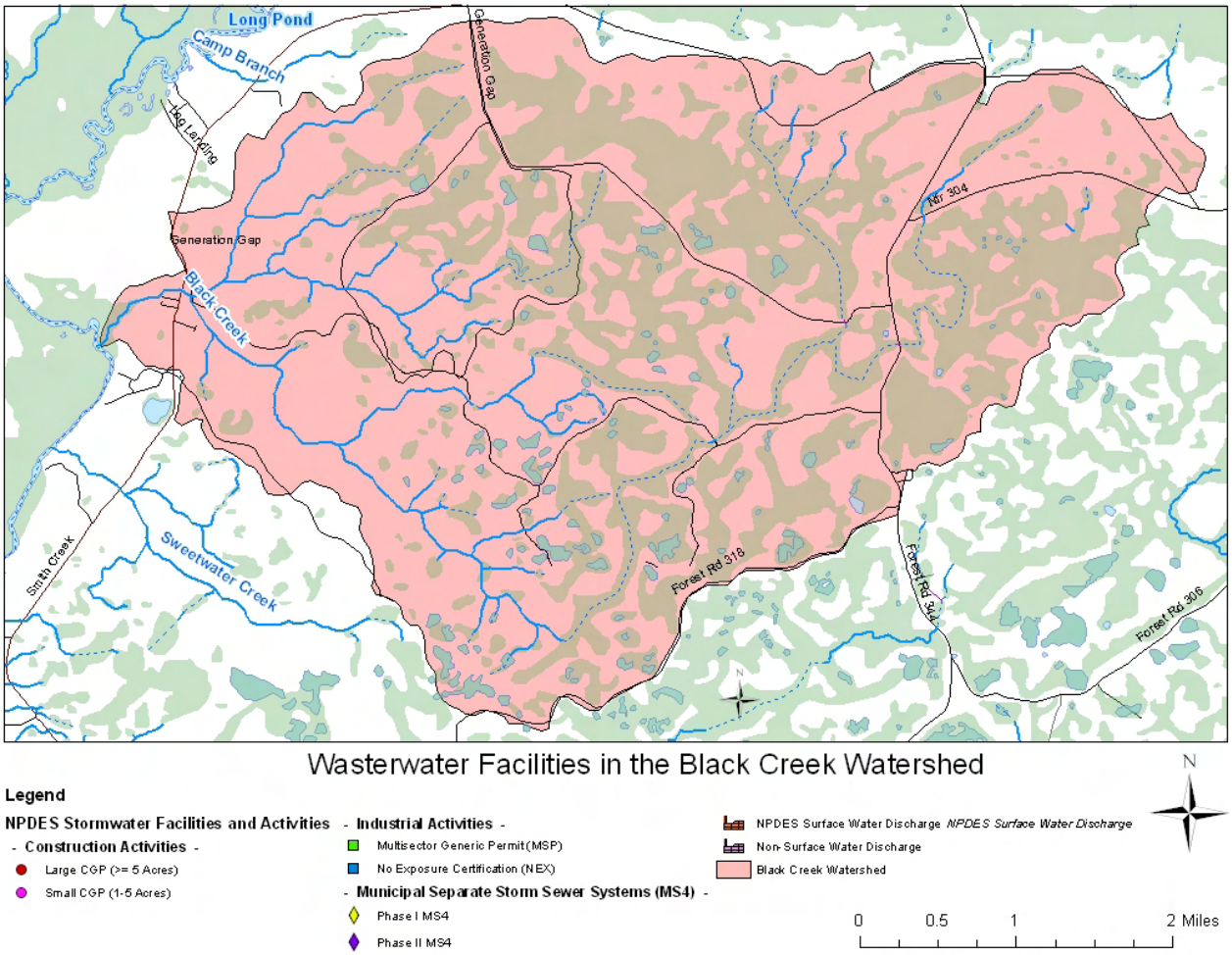
4.2.1 Point Sources

There are currently no facilities with a permit to discharge wastewater in the Black Creek Watershedwatershed (**Figure 4.1**).

Municipal Separate Storm Sewer System Permittees

It is unclear if there is a municipal separate storm sewer system (MS4) located in the Black Creek watershed; further investigation is needed.

Figure 4.1. Wastewater Facilities in the Black Creek Watershed, WBIDs 1024 and 1025



4.2.2 Land Uses and Nonpoint Sources

Additional fecal coliform loadings to the Black Creek Watershed are generated from nonpoint sources in the watershed. Potential nonpoint sources of coliforms include loadings from surface runoff, wildlife, livestock, pets, and leaking septic tanks.

Land Uses

The spatial distribution and acreage of different land use categories were identified using the 1995 NWFWMD land use coverage (scale 1:40,000) contained in the Department's geographic information system (GIS) library. Land use categories in the watershed were aggregated using the simplified Level 1 codes tabulated in **Table 4.1. Figure 4.2** shows the acreage of the principal land uses in the watershed (Level 2 is used in this figure to present the watershed's land use in more detail than the Level 1 table). As shown in **Table 4.1**, land use in the Black

Creek Watershed is heavily dominated by wetlands and upland forests, which comprise 47.81 and 46.90 percent of the entire watershed, respectively. Non-natural land uses in the watershed include transportation, communication and utilities (0.14 percent), urban and built-up (0.10 percent), and agriculture (0.04 percent).

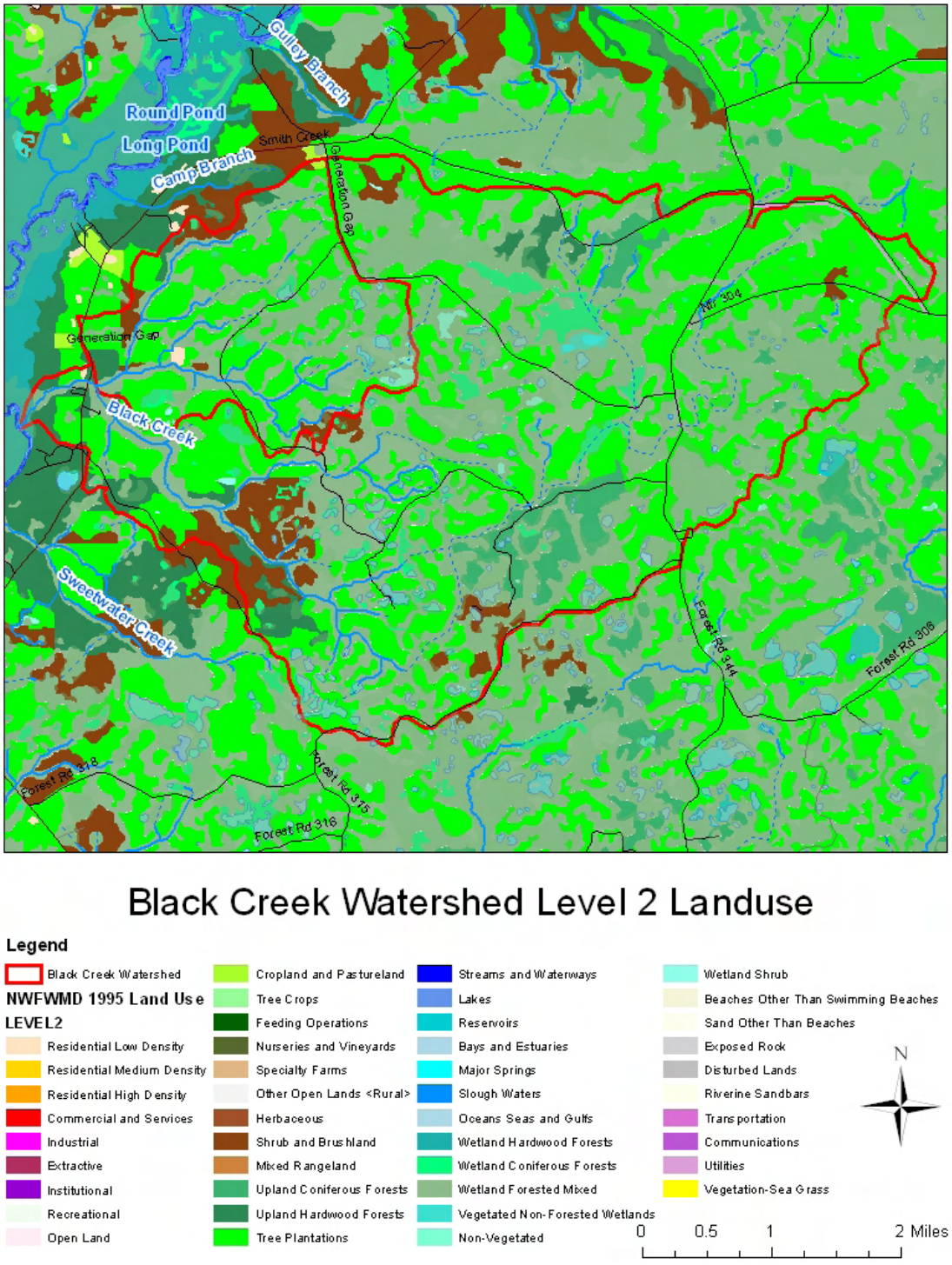
Table 4.1. Classification of Land Use Categories in the Black Creek Watershed, WBIDs 1024 and 1025

Code	Land Use	Acreage	Mi^2	% of Watershed
Black Creek, WBID 1024				
1000	Urban and Built-up	3.49	0.01	0.04
2000	Agriculture	0.01	0.00	0.00
3000	Rangeland	454.13	0.71	4.70
4000	Upland Forests	4,504.56	7.04	46.62
5000	Water	36.83	0.06	0.38
6000	Wetlands	4,646.44	7.26	48.09
7000	Barren Land	0.00	0.00	0.00
8000	Transportation, Communication, and Utilities	16.44	0.03	0.17
	Total	**9,661.90**	**15.10**	**100.00**

Code	Land Use	Acreage	Mi^2	% of Watershed
Unnamed Run, WBID 1025				
1000	Urban and Built-up	8.60	0.01	0.39
2000	Agriculture	5.29	0.01	0.24
3000	Rangeland	103.21	0.16	4.66
4000	Upland Forests	1,065.76	1.67	48.11
5000	Water	0.74	0.00	0.03
6000	Wetlands	1,031.49	1.61	46.57
7000	Barren Land	0.00	0.00	0.00
8000	Transportation, Communication, and Utilities	0.00	0.00	0.00
	Total	**2,215.08**	**3.46**	**100.00**

Code	Land Use	Acreage	Mi^2	% of Watershed
Black Creek Watershed, WBIDs 1024 and 1025				
1000	Urban and Built-up	12.09	0.02	0.10
2000	Agriculture	5.30	0.01	0.04
3000	Rangeland	557.34	0.87	4.69
4000	Upland Forests	5,570.32	8.70	46.90
5000	Water	37.56	0.06	0.32
6000	Wetlands	5,677.93	8.87	47.81
7000	Barren Land	0.00	0.00	0.00
8000	Transportation, Communication, and Utilities	16.44	0.03	0.14
	Total	**11,876.98**	**18.56**	**100.00**

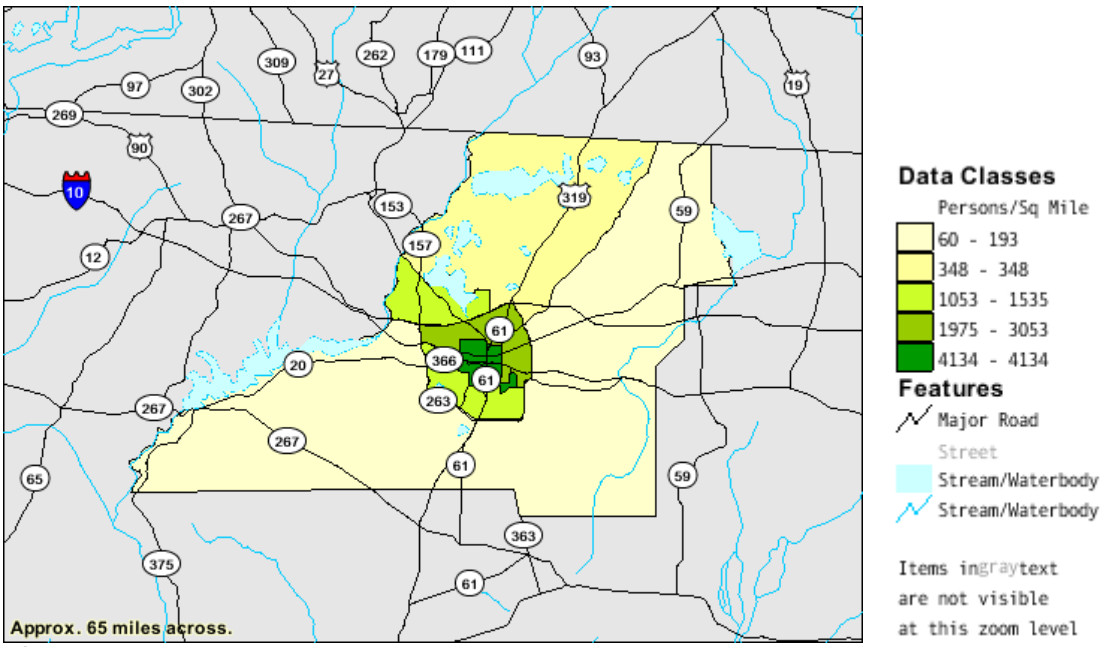
Figure 4.2. Principal Land Uses in the Black Creek Watershed, WBIDs 1024 and 1025



Population

According to the U.S. Census Bureau, the population density in and around Leon County in the year 2000 was at or less than 359.1 people/mi^2 (10 person/mi^2 is the minimum used by the Census Bureau) (**Figure 4.3**) (U.S. Census Bureau Website, 2008). The Bureau reports that in Leon County, which includes WBIDs 1024 and 1025, the total population for 2000 was 239,452, with 96,521 occupied housing units and 103, total-housing units. For all of Leon County, the Census Bureau reported a housing density of 155.9 housing units/mi^2.

Figure 4.3. Population Density in Leon County, Florida, in 2000



Source:
U.S. Census Bureau, Census 2000 Summary File 1, Matrix P1

Septic Tanks

Onsite sewage treatment and disposal systems (OSTDS's), including septic tanks, are commonly used where providing central sewer is not cost-effective or practical. When properly sited, designed, constructed, maintained, and operated, OSTDS's are a safe means of disposing of domestic waste. The effluent from a well-functioning OSTDS is comparable to secondarily treated wastewater from a sewage treatment plant. When not functioning properly, OSTDS's can be a source of coliforms, pathogens, and other pollutants to both ground water and surface water.

As of 2006, Leon County had roughly 38,530 septic systems (Florida Department of Health [FDOH] Website, 2008). Data for septic tanks are based on 1970 to 2007 Census results, with year-by-year additions based on new septic tank construction. The data do not reflect septic tanks that have been removed going back to 1970. From fiscal years 1991 to 2007, 5,849

permits for repairs were issued (FDOH Website, 2008). Based on the number of permitted septic tanks and housing units located in the county, approximately 100 percent of the housing units are using septic tank systems.

No measured septic tank failure rate data were available for the watershed at the time this TMDL analysis was conducted. Therefore the failure rate was derived from the number of septic tanks and septic tank repair permits for the county published by FDOH (http://www.doh.state.fl.us/environment/OSTDS/statistics/ostdsstatistics.htm), (**Table 4.2a**). Using the FDOH information, a discovery rate of failed septic tanks for each year between 2000 and 2005 was calculated and listed in **Table 4.2a**. Using the table, the average annual septic tank failure discovery rate for Leon County is about 1.07 percent. Assuming that failed septic tanks are not discovered for about 5 years, the estimated annual septic tank failure rate is about 5 times the discovery rate, or 5.35 percent.

Table 4.2a. Estimated Septic Numbers and Septic Failure Rates for Leon County, 2000–2005

	2000	2001	2002	2003	2004	2005	Average
New installation (septic tanks)	318	342	297	344	296	291	314.67
Accumulated installation (septic tanks)	36,588	36,930	37,227	37,571	37,867	38,158	37,390.17
Repair permit (septic tanks)	382	417	436	475	383	304	399.50
Failure discovery rate (%)	1.044	1.129	1.171	1.264	1.011	0.797	1.07
Failure rate (%)*	5.22	5.646	5.856	6.321	5.057	3.983	5.35

* The failure rate is 5 times the failure discovery rate.

The Black Creek Watershed comprises 18.56 mi^2, or approximately 2.64 percent of the land area of Leon County (701.73 mi^2). The number of septic tanks in the watershed is not known, but using the ratio of Level 1 urban and built-up land use in the watershed to that in Leon County (1.5530E-4), the number of septic tanks is estimated to be 6. Using these numbers (FDOH Website, 2008) and 70 gallons/day/person (EPA, 2001), a loading of 6.89E+9 colonies/day is derived. These estimations, as shown in **Table 4.2b,** constitute 1.25 percent of the total load to the Black Creek Watershed.

Table 4.2b. Estimation of Coliform Loading from Failed Septic Tanks in the Black Creek Watershed

Estimated Population Density and Area	Estimated Number of Septic Tanks in Area	Estimated Number of Tank Failures	Estimated Concentration from Failed Tanks (cfu/100mL)*	Gallons/ Person/ Day	Estimated Number of People per Household	Estimated Load from Failing Tanks (cfu/day)
Standard Loading	1	1	1.00E+06	70	2.6	6.89E+09
Black Creek Watershed	6	1	1.00E+06	70	2.6	6.89E+09
Leon County	38,530	1,927	1.00E+06	70	2.6	1.33E+13

cfu – Colony-forming units

Livestock

Another potential nonpoint source of coliforms includes livestock and other agricultural animals. **Table 4.3a** summarizes cattle populations in Leon County in 2002, and **Table 4.3b** summarizes populations of other agricultural animals in the county in 2002. Approximately 0.04 percent of the Black Creek Watershed is specifically categorized as agriculture Level 1 land use system. **Appendix B** contains a summary of the loads from all livestock, which is 6.9691E+10 colonies/day, or 15 percent of the total loading to the Black Creek Watershed.

Table 4.3a. Summary of the Cattle Population in Leon County, 2002

Livestock	Year 2002	
	Inventory	Sold
Cattle and Calves	2,841	1,489
Dairy Cattle		
Beef Cattle		

Table 4.3b. Summary of Agricultural Animal Populations (Excluding Cattle)

Livestock	Year 2002	
	Inventory	Sold
Hogs and Pigs	493	400
Poultry		
Layers and pullets 20 weeks and older	436	
Broilers	50	0
Sheep and Lambs	72	
Horses	1,070	83
Milk Goats		
Goats, except Angora and Milk	201	83
Ducks	80	0
Geese	15	0
Pheasants		
Other Poultry		
Mules, Burros, and Donkeys		
Rabbits		

Source: U.S. Department of Agriculture (USDA), 2002.
See **Appendix B.**

Pets–Domestic Animals

Another possible source of fecal coliform bacteria in the Black Creek Watershed could be pets. The Department has been unable to obtain data on the number of dogs in the area; however, estimates can be made using literature-based values of dog ownership rates. Using dog-to-household ratio estimates from the American Veterinary Medical Association (AVMA, 2007), and assuming that coliforms from 100 percent of dogs reach the waterbody and are viable upon reaching it, the approximate loading to the watershed from dogs is 4.3471E+10 counts per day (see **Appendix B** for details). Similarly, the number of horses and ponies can be estimated for a load of 3.1479E+8 colonies/day. The total load from domestic animals is 4.3786E+10 colonies/day, or 9.42 percent of the total to the watershed.

Boats

There are no boats located in the watershed.

Wildlife

The most recent TMDL work (Benham, 2007) quantifying wildlife contributions to fecal coliform divides the load among eight categories of wildlife: deer, raccoons, muskrats, beavers, geese, ducks, wild turkeys, and other. Wildlife are assigned to a habitat they would normally frequent. For example, beaver, geese, and ducks are assigned to a buffer 91 meters wide along the perimeter of main streams and impoundments, while deer are assigned to the entire watershed.

The white-tailed deer population has been estimated at various densities (12.8/mi^2), as shown in **Appendix B**. Migratory waterfowl and other bird populations have been estimated annually from 1998 to 2006 (BirdSource Website, 2007). The value used (0.44/mi^2) is a composite of the largest species in size. The total load from wildlife is estimated at 3.45434E+11 colonies/day, or 74.33 percent of the total.

4.3 Source Summary

Table 4.4 summarizes the daily average fecal coliform loadings (roughly corresponding to the period from 1997 through 2007) from livestock, wildlife, domestic animals, and septic tanks in the Black Creek Watershed.

Table 4.4. Average Daily Quantity of Internal Fecal Coliform Loads to the Black Creek Watershed

Nonpoint Source Category	Internal Loads to Black Creek Watershed (cfu/day)	% of Total
Total Livestock (from 2002)	6.9691E+10	15.19
Total Wildlife	3.4543E+11	75.27
Total Domestic Animals (Excluding Cats)	4.3786E+10	9.54
Total	**4.5891E+11**	**100.00**

Total septic includes sewer line link and failed septic tanks.
See **Appendix B.**

The information provided in this chapter consists of estimates and is presented for reference purposes to help guide the BMAP process. It was not used in the percent reduction calculation of this TMDL.

Chapter 5: DETERMINATION OF ASSIMILATIVE CAPACITY

5.1 Determination of Loading Capacity

The methodology used for this TMDL was the "percent reduction" methodology. The Department generally prefers to use the load duration curve or "Kansas" method for coliform TMDLs, but this method could not be used because there are no stream gauging stations on Black Creek. To determine the TMDL, the percent reduction that would be required for each of the exceedances to meet applicable criteria was determined, and the median value of all of these reductions for both fecal determined the overall required reduction, and therefore the TMDL.

5.1.1 Data Used in the Determination of the TMDL

Seven sampling stations in the Black Creek Watershed have coliform observations (**Figure 5.1**). The primary data collector is the Department's Northwest District (STORET IDs: 21FLPNS 301932208441442 and 21FLPNS 301932708441365). The Department's Watershed Assessment Section, NWFWMD, and Leon County conducted additional sampling. **Figure 5.1** shows the locations of these sites, while **Table 5.1** provides a brief statistical overview of the observed data at the sites. **Figure 5.2** is a chart showing the observed data over time.

Figure 5.1. Monitoring Sites in the Black Creek Watershed, WBIDs 1024 and 1025

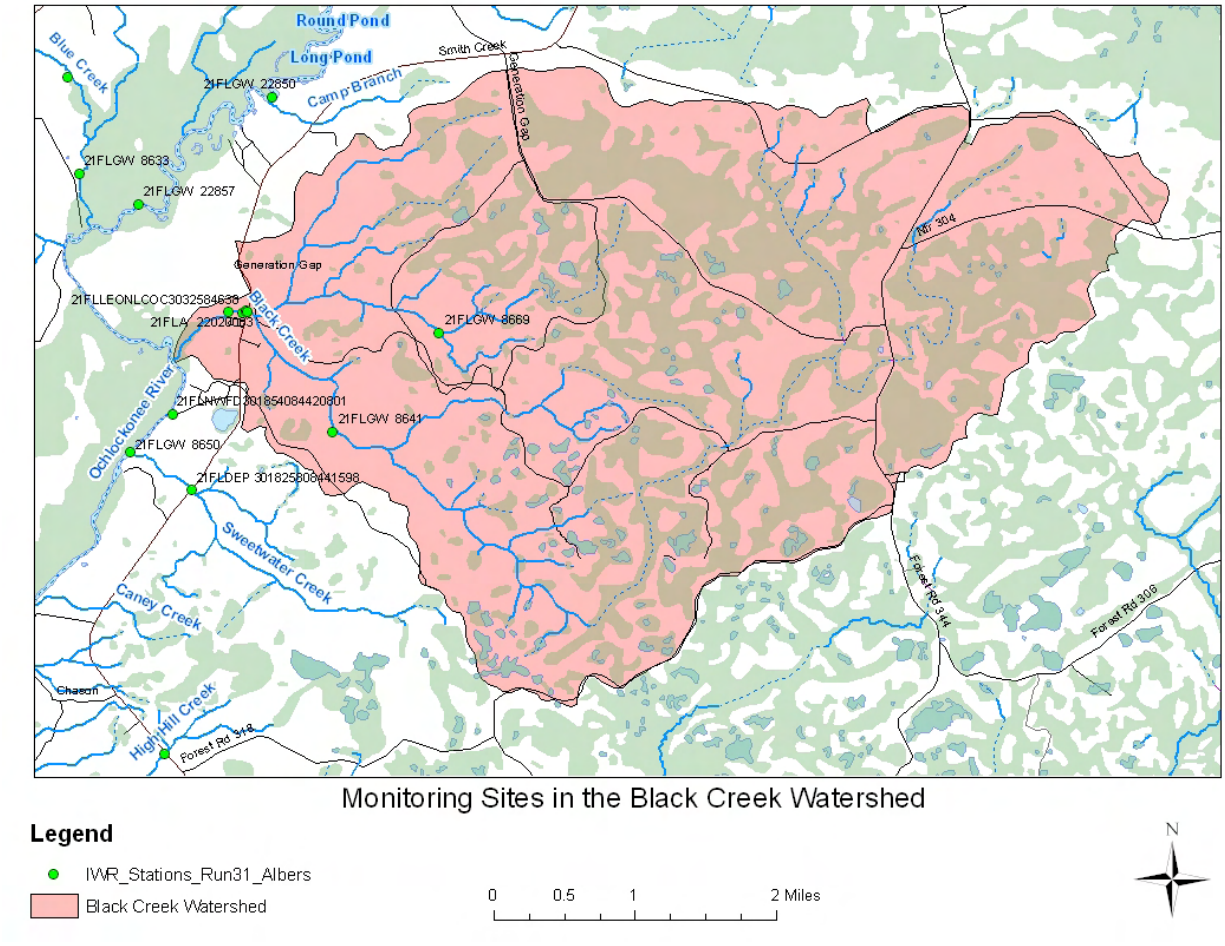
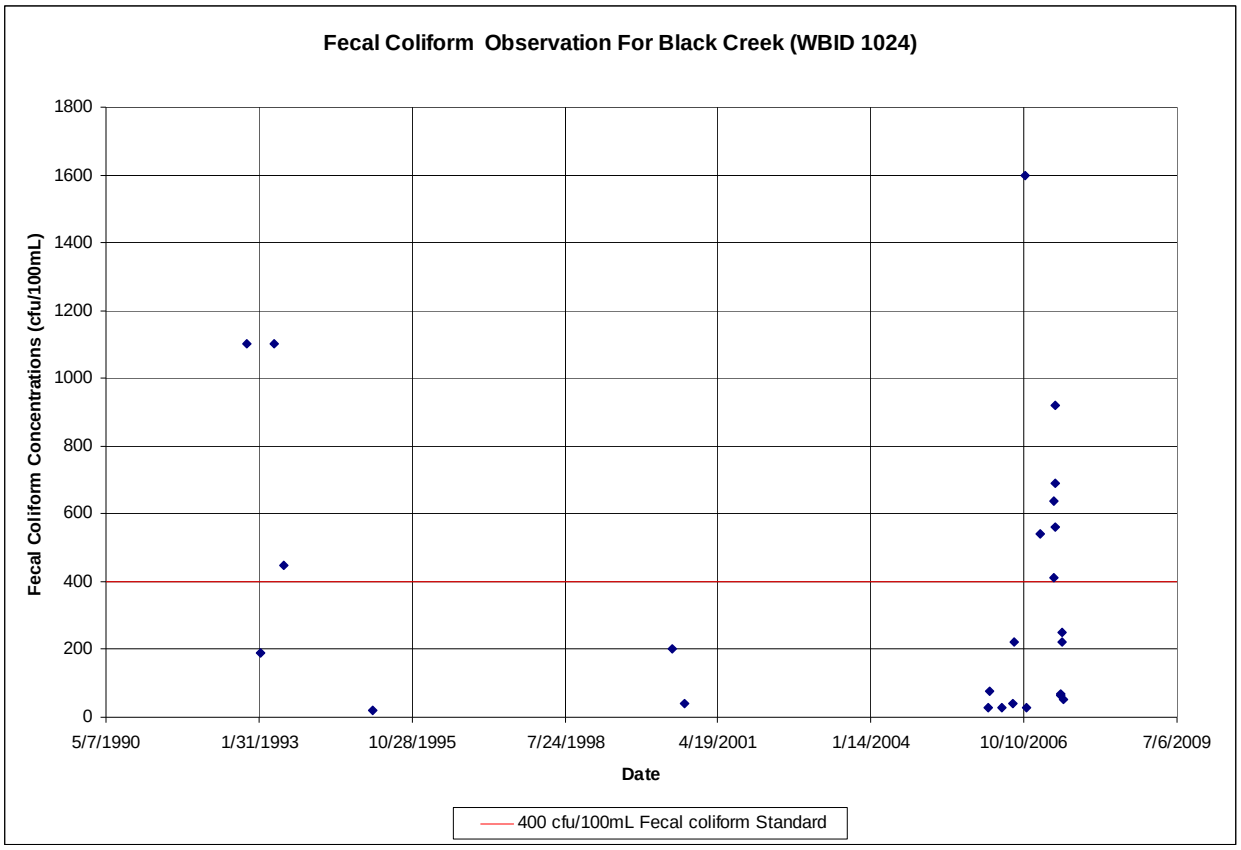


Table 5.1. Statistical Table of Observed Data for Black Creek, WBIDs 1024 and 1025

WBID	Parameter	Total Number of Samples	Geometric Mean of Samples (N/100mL)	Number of Samples above Standard Concentration (FC>400 (N/100mL))	Minimum Concentration (N/100mL)	Maximum Concentration (N/100mL)
Black Creek Watershed (WBIDs 1024 and 1025)	Fecal Coliform	25	181.0338	10	20	1,600

Figure 5.2. Chart of Observations for Fecal Coliforms in Black Creek, WBID 1024



5.1.2 TMDL Development Process

Development of the Percent Reduction

Exceedances of the state criterion were compared with the criterion of 400 counts/100mL. For each individual exceedance, an individual required reduction was calculated using the following:

$$(1)\ \frac{[(\text{observed value}) - (\text{state criterion})] \times 100}{(\text{observed value})}$$

After the individual results were calculated, the median of the individual values was calculated, which is 39.57 percent. This means that in order to meet the state criterion of 400 counts/100mL, a 39.57 percent reduction in current loading is necessary, and this is therefore the TMDL for Black Creek. **Table 5.2** shows the individual reduction calculations for Black Creek, including all exceedances, and **Table 5.1** shows annual summaries of data used in the calculation of the TMDL.

Table 5.2. Calculation of Reductions for the Fecal Coliform TMDL for Black Creek, WBID 1024

WBID	Station Number	Date	Time	Result (counts/ 100mL)	Remark Code*	Required Reduction (%)
1024	21FLNWFD301932084413701	7/13/1993	930	450	A	11.111
1024	21FLLEONLCOC3032584638	10/17/2006	1359	1,600		75.000
1024	21FLLEONLCOC3032584638	1/22/2007	1154	540		25.926
1024	21FLPNS 301932708441365	4/26/2007	1215	410		2.439
1024	21FLPNS 301932208441442	4/26/2007	1255	636	B	37.107
1024	21FLPNS 301932708441365	5/1/2007	1205	690	B	42.029
1024	21FLLEONLCOC3032584638	5/1/2007	850	920		56.522
1024	21FLPNS 301932208441442	5/1/2007	1240	560		28.571
	Median			**598**		**32.8392**

* A – Value reported is the mean of two or more determinations
B – Results based on colony counts outside the acceptable range.

5.2 Critical Conditions/Seasonality

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, as described above, livestock that have direct access to the receiving water can also 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.

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:

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

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

$$\mathbf{TMDL \cong \sum WLAs_{wastewater} + \sum WLAs_{NPDES\ Stormwater} + \sum LAs + MOS}$$

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 consistent with the percent reduction needed for nonpoint sources and is the same percent reduction required under 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 the Black Creek Watershed is expressed in terms of percent reduction, and represents the maximum annual fecal coliform load the watershed can assimilate and maintain the fecal coliform criterion (**Table 6.1**).

Table 6.1. TMDL Components for the Black Creek Watershed, WBID 1024

WBID	Parameter	TMDL (% Reduction)	WLA		LA (% Reduction)	MOS
			Wastewater (counts/ 100mL)	NPDES Stormwater		
Black Creek Watershed (WBID 1024)	Fecal Coliform	33%	N/A	N/A	33%	Implicit

N/A – Not applicable

6.2 Load Allocation

Based on a percent reduction, a fecal coliform reduction of 33 percent 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

Currently, there are no permitted NPDES wastewater discharges in the watershed. Any new potential discharger is expected to comply with the Class III criterion for coliform bacteria.

6.3.1 NPDES Wastewater Discharges

As mentioned previously, there are no permitted wastewater facilities with a discharge permit in the Black Creek Watershed. Any new potential discharger is expected to comply with the Class III criterion for coliform bacteria.

6.4 Margin of Safety

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

For fecal coliform, an implicit MOS was inherently incorporated by using 400 MPN/100mL of fecal coliform as the water quality target for each and every sampling event, instead of setting the criterion as no more than 10 percent of the samples exceeding 400 MPN/100mL. For fecal coliform TMDLs, using the correlation lines fitting through only the existing loadings that exceeded the allowable loadings could overestimate the actual existing loading , which makes the estimation more conservative and therefore adds to the MOS. An additional MOS was included in the TMDL by not allowing any exceedances of the state criterion, even though intermittent natural exceedances of the criterion would be expected and would be taken into account when determining impairment.

Chapter 7: NEXT STEPS: IMPLEMENTATION PLAN DEVELOPMENT AND BEYOND

7.1 Basin Management Action Plan

Following the adoption of this TMDL by rule, the next step in the TMDL process is to develop an implementation plan for the TMDL, which will be a component of the BMAP for the Black Creek Watershed. This document will be developed over the next year in cooperation with local stakeholders and will attempt to reach consensus on more detailed allocations and on how load reductions will be accomplished. The BMAP will include the following:

- *Appropriate allocations among the affected parties;*
- *A description of the load reduction activities to be undertaken;*
- *Timetables for project implementation and completion;*
- *Funding mechanisms that may be utilized;*
- *Any applicable signed agreement;*
- *Local ordinances defining actions to be taken or prohibited;*
- *Local water quality standards, permits, or load limitation agreements; and*
- *Monitoring and follow-up measures.*

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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 state's water management districts, along with wetland protection requirements, into the Environmental Resource Permit regulations.

Rule 62-40, F.A.C., also requires the 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. No PLRG had been developed for Newnans Lake when this report was published.

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

An important difference between the federal NPDES and the state's stormwater/environmental resource permitting programs is that the NPDES Program covers both new and existing discharges, while the state's program 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: Summary of Land Use Loads by Category

Land Use Information for the Black Creek Watershed

		Leon County, Florida		Black Creek Watershed	
Land Use Level 1		**Total (mi^2)**	**%**	**Total (mi^2)**	**%**
1000	Urban and Built-up	1.2170E+02	1.7342E+01	1.8900E-02	1.0184E-01
2000	Agriculture	5.5492E+01	7.9079E+00	8.3000E-03	4.4725E-02
3000	Rangeland	6.8390E+00	9.7459E-01	8.7090E-01	4.6929E+00
4000	Upland Forests	3.7942E+02	5.4069E+01	8.7037E+00	4.6900E+01
5000	Water	2.1210E+01	3.0225E+00	5.8600E-02	3.1577E-01
6000	Wetlands	1.1027E+02	1.5714E+01	8.8718E+00	4.7806E+01
7000	Barren Land	7.8200E-02	1.1144E-02	0.0000E+00	0.0000E+00
8000	Transportation and Utilities	6.7276E+00	9.5871E-01	2.5700E-02	1.3849E-01
	Total Land	6.8052E+02	9.6977E+01	1.8499E+01	9.9684E+01
	Total Land+Water	7.0173E+02	1.0000E+02	1.8558E+01	1.0000E+02
	Total Census 2000	7.0178E+02		1.0899E-01	
	Urban Ratio WBID/County	1.0000E+00		1.5530E-04	
	Agriculture Ratio WBID/County	1.0000E+00		1.4957E-04	
	Natural Ratio WBID/County	1.0000E+00		3.3431E-02	
	Total Septic Tanks thru 2006	3.8530E+04		5.9839E+00	
	Total Repairs 1991 thru 2006	5.8490E+03		9.0837E-01	
	Total Failures	1.9265E+03		2.9919E-01	
	Total 2000 Households	9.6521E+04		1.4990E+01	
	Total Houseboats				
	Total 1990 Public Sewer	5.8881E+04		9.1444E+00	
	Total 1990 Septic	2.2090E+04		3.4307E+00	
	Total 1990 Other	3.5400E+02		5.4978E-02	
	Total 2000 Population	2.3945E+05		3.7188E+01	

Fecal Coliform Loading from Animals in the Black Creek Watershed

Animal Type	FC Load Produced by Animals (cts/animal/day)	Number of Animals in Leon County	County Area (mi^2)	Animal Density in Leon County (mi^2)	References	Black Creek Watershed Drainage Area (mi^2)	Number of Animals in Black Creek Watershed	Load Produced by Animals in Black Creek Watershed (cts/day)
Livestock								
Cattle and Calves Inventory	1.04E+11	2841	7.0173E+02			1.8200E+01	4.2493E-01	4.4193E+10
Cattle and Calves Sold	1.04E+11	1489	7.0173E+02			1.8200E+01	2.2271E-01	2.3162E+10
Dairy Cattle Inventory	1.01E+11		7.0173E+02		C	1.8200E+01	0.0000E+00	0.0000E+00
Beef Cattle Inventory	1.04E+11		7.0173E+02		C	1.8200E+01	0.0000E+00	0.0000E+00
Sheep and Lambs Inventory	1.20E+10	72	7.0173E+02		C	1.8200E+01	1.0769E-02	1.2923E+08
Sheep and Lambs Sold	1.20E+10		7.0173E+02			1.8200E+01	0.0000E+00	0.0000E+00
Horses and Ponies Inventory	4.20E+08	1070	7.0173E+02		C	1.8200E+01	1.6004E-01	6.7217E+07
Horses and Ponies Sold	4.20E+08	83	7.0173E+02			1.8200E+01	1.2414E-02	5.2140E+06
Mules, Burros, and Donkeys Inventory	4.20E+08		7.0173E+02		C,E	1.8200E+01	0.0000E+00	0.0000E+00
Mules, Burros, and Donkeys Sold	4.20E+08		7.0173E+02			1.8200E+01	0.0000E+00	0.0000E+00
Llamas (~Sheep)	1.20E+10	18	7.0173E+02		C,E	1.8200E+01	2.6923E-03	3.2307E+07
Bison (~Beef Cattle)	1.04E+11		7.0173E+02		C,E	1.8200E+01	0.0000E+00	0.0000E+00
Deer	5.00E+08		7.0173E+02		C,E	1.8200E+01	0.0000E+00	0.0000E+00
Elk	5.00E+08		7.0173E+02		C,E	1.8200E+01	0.0000E+00	0.0000E+00
Goats, All (~Sheep) Inventory	1.20E+10	201	7.0173E+02		C,E	1.8200E+01	3.0064E-02	3.6077E+08
Goats, All (~Sheep) Sold	1.20E+10	83	7.0173E+02			1.8200E+01	1.2414E-02	1.4897E+08
Hogs and Pigs Inventory	1.08E+10	493	7.0173E+02		C	1.8200E+01	7.3739E-02	7.9638E+08
Hogs and Pigs Sold	1.08E+10	400	7.0173E+02			1.8200E+01	5.9828E-02	6.4615E+08
Layer Chickens Inventory	1.40E+08	436	7.0173E+02		C	1.8200E+01	6.5213E-02	9.1298E+06
Layer Chickens Sold	1.40E+08		7.0173E+02			1.8200E+01	0.0000E+00	0.0000E+00
Broilers Inventory	1.40E+08	50	7.0173E+02		C	1.8200E+01	7.4786E-03	1.0470E+06
Broilers Sold	1.40E+08	0	7.0173E+02			1.8200E+01	0.0000E+00	0.0000E+00

Animal Type	FC Load Produced by Animals (cts/animal/day)	Number of Animals in Leon County	County Area (mi^2)	Animal Density in Leon County (mi^2)	References	Black Creek Watershed Drainage Area (mi^2)	Number of Animals in Black Creek Watershed	Load Produced by Animals in Black Creek Watershed (cts/day)
Turkeys Inventory	9.50E+07	25	7.0173E+02		C	1.8200E+01	3.7393E-03	3.5523E+05
Turkeys Sold	9.50E+07	0	7.0173E+02			1.8200E+01	0.0000E+00	0.0000E+00
Ducks Inventory	2.50E+09	80	7.0173E+02		C	1.8200E+01	1.1966E-02	2.9914E+07
Ducks Sold	2.50E+09	0	7.0173E+02			1.8200E+01	0.0000E+00	0.0000E+00
Geese Inventory	4.90E+10	15	7.0173E+02		C	1.8200E+01	2.2436E-03	1.0993E+08
Geese Sold	4.90E+10	0	7.0173E+02			1.8200E+01	0.0000E+00	0.0000E+00
Emus (~Geese)	4.90E+10		7.0173E+02		C,E	1.8200E+01	0.0000E+00	0.0000E+00
Ostriches (~Geese)	4.90E+10		7.0173E+02		C,E	1.8200E+01	0.0000E+00	0.0000E+00
Pheasants (~Geese) Inventory	4.90E+10		7.0173E+02		C,E	1.8200E+01	0.0000E+00	0.0000E+00
Pheasants (~Geese) Sold	4.90E+10		7.0173E+02			1.8200E+01	0.0000E+00	0.0000E+00
Pigeons or Squab Inventory	1.60E+08		7.0173E+02		C	1.8200E+01	0.0000E+00	0.0000E+00
Pigeons or Squab Sold	1.60E+08	0	7.0173E+02			1.8200E+01	0.0000E+00	0.0000E+00
Quail (~Pigeon)	1.60E+08		7.0173E+02		C	1.8200E+01	0.0000E+00	0.0000E+00
Other			7.0173E+02		C	1.8200E+01	0.0000E+00	0.0000E+00
Rabbits Inventory	2.53E+09		7.0173E+02		J,K	1.8200E+01	0.0000E+00	0.0000E+00
Rabbits Sold	2.53E+09		7.0173E+02		J,K	1.8200E+01	0.0000E+00	0.0000E+00
Total Livestock			**7.0173E+02**		**C**	**1.8200E+01**	**0.0000E+00**	**6.9691E+10**
Wildlife			**7.0173E+02**		**C**	**1.8200E+01**		
Alligators			7.0173E+02		C	1.8200E+01	0.0000E+00	0.0000E+00
Black Bears			7.0173E+02		C	1.8200E+01	0.0000E+00	0.0000E+00
Raccoons	1.25E+08		7.0173E+02		C	1.8200E+01	0.0000E+00	0.0000E+00
Beavers	2.50E+08		7.0173E+02		C	1.8200E+01	0.0000E+00	0.0000E+00
Deer	5.00E+08	8.9822E+03	7.0173E+02		CI	1.8200E+01	3.0029E+02	1.5014E+11
Dolphin, Porpoise, Manatee			7.0173E+02		C	1.8200E+01	0.0000E+00	0.0000E+00
Waterfowl	4.90E+10	1.1921E+02	7.0173E+02		CI	1.8200E+01	3.9854E+00	1.9529E+11
Wild Pigs	1.08E+10		7.0173E+02		CI	1.8200E+01	0.0000E+00	0.0000E+00
Total Wildlife			**7.0173E+02**		**C**	**1.8200E+01**		**3.4543E+11**

Animal Type	FC Load Produced by Animals (cts/animal/day)	Number of Animals in Leon County	County Area (mi^2)	Animal Density in Leon County (mi^2)	References	Black Creek Watershed Drainage Area (mi^2)	Number of Animals in Black Creek Watershed	Load Produced by Animals in Black Creek Watershed (cts/day)
Domestic Animals			**7.0173E+02**		**C**	**1.8200E+01**		
Dogs	5.00E+09	4.6388E+03	7.0173E+02	0.58*HH	F	1.8200E+01	8.6942E+00	4.3471E+10
Cats	5.00E+09	5.2787E+03	7.0173E+02	0.66*HH	F	1.8200E+01	9.8934E+00	4.9467E+10
Horses and Ponies–Pets	4.20E+08	3.9990E+02	7.0173E+02	0.05*HH	F	1.8200E+01	7.4950E-01	3.1479E+08
Total Domestic			**7.0173E+02**			**1.8200E+01**		**9.3253E+10**
Septic–Human Impacts			**7.0173E+02**			**1.8200E+01**		
Human	2.00E+09		7.0173E+02			1.8200E+01		
Sewer Line Leaks	6.89E+09		7.0173E+02			1.8200E+01		3.7389E+09
Houseboats–Nonmarina	2.00E+09		7.0173E+02		C	1.8200E+01		
Boats–Marina Slips	2.00E+09		7.0173E+02			1.8200E+01		0.0000E+00
Septic Tanks Failed	6.89E+09		7.0173E+02			1.8200E+01	2.9919E-01	2.0611E+09
Septic Tanks Normal			7.0173E+02			1.8200E+01		
Septic Tanks–ATU	2.76E+08		7.0173E+02		H	1.8200E+01		
Total Septic			**7.0173E+02**			**1.8200E+01**		**5.8000E+09**
Aquaculture								
Fish Farms			7.0173E+02			1.8200E+01	0.0000E+00	
Fish Farms Sold			7.0173E+02			1.8200E+01	0.0000E+00	
Oyster Houses			7.0173E+02			1.8200E+01	0.0000E+00	
Total Aquaculture			**7.0173E+02**			**1.8200E+01**	**0.0000E+00**	
Total			**7.0173E+02**			**1.8200E+01**	**0.0000E+00**	**5.1417E+11**

REFERENCES

A	USDA Census, 2002; Note A–D indicates confidential data not available at
B	Assume 1 animal per household* 7,180 housing units=7,180.
C	EPA, 2001. Available: http://www.epa.gov/owow/tmdl/pathogen_all.pdf.
D	American Society of Agricultural and Biological Engineers, 1998. Available: http://www.asae.org.
E	Estimated from similar animals.
F	American Veterinary Medical Association, 2002. Available: http://www.avma.org. Dogs=0.58*Households, Cats=0.66*HH, Horses=0.05*HH.
G	Speas, 2004. Range of 500 to 1,900 cfu/100mL or 96 percent removal, use one ATU=0.04*6.89E09 cfu/day.
H	EPA, 2008. Available: http://www.epa.gov/region1/assistance/ceitts/wastewater/techs/delta.html.
I	Available: http://www.bae.ncsu/edu/programs/extension/manure.
J	Rhode Island Department of Environmental Management, 2003. Table 8.
K	FDOH Onsite Sewage Installations. Available: http://www.doh.state.fl.us/environment/ostds/statistics/newInstallations.pdf.
L	FDOH Onsite Sewage Repairs. Available: http://www.doh.state.fl.us/environment/ostds/statistics/repairs.pdf.

Appendix C: Summary of Permitted Point Source Loads and Decay Rates

Not applicable.

Appendix D: Summary of Measured External Loads

Not applicable.

Appendix E: Summary of Effluent Data

Not applicable.

Appendix F: Summary of Photos and News Articles

Black Creek upstream at County Road 375

Black Creek downstream at County Road 375

Unnamed Run upstream (WBID 1025)

Unnamed Run downstream (WBID 1025)

Tributary to Black Creek

Appendix G: Black Creek Watershed Data

Date	Time	Black Creek Average Daily Flow (cfs*) (USGS 02376100 flow scaled by drainage area)	% of Time Discharge Is Equaled or Exceeded (T)	Result (counts/100mL)	Calculated FC Load (counts/day) for Black Creek Watershed
11/12/1992	1030	22.66	35.38	1,100.00	6.10E+11
2/10/1993	1030	24.80	33.64	190.00	1.15E+11
5/13/1993	1230	0.45	93.45	1,100.00	1.20E+10
7/13/1993	930	3.57	64.80	450.00	3.93E+10
2/15/1995	**1111**	**21.41**	**36.60**	**20.00**	**1.05E+10**
6/21/2000	1400	0.23	99.19	200.00	1.14E+09
9/11/2000	1100	124.37	5.79	40.00	1.22E+11
2/22/2006	1355	23.02	35.15	28.00	1.58E+10
2/28/2006	945	70.84	13.81	76.00	1.32E+11
5/16/2006	1015	1.34	77.58	28.00	9.17E+08
8/1/2006	1005	0.30	97.83	40.00	2.97E+08
8/8/2006	1132	0.34	96.63	220.00	1.82E+09
10/17/2006	1359	0.36	96.16	1,600.00	1.40E+10
10/25/2006	1005	0.77	84.81	30.00	5.63E+08
1/22/2007	1154	16.42	41.69	540.00	2.17E+11
4/26/2007	1215	0.39	95.03	410.00	3.94E+09
4/26/2007	1255	0.39	95.03	636.00	6.11E+09
5/1/2007	1205	0.36	96.19	690.00	6.03E+09
5/1/2007	850	0.36	96.19	920.00	8.03E+09
5/1/2007	1240	0.36	96.19	560.00	4.89E+09
6/4/2007	1325	0.30	97.89	66.00	4.90E+08
6/4/2007	1240	0.30	97.89	68.00	5.05E+08
6/12/2007	1315	0.29	98.17	220.00	1.54E+09
6/12/2007	1230	0.29	98.17	250.00	1.75E+09
6/21/2007	1045	0.23	99.25	54.00	3.06E+08

* cfs – Cubic feet per second

Appendix H: Public Comments

Leon County

Leon County
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(850) 606-5302 www.leoncountyfl.gov

Leon County Public Works
2280 Miccosuke Road
Tallahassee, Florida 32308
850 / 606-1500

July 21, 2008

Mr. Jan Mandrup-Poulsen
Environmental Administrator
Watershed Assessment Section
Florida Department of Environmental Protection
Mail Station 3555
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Leon County, Florida Comments
on Draft TMDLs for Black Creek

(Black Creek (WBID 1024) - Fecal Coliform TMDL)

Dear Mr. Mandrup-Poulsen:

Leon County, Florida hereby submits its comments on the proposed draft TMDL for the Black Creek (WBID 1024) Fecal Coliform TMDL.

Comment 1: **The Apalachicola National Forest includes 92% of Leon County lands in WBIDs 1024 and 1025 (16.7 square miles in Forest). However, that unique land use is not acknowledged in the TMDL.**

- The Forest could support a greater wildlife population density than found in a "forest" within the urban area.
- Hunting obviously occurs in the Forest, but the use of dogs by some hunters may need consideration. After cleaning their kill, hunters are known to place the waste in streams to keep it away from their dogs.
- County stream sampling identified elevated fecal counts on other Forest streams without associated high nutrient levels.

Comment 2: ***Land use coverage is used to calculate the human presence in the WBIDs.***

- The Northwest Florida Water Management District land use data is referenced. Leon County modified that data for the NPDES MS4 Year 3 Pollutant Loading study (2005) to correlate better for stormwater management purposes.
- 2000 census data identifies 20 individuals in the WBID. Appendix B calculation based on the relative percentage of "urban/built up" land overestimates the population to 37.

- The county-wide percentage of households using septic tanks versus central sewer is applied to the population rather than recognizing central sewer doesn't extend to the specified WBIDs.

Comment 3: The NPDES MS4 wasteload allocation is described inconsistently in Chapter 6.

- Section 6.1 (p. 28) states that ". . . the WLA for NPDES stormwater is typically based on the percent reduction needed for nonpoint sources and is also accounted for within the LA . . ." This is contrary to the role of the NPDES MS4 permit described in Section 6.3.2 (p. 29), which states ". . . any MS4 permittee will only be responsible for reducing the loads associated with stormwater outfalls for which it owns or otherwise has responsible control, and is not responsible for reducing other nonpoint source loads within its jurisdiction." The document does not differentiate the pollutant loading associated with NPDES outfalls from the loading generated from "LA" sources, and appears to double-count the point sources.

- Assigning reduction goals without recognizing the pollutant sources appears premature.

- Leon County maintains approximately 1 mile of Smith Creek Road in the WBIDs, with minimal roadside ditch flow to the stream at the bridge. Since this outfall is unlikely to influence an upstream sampling point, the NPDES Stormwater WLA appears inappropriate according to Section 6.3.2.

Sincerely,

Theresa B. Heiker

Theresa Heiker, P.E.
Stormwater Management Coordinator

F:\THERESAH\Black Creek Fecal Comments Final.doc

Florida Department of
Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

September 9, 2008

Theresa Heiker
Leon County
Stormwater Management Coordinator
2280 Miccosukee Road
Tallahassee, FL 32308

Dear Ms. Heiker:

Thank you for your July 21, 2008 letter, providing comments on the draft Total Maximum Daily Load (TMDL) Report, Fecal Coliform TMDL for Black Creek (WBID 1024). In your letter, you identified a number of general issues, which we will address in the order in they were made:

Comment 1: **The Apalachicola National Forest includes 92% of Leon County lands in WBIDs 1024 and 1025 (16.7 square miles in Forest). However, that unique land use is not acknowledged in the TMDL.**

- The Forest could support a greater wildlife population density than found in a "forest" within the urban area.
- Hunting obviously occurs in the Forest, but the use of dogs by some hunters may need consideration. After cleaning their kill, hunters are known to place the waste in streams to keep it away from their dogs.
- County stream sampling identified elevated fecal counts on other Forest streams without associated high nutrient levels.

The department agrees that wildlife could be a high portion of the fecal coliform in the basin. However, we believe that some of the fecal coliform source may be from the other WBID (1025) and more sampling needs to be conducted and this could happen in the BMAP process.

Comment 2: ***Land use coverage is used to calculate the human presence in the WBIDs.***

- The Northwest Florida Water Management District land use data is referenced. Leon County modified that data for the NPDES MS4 Year 3 Pollutant Loading study (2005) to correlate better for stormwater management purposes.
- 2000 census data identifies 20 individuals in the WBID. Appendix B calculation based on the relative percentage of "urban/built up" land overestimates the population to 37.

- **The county-wide percentage of households using septic tanks versus central sewer is applied to the population rather than recognizing central sewer doesn't extend to the specified WBIDs.**

The information regarding central sewer was removed from the document on page 14.

Comment 3: The NPDES MS4 wasteload allocation is described inconsistently in Chapter 6.

- **Section 6.1 (p. 28) states that ". . . the WLA for NPDES stormwater is typically based on the percent reduction needed for nonpoint sources and is also accounted for within the LA . . ." This is contrary to the role of the NPDES MS4 permit described in Section 6.3.2 (p. 29), which states ". . . any MS4 permittee will only be responsible for reducing the loads associated with stormwater outfalls for which it owns or otherwise has responsible control, and is not responsible for reducing other nonpoint source loads within its jurisdiction." The document does not differentiate the pollutant loading associated with NPDES outfalls from the loading generated from "LA" sources, and appears to double-count the point sources.**

- **Assigning reduction goals without recognizing the pollutant sources appears premature.**

- **Leon County maintains approximately 1 mile of Smith Creek Road in the WBIDs, with minimal roadside ditch flow to the stream at the bridge. Since this outfall is unlikely to influence an upstream sampling point, the NPDES Stormwater WLA appears inappropriate according to Section 6.3.2.**

The information on page 23 has been changed to read "the WLA for NPDES stormwater is typically consistent with the percent reduction needed for nonpoint sources and is the same percent reduction requirements under the LA".

Again we appreciate the time you spent reviewing this report and the comments. If you have further questions or need more information please contact Erin Wilcox (850-245-8442 or me at (850) 245-8448.

Sincerely,

Jan Mandrup-Poulsen, Environmental Administrator
Watershed Assessment Section

jmp/wa/ew

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August 29, 2008

Jan Mandrup-Poulsen
Environmental Administrator
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Mr. Mandrup-Poulsen,

The following are my comments on both the TMDL for fecal coliform for Munson Slough Watershed WBID 807D and the TMDL for fecal coliform for Black Creek Watershed WBID 1024. Comments are as follows:

Munson Slough WBID 807D Comments (for the July 31, 2008 release)

General comments

Editing looks hurried, editor neglected to pull out all the load duration curve language (5.1 Determination of Loading Capacity) and there are a couple of other editing errors (New River table is mentioned on page 27). Table 2.2 does not include all the data used for the TMDL (Table 5.2c). A substantial difference between the June 17th version and the July 31st version is the removal of all the Biological Research Associates (BRA) data from Table 2.2. There were some laboratory associated problems concerning those data, so the removal may be justified, but there should be documentation in the TMDL explaining why the data was dropped. However, that data does remain in the Appendix G table.

Old and Qualified Data

There are some concerns about "old" and qualified data (Table 5.2c in the TMDL document).

62-303.400(3). Unless information presented to the Department demonstrates otherwise, data more than 7.5 years old at the time the water is proposed for listing on the verified list are not representative of current conditions and shall not be used except to evaluate historical trends . . . Any determinations by the Department to use data older than 7.5 years shall be documented, and the documentation shall include the basis for the decision.

Data over 7.5 years old are being used (Table 1). Some of it is over 10 years old which gets you into issues with the Planning list 62-303.320(3). We have no documentation about why this data is being used. Furthermore, the "old" data is "M" or "D" qualified. These qualifiers (especially the "D" qualifier) do not seem appropriate for the analysis or the results. Further explanation would be needed to include these data points in the calculation.

Table 1. Modified from Table 5.2c. Bold dates are over ten years old.

Date	Result	Qualifier	State Criterion	% Reduction
11/12/1992	**33750**	**M**	**400**	**98.81**
3/11/1996	**2000**	**M**	**400**	**80.00**
7/15/1996	**1000**	**M**	**400**	**60.00**
8/10/1998	**8800**	**D**	**400**	**95.45**
7/21/2005	548	B	400	27.01
11/21/2005	3900	B	400	89.74
11/21/2005	2800	B	400	85.71
11/21/2005	9700	B	400	95.88
11/21/2005	8800	B	400	95.45
6/13/2006	15800		400	97.47
6/13/2006	4200	B	400	90.48
6/13/2006	16400	B	400	97.56
6/13/2006	26400		400	98.48
11/7/2006	510		400	21.57
11/8/2006	5400		400	92.59
4/17/2007	1600	L	400	75.00
Median	**4800**			**91.53**

B-Results based on colony counts outside the acceptable range
D-Measurement was made in the field
L-Off-scale high. Actual value is known to be greater than value given.
M-When reporting chemical analyses: presence of material is verified but not quantified; the actual value is less than the value given. The reported value shall be the laboratory practical quantitation limit. This code shall be used I the level is too low to permit accurate quantification, but the estimated concentration is greater than the method detection limit.

Pulling the questionable/"old" data gives you this (Table 2). Reduction does not change.

Table 2. Modified from Table 5.2C.

Date	Result	Remark Code	State Criterion	% Reduction
7/21/2005	548	B	400	27.01
11/21/2005	3900	B	400	89.74
11/21/2005	2800	B	400	85.71
11/21/2005	9700	B	400	95.88
11/21/2005	8800	B	400	95.45
6/13/2006	15800		400	97.47
6/13/2006	4200	B	400	90.48
6/13/2006	16400	B	400	97.56

6/13/2006	26400		400	98.48
11/7/2006	510		400	21.57
11/8/2006	5400		400	92.59
4/17/2007	1600	L	400	75.00
Median	**4800**			**91.53**

B-Results based on colony counts outside the acceptable range
L-Off-scale high. Actual value is known to be greater than value given.

Black Creek WBID 1024 Comments (for the July 31, 2008 release)

General comments

Editing looks hurried, editor neglected to pull out all the load duration curve language (5.1 Determination of Loading Capacity) and there are a couple of other editing errors (New River table is mentioned on page 21). Table 2.2 does not include all the data used for the TMDL (Table 5.2). Appendix G (page 48) contains all data; therefore, the following comments and tables are based on the information provided in Appendix G.

Old Data

There are some concerns about "old" data.

62-303.400(3). Unless information presented to the Department demonstrates otherwise, data more than 7.5 years old at the time the water is proposed for listing on the verified list are not representative of current conditions and shall not be used except to evaluate historical trends . . . Any determinations by the Department to use data older than 7.5 years shall be documented, and the documentation shall include the basis for the decision.

Data over 7.5 years old are being used (Table 1). Some of it is over 10 years old which gets you into issues with the Planning list 62-303.320(3). We have no documentation about why this data is being used.

Table 1. Modified from Appendix G. Italicized dates are over ten years old. Bold numbers in the % Reduction column are used in the TMDL calculation.

Date	Result	Qualifier	State criterion	%Reduction
11/12/1992	1100	Q	400	**63.64**
2/10/1993	190		400	-110.53
5/13/1993	1100	Q	400	**63.64**
7/13/1993	450	A	400	**11.11**
2/15/1995	20		400	-1900.00
6/21/2000	200	Q	400	-100.00
9/11/2000	40	Q	400	-900.00
2/22/2006	28	B	400	-1328.57
2/28/2006	76		400	-426.32
5/16/2006	28	B	400	-1328.57
8/1/2006	40		400	-900.00

8/8/2006	220		400	-81.82	
10/17/2006	1600		400	**75.00**	
10/25/2006	30	B	400	-1233.33	
1/22/2007	540		400	**25.93**	
4/26/2007	410		400	**2.44**	
4/26/2007	636	B	400	**37.11**	
5/1/2007	690	B	400	**42.03**	
5/1/2007	920		400	**56.52**	
5/1/2007	560		400	**28.57**	
6/4/2007	66	Q	400	-506.06	
6/4/2007	68	Q	400	-488.24	
6/12/2007	220		400	-81.82	
6/12/2007	250		400	-60.00	
6/21/2007	54		400	-640.74	
Median				**39.57**	**(Current TMDL number)**

A-arithmetic mean (average) of two or more determinations
B-Results based on colony counts outside the acceptable range
Q-Sample held beyond the accepted holding time

Pulling data over ten years old out of the TMDL calculation gives you this (Table 2). The reduction changes to 37.11%.

Table 2. Modified from Appendix G with "old" data removed. Bold numbers in the % Reduction column are used in the TMDL calculation.

Date	Result	Qualifier	State criterion	%Reduction
6/21/2000	200	Q	400	-100.00
9/11/2000	40	Q	400	-900.00
2/22/2006	28	B	400	-1328.57
2/28/2006	76		400	-426.32
5/16/2006	28	B	400	-1328.57
8/1/2006	40		400	-900.00
8/8/2006	220		400	-81.82
10/17/2006	1600		400	**75.00**
10/25/2006	30	B	400	-1233.33
1/22/2007	540		400	**25.93**
4/26/2007	410		400	**2.44**
4/26/2007	636	B	400	**37.11**
5/1/2007	690	B	400	**42.03**
5/1/2007	920		400	**56.52**
5/1/2007	560		400	**28.57**
6/4/2007	66	Q	400	-506.06
6/4/2007	68	Q	400	-488.24
6/12/2007	220		400	-81.82
6/12/2007	250		400	-60.00
6/21/2007	54		400	-640.74

Median	**37.11**

A-arithmetic mean (average) of two or more determinations
B-Results based on colony counts outside the acceptable range
Q-Sample held beyond the accepted holding time

Insufficient Sample Size and Qualified Data

There are some concerns with sample size and qualified data.

62-303.420(2). If the water was listed on the planning list and there were insufficient data from the last five years preceding the planning list assessment to meet the data distribution requirements of section 303.320(4), F.A.C., and to meet a minimum sample size for verification of 20 samples, additional data will be collected as needed to provide a minimum sample size of twenty.

If "Q" data is dropped (and it should be dropped or why bother with holding times) that leaves only 19 samples. After dropping the "Q" data, the insufficient sample size does not meet the criteria for being on the verified list unless FDEP uses 62-303.420(7)(a) which states:

(7) . . . . water segments shall also be included on the verified list if, based on representative data collected and analyzed . . .

(a) There are less than 20 samples, but there are five are more samples that do not meet an applicable water quality criterion based on data from at least five temporally independent sampling events . . . .

When "Q" data are not included in the TMDL calculation, the % reduction changes to 32.84 (Table 3).

Table 3. Modified from Appendix G ("Q" data removed). Bold numbers in the % Reduction column are used in the TMDL calculation.

Date	Result	Qualifier	State criterion	%Reduction
2/10/1993	190		400	-110.53
7/13/1993	450	A	400	**11.11**
2/15/1995	20		400	-1900.00
2/22/2006	28	B	400	-1328.57
2/28/2006	76		400	-426.32
5/16/2006	28	B	400	-1328.57
8/1/2006	40		400	-900.00
8/8/2006	220		400	-81.82
10/17/2006	1600		400	**75.00**
10/25/2006	30	B	400	-1233.33
1/22/2007	540		400	**25.93**
4/26/2007	410		400	**2.44**
4/26/2007	636	B	400	**37.11**
5/1/2007	690	B	400	**42.03**

5/1/2007	920	400	**56.52**
5/1/2007	560	400	**28.57**
6/12/2007	220	400	-81.82
6/12/2007	250	400	-60.00
6/21/2007	54	400	-640.74
Median			**32.84**

A-arithmetic mean (average) of two or more determinations
B-Results based on colony counts outside the acceptable range

The sample size is further reduced when both "old" data and "Q" data are removed from the data set, which leaves 16 data points and a 37.11 % reduction (Table 4).

Table 4. Modified from Appendix G (old data and "Q" data removed). Bold numbers in the % Reduction column are used in the TMDL calculation.

Date	Result	Qualifier	State criterion	%Reduction
2/22/2006	28	B	400	-1328.57
2/28/2006	76		400	-426.32
5/16/2006	28	B	400	-1328.57
8/1/2006	40		400	-900.00
8/8/2006	220		400	-81.82
10/17/2006	1600		400	**75.00**
10/25/2006	30	B	400	-1233.33
1/22/2007	540		400	**25.93**
4/26/2007	410		400	**2.44**
4/26/2007	636	B	400	**37.11**
5/1/2007	690	B	400	**42.03**
5/1/2007	920		400	**56.52**
5/1/2007	560		400	**28.57**
6/12/2007	220		400	-81.82
6/12/2007	250		400	-60.00
6/21/2007	54		400	-640.74
Median				**37.11**

B-Results based on colony counts outside the acceptable range

Miscellaneous

62-303.320(4) To place a water segment on the planning list using Table 1, a water segment shall have a minimum of ten samples for the ten-year period, with at least five temporally independent samples. To be treated as a temporally independent sample, samples shall be at least one week apart, regardless whether the samples are collected at different locations within the segment.

62-303.320(4)(a). Samples collected at the same location less than four days apart shall be considered as one sample, with the median value used to represent the sampling period.

62-303.320(4)(b) Samples collected within 200 meters of each other will be considered the same station or location, unless there is a tributary, an outfall, or significant change in the hydrography of the water.

Developing the verified list requires that the planning list requirements (62-303.320) be met. The current data set utilizes two samples collected on the same day at stations within two hundred meters of each other (5/1/07 samples reading 690 and 920). These samples should be represented as one sampling period, which would reduce the sample size to 15 data points and a 32.84 % reduction (Table 5).

Table 5. Modified from Appendix G (old data and "Q" data removed). Bold numbers in the % Reduction column are used in the TMDL calculation. Italicized number (805 result) is the median of 690 and 920.

Date	Result	Qualifier	State criterion	%Reduction
2/22/2006	28	B	400	-1328.57
2/28/2006	76		400	-426.32
5/16/2006	28	B	400	-1328.57
8/1/2006	40		400	-900.00
8/8/2006	220		400	-81.82
10/17/2006	1600		400	**75.00**
10/25/2006	30	B	400	-1233.33
1/22/2007	540		400	**25.93**
4/26/2007	410		400	**2.44**
4/26/2007	636	B	400	**37.11**
5/1/2007	*805*	*B*	*400*	***50.31***
5/1/2007	560		400	**28.57**
6/12/2007	220		400	-81.82
6/12/2007	250		400	-60.00
6/21/2007	54		400	-640.74
Median				**32.84**

B-Results based on colony counts outside the acceptable range

Conclusions

Taking everything that has been stated into account, Table 6 is what the TMDL reduction for Black Creek should be, utilizing my interpretation of the IWR. This table would take the place of table 5.2 (page 22) in the Black Creek TMDL document.

Table 6. Calculation of Reductions for the Fecal Coliform TMDL for Black Creek.

WBID	Station Number	Date	Time	Result	Remark Code	%Reduction
1024	21FLLEONLCOC3032584638	10/17/2006	1359	1600		75.000
1024	21FLLEONLCOC3032584638	1/22/2007	1154	540		25.926
1024	21FLPNS301932708441365	4/26/2007	1215	410		2.439
1024	21FLPNS301932208441442	4/26/2007	1255	636	B	37.107

1024	21FLPNS301932708441365 and 21FLLEONLCOC3032584638 (median)	5/1/2007	1205 & 850	805	B	50.311
1024	21FLPNS301932208441442	5/1/2007	1240	560		28.571
	Median			**598**		**32.839**

Additionally, both documents should include the justification for using out-dated and/or qualified data.

Sincerely,

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Lt. Governor

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Secretary

September 9, 2008

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Dear Mr. Richardson:

Thank you for your August 29, 2008 letter, providing comments on the draft Total Maximum Daily Load (TMDL) Report, Fecal Coliform TMDL for Black Creek (WBID 1024).

To address your suggestions, the Department has made several revisions to the TMDL report, as appropriate. Table 2.2 contains only the information from the verified period and the table in Appendix G contains the entire record of data. In regards to the issue of older data we rely on the language in 403.067(3)(b), Florida Statutes, which requires the Department to use all objective and credible data, while applying quality assurance and quality control protocols. The Florida Administrative Code states that "Water segments shall be placed on the planning list if, using objective and credible data," when taken together with the language in 62-303.400(1), FAC, we believe the data used in the listing process and for the subsequent TMDL reports meet these requirements. With regard to your inquiry on those data having lab remarks codes, in consultation with the DEP's Biology section (the group responsible for process the fecal coliform samples sent to DEP), it was their opinion that the "B" coded data should be retained and used for TMDL Program purposes. The "B" code indicates the results were outside the acceptable range, but that the values reported would be conservative numbers, i.e., the true value (counts) would be higher than the value being reported. Based on preliminary studies done by the DEP's Biology Section, we further believe that, in general, the "Q" qualified data that were processed within 24-hours of sample collection would also provide a conservative estimate, but the holding time information for all the available data was not readily available, so these data were dropped from the Black Creek TMDL for fecal coliforms.

We greatly appreciate the time you spent to review this report and prepare comments. A revised version of the TMDL that reflects changes made based on all comments received will be posted on the TMDL web page shortly.

Sincerely,

Jan Mandrup-Poulsen, Environmental Administrator
Watershed Assessment Section

"More Protection, Less Process"
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