

**FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION**

Division of Water Resource Management, Bureau of Watershed Management

NORTHWEST DISTRICT • OCHLOCKONEE–ST. MARKS BASIN

**TMDL Report**

**Fecal Coliforms TMDL for Munson  
Slough Watershed, WBID 807D**

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# Acknowledgments

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## **Websites**

### ***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](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/tmdl/stat\\_rep.htm](http://www.dep.state.fl.us/water/tmdl/stat_rep.htm)

**Water Quality Assessment Report**

[http://www.dep.state.fl.us/water/tmdl/stat\\_rep.htm](http://www.dep.state.fl.us/water/tmdl/stat_rep.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

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## 1.1 Purpose of Report

This report presents the Total Maximum Daily Load (TMDL) for fecal Coliforms for Munson Slough in the Ochlockonee–St. Marks Basin. Munson Slough was verified as impaired for fecal Coliforms, 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 Munson Slough that would restore the waterbody so that it meets its applicable water quality criterion for fecal Coliforms.

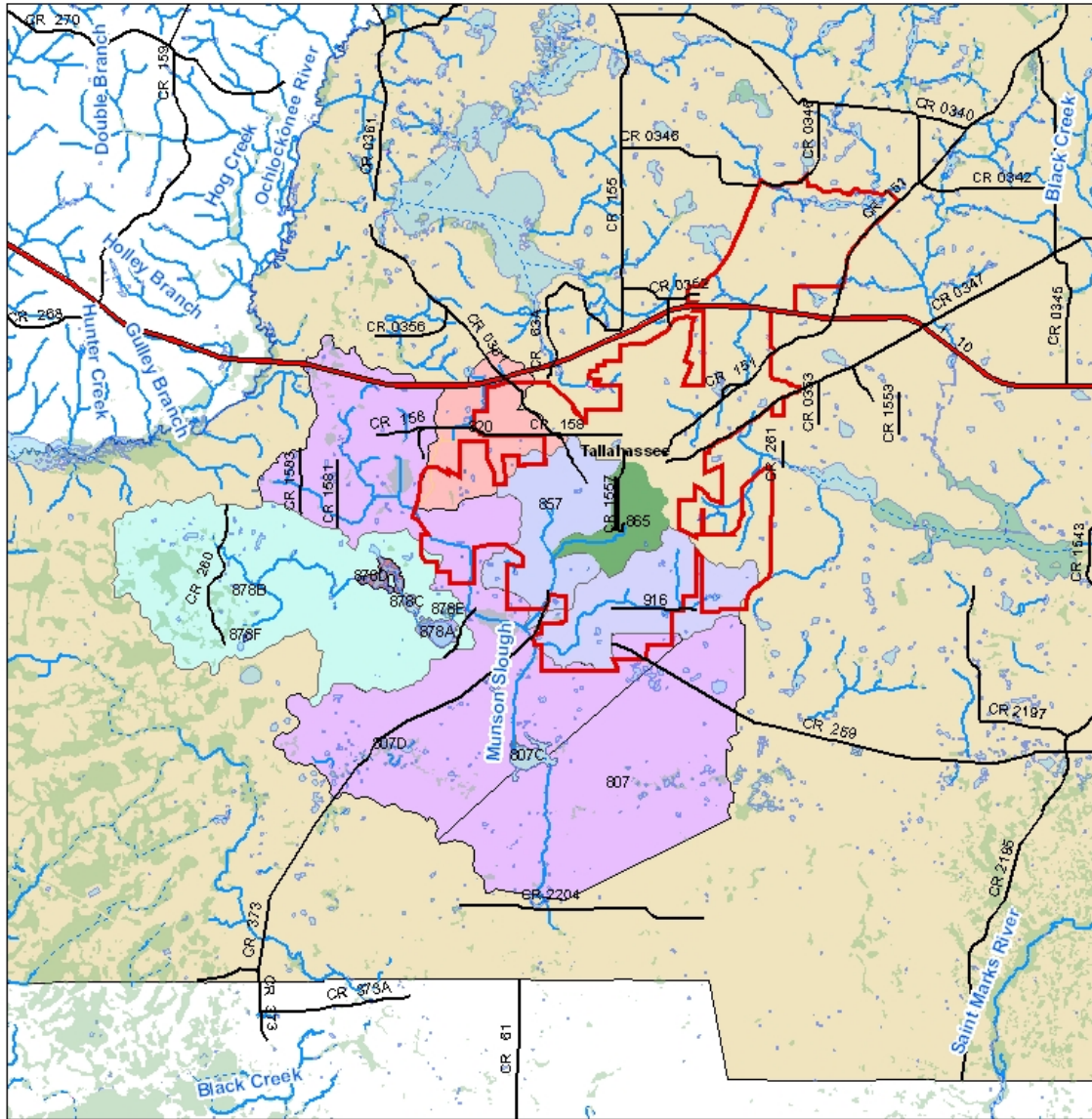
## 1.2 Identification of Waterbody

For assessment purposes, the Department has divided the Ochlockonee–St. Marks Basin into water assessment polygons with a unique **waterbody identification** (WBID) number for each watershed or stream reach. The Munson Slough watershed is divided into 11 segments, as shown in **Figure 1.1**, and this TMDL addresses potential sources of bacteria that impact Munson Slough, WBID 807D.

The Munson Slough Watershed is located in the southern end of Leon County, Florida, with a 53.32-square-mile (mi<sup>2</sup>) drainage area upstream of Eight Mile Pond (**Figure 1.1**). The watershed contains West Drainage Ditch/Munson Slough above Lake Munson (WBID 807D), which discharges directly to Lake Munson (WBID 807C). Lake Munson discharges directly to Munson Slough below Lake Munson (WBID 807). Munson Slough below Lake Munson discharges directly to Ames Sink. The Munson Slough Watershed (Bradford Brook) contains Lake Cascade (WBID 878D), which discharges directly to Lake Hiawatha (WBID 878C). Lake Hiawatha discharges directly to Lake Bradford (WBID 878A) which discharges directly to Grassy Lake (WBID 878E), which also discharges directly to WDD/Munson Slough above Lake Munson. The Watershed also contains Godby Ditch (WBID 820), Central Drainage Ditch (WBID 857), East Drainage Ditch (WBID 916), and Silver Lake Drain (Bradford Brook) (WBID 878B) which also discharges directly to WDD/Munson Slough above Lake Munson (**Figure 1.2**).

Munson Slough is 42,000 feet long from U.S. Highway 90 to Ames Sink (Federal Emergency Management Agency [FEMA], 2007). The major population center in the watershed is Tallahassee, a city of 159,012 people (U.S. Census Bureau, 2006). Additional information about the watershed's hydrology and geology are available in the Water Quality Assessment Report for the Ochlockonee–St. Marks Basin (Florida Department of Environmental Protection [Department], 2003).

Figure 1.1. Munson Slough Watershed in Florida, and Major Geopolitical Features



**Legend**

- FDOT County Routes
- FDOT Interstates
- ▭ City Limits (poly)
- ▭ 878E
- ▭ 878A
- ▭ 878C
- ▭ 878D
- ▭ 878F
- ▭ 878B
- ▭ 916
- ▭ 865
- ▭ 857
- ▭ 820
- ▭ 807C
- ▭ Munson Slough Sub Watershed (WBID 807 & 807D)
- ▭ Leon County

0 0.5 1 2 3 4 Miles

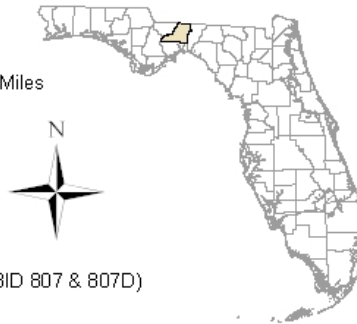
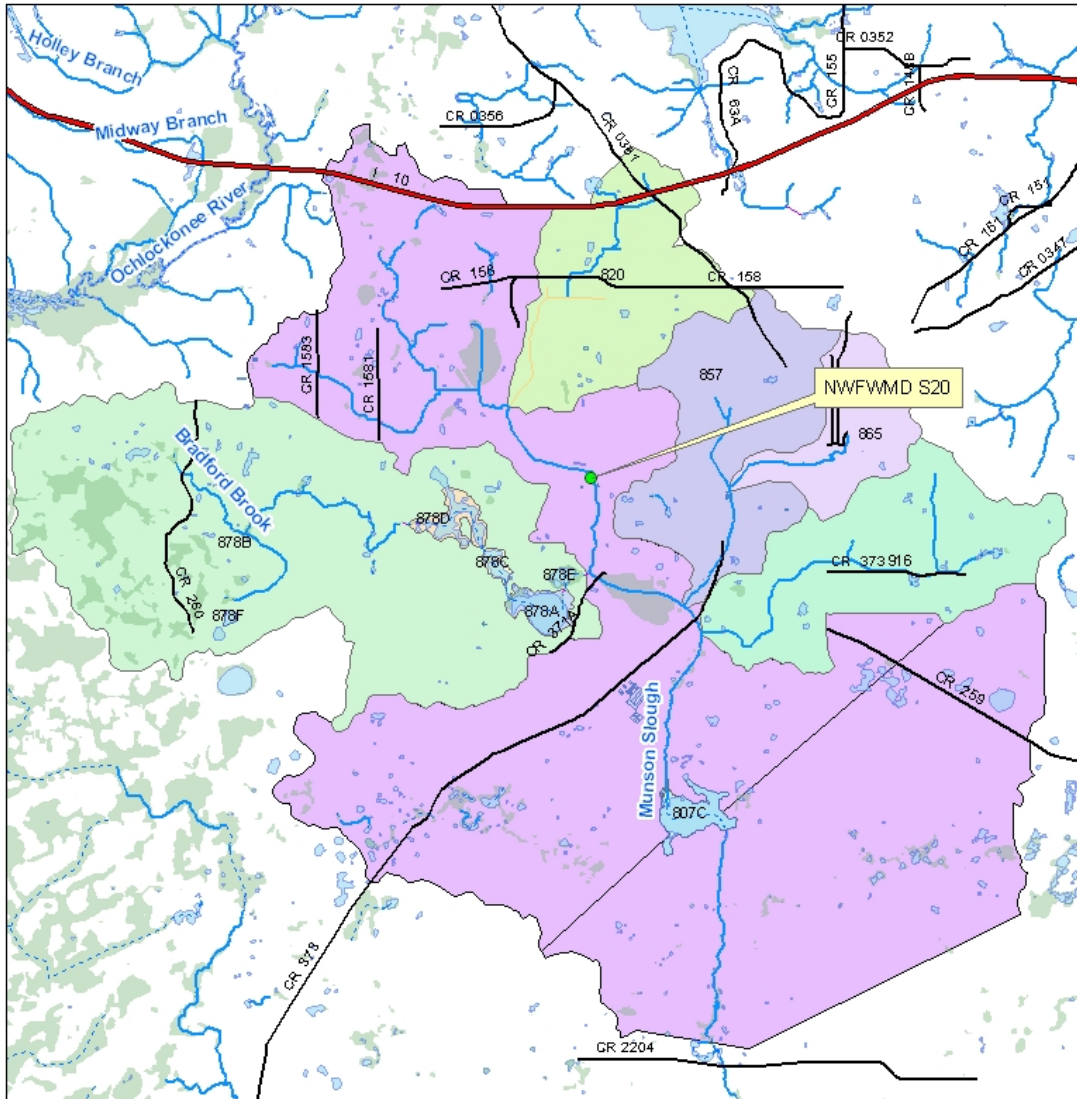




Figure 1.2. WBIDs in the Munson Slough Watershed, Including WBID 807D



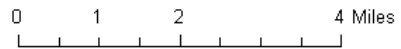
### Munson Slough Watershed



Map Prepared May 6, 2008 by the Bureau of Watershed Management, Division of Water Resource Management.  
 This map is a representation of ground conditions and is not intended for delineations or analysis of the features shown. For more information or copies, contact Erin Wilcox at (850) 245-8442, or erin.wilcox@dep.state.fl.us.

**Legend**

- NWFWM S20
- FDOT Interstates
- FDOT County Routes
- 807C
- 820
- 857
- 865
- 878A
- 878B
- 878C
- 878D
- 878E
- 878F
- 916
- Munson Slough Sub Watershed (WBID 807 & 807D)



### 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 Coliforms that caused the verified impairment of Munson Slough. 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 4 provides information on the U.S. Environmental Protection Agency's (EPA) TMDL in the watershed.

# Chapter 2: DESCRIPTION OF WATER QUALITY PROBLEM

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## 2.1 Statutory Requirements and Rulemaking History

Section 303(d) of the federal Clean Water Act requires states to submit to the 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 Coliforms for each waterbody segment in the Munson Slough Watershed within the verification period, which was January 1, 2000, through June 30, 2007. Four of the 11 waterbody segments in the watershed were verified impaired for fecal Coliforms, as follows: Munson Slough above Lake Munson (WBID 807D), Godby Ditch (WBID 820), Central Drainage Ditch (WBID 857), and East Drainage Ditch (WBID 916). This TMDL addresses the fecal Coliforms impairment within the watershed as a whole.

A total of 120 fecal Coliforms samples was collected within the verified period. The samples used in the TMDL calculation range from 2 counts/100 milliliters (mL) to 39,200 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 Coliforms	Low	2008
563	Unnamed Drain	Fecal Coliforms, Turbidity	Low	2018
582	Lake Jackson Outlet	Unionized Ammonia	Low	2014
628	Black Creek	Fecal Coliforms	Low	2018
647	Alford Arm	DO	Medium	2008
682	Juniper Creek	DO, Fecal Coliforms	Medium	2008
684	Mule Creek	Fecal Coliforms	Low	2018
689	Lake Overstreet Drain	Fecal Coliforms	Low	2018
716	Caney Branch	Fecal Coliforms	Low	2018
756	Lake Lafayette Drain	DO	Medium	2008
757	Bear Creek	Fecal Coliforms	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 Coliforms	Low	2018
820	Godby Ditch	Fecal Coliforms	Low	2018
879	Hammock Creek	DO	Low	2014
896	Polk Creek	Fecal Coliforms	Low	2018
913	Big Creek	Fecal Coliforms	Low	2018
919	Unnamed Slough	Fecal Coliforms	Low	2018
921	Harvey Creek	Fecal Coliforms	Low	2018
965	Sweetwater Branch	Fecal Coliforms	Low	2018
971	Chicken Branch	Fecal Coliforms	Low	2018
977	Moore Branch	Fecal Coliforms	Low	2018
1006	Wakulla River	Biology	Medium	2008
1024	Black Creek	Fecal Coliforms	Low	2008
1028	McBride Slough	Fecal Coliforms	Low	2018
1049	Big Branch	Fecal Coliforms	Low	2018
1054	Black Creek	DO	Low	2014
1124	Big Boggy Branch	Fecal Coliforms	Low	2018
1300	Telogia Creek	Fecal Coliforms, Iron	Medium	2008
1303	Quincy Creek	Fecal Coliforms, Iron	Low	2018
8026	Coast apalach Gulf West	Shellfish	Medium	2008
8999	Gulf Coast	Mercury (in Fish Tissue)	Low	2011
1248B	Ochlockonee Bay	Fecal Coliforms	Low	2018
1248C	Ochlockonee Bay	Fecal Coliforms	Low	2018
1297B	Ochlockonee River	Iron	Medium	2013

WBID	Waterbody Segment	Parameters Assessed Using the IWR	Priority for TMDL Development	Projected Year of TMDL Development
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 Coliforms, 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 Coliforms, 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 the bacterial impairment in Munson Slough.

DO – Dissolved oxygen  
 TSI – Trophic State Index

Table 2.2. Summary of Fecal Coliforms Data, 2005–2007

WBID	Station	Date	Time	Result (cfu/100mL)	Result Code
807D	21FLLEONLCLM3037584313	1/31/2005	1445	30	
807D	21FLLEONLCLM3039084312	2/4/2005	1400	112	
807D	21FLLEONLCLM3039584309	2/4/2005	1400	210	
807D	21FLLEONLCLM3040184306	2/4/2005	1400	110	
807D	21FLLEONLCLM3040384307	2/4/2005	1400	320	
807D	21FLLEONLCLM3037584313	4/20/2005	1012	8	
807D	21FLLEONLCLM3044584353	5/4/2005	858	66	
807D	21FLLEONLCLM3039084312	6/21/2005	1024	16	
807D	21FLLEONLCLM3039584309	6/21/2005	1014	14	
807D	21FLLEONLCLM3040184306	6/21/2005	958	210	
807D	21FLLEONLCLM3040384307	6/21/2005	942	32	
807D	21FLLEONLCLM3044584353	7/20/2005	1230	80	
807D	21FLLEONLCLM3037584313	7/21/2005	1220	12	
807D	21FLLEONLCLM3039084312	7/21/2005	927	150	B
807D	21FLLEONLCLM3039584309	7/21/2005	904	548	B
807D	21FLLEONLCLM3040184306	7/21/2005	846	128	B
807D	21FLLEONLCLM3040384307	7/21/2005	824	116	
807D	21FLLEONLCLM3044584353	10/13/2005	1113	92	
807D	21FLLEONLCLM3037584313	10/17/2005	1330	6	
807D	21FLLEONLCLM3039084312	11/21/2005	1205	3,900	B
807D	21FLLEONLCLM3039584309	11/21/2005	1105	2,800	B
807D	21FLLEONLCLM3040184306	11/21/2005	505	9,700	B
807D	21FLLEONLCLM3040384307	11/21/2005	445	8,800	B
807D	21FLWQA 302314808418475	2/22/2006	1500	12	B
807D	21FLLEONLCLM3037584313	3/14/2006	1135	16	B
807D	21FLWQA 302446408419479	3/14/2006	1435	7,700	B
807D	21FLWQA 302642308421141	3/14/2006	1510	187	B
807D	21FLWQA 302314808418475	3/15/2006	1240	73	B
807D	21FLWQA 302414708418287	3/15/2006	1248	39,200	B
807D	21FLWQA 302441108419441	3/15/2006	1125	13	B
807D	21FLLEONLCLM3044584353	3/21/2006	1120	40	
807D	21FLLEONLCLM3044784362	3/21/2006	1100	400	
<b>807D</b>	<b>21FLLEONLCLM3047084370</b>	<b>3/21/2006</b>	<b>920</b>	<b>584.5</b>	<b>B</b>
807D	21FLLEONLCLM3037584313	5/24/2006	1140	44	B
807D	21FLLEONLCLM3039084312	6/13/2006	1200	15,800	B
807D	21FLLEONLCLM3039584309	6/13/2006	1145	4,200	
807D	21FLLEONLCLM3040184306	6/13/2006	1100	16,400	B
807D	21FLLEONLCLM3040384307	6/13/2006	1020	26,400	B
807D	21FLLEONLCLM3044584353	6/19/2006	1130	151	B

WBID	Station	Date	Time	Result (cfu/100mL)	Result Code
807D	21FLLEONLCLM3044784362	6/19/2006	1105	54	
807D	21FLLEONLCLM3047084370	6/19/2006	950	190	
<b>807D</b>	<b>21FLLEONLCMU13037584309</b>	<b>6/26/2006</b>	<b>1038</b>	<b>7.8</b>	
807D	21FLLEONLCMU13037584309	7/20/2006	958	11	
807D	21FLLEONLCLM3037584313	8/8/2006	1115	370	
807D	21FLLEONLCMU13037584309	8/23/2006	829	2	U
807D	21FLLEONLCLM3044584353	8/29/2006	1140	260	
807D	21FLLEONLCLM3044784362	8/29/2006	1100	650	B
<b>807D</b>	<b>21FLLEONLCLM3047084370</b>	<b>8/29/2006</b>	<b>940</b>	<b>504</b>	<b>B</b>
807D	21FLLEONLCMU13037584309	9/14/2006	938	46	
807D	21FLLEONLCMU13037584309	10/4/2006	1215	2	
807D	21FLLEONLCLM3037584313	10/31/2006	945	128	B
807D	21FLLEONLCLM3039084312	11/7/2006	1135	20	B
807D	21FLLEONLCLM3039584309	11/7/2006	1115	10	B
807D	21FLLEONLCLM3040184306	11/7/2006	1040	510	
807D	21FLLEONLCLM3040384307	11/7/2006	1005	5400	
807D	21FLLEONLCMU13037584309	11/8/2006	1341	79	
807D	21FLLEONLCLM3044584353	11/28/2006	1100	33	B
<b>807D</b>	<b>21FLLEONLCLM3047084370</b>	<b>11/28/2006</b>	<b>930</b>	<b>180</b>	<b>B</b>
807D	21FLLEONLCMU13037584309	12/6/2006	1620	350	
807D	21FLLEONLCMU13037584309	1/4/2007	1407	33	
807D	21FLLEONLCLM3040484308	1/22/2007	1310	350	
807D	21FLLEONLCLM3037584313	1/23/2007	1145	23	
807D	21FLLEONLCMU13037584309	2/2/2007	1355	170	
807D	21FLLEONLCLM3044584353	2/7/2007	1205	49	
807D	21FLLEONLCLM3044784362	2/7/2007	1135	22	
<b>807D</b>	<b>21FLLEONLCLM3047084370</b>	<b>2/7/2007</b>	<b>1000</b>	<b>110</b>	
807D	21FLLEONLCMU13037584309	3/5/2007	1635	79	
807D	21FLLEONLCLM3037584313	4/17/2007	1040	1,600	L
807D	21FLLEONLCMU13037584309	4/17/2007	820	2	U
807D	21FLLEONLCLM3040484308	4/24/2007	1400	350	
807D	21FLLEONLCLM3046284370	5/1/2007	950	2	
807D	21FLLEONLCMU13037584309	5/4/2007	830	4	
807D	21FLLEONLCLM3040484308	5/17/2007	1100	2	
807D	21FLLEONLCMU13037584309	6/11/2007	1355	4.5	

**Notes:**

The table includes an example of data within the verified period for Group 1 (January 1, 2000–June 30, 2007), obtained from the Department's IWR Run 31 and Northwest Florida Watershed Assessment Section (NWFWS) Database. **Appendix G** contains a complete table of all existing data.

Rows with bold type/grey highlighting indicate the presence of more than one sample on that date at that particular location. In these cases, an average of the values was calculated and used as the coliforms concentration for that date.

cfu – Colony-forming units

**Result Code:**

B – Results based on colony counts outside the acceptable range;  
L – Actual value is known to be greater than value given  
U – Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.



# Chapter 3. DESCRIPTION OF APPLICABLE WATER QUALITY STANDARDS AND TARGETS

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## 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:

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

The Munson Slough Watershed consists of 11 Class III fresh waterbodies, WDD/Munson Slough above Lake Munson, Lake Munson, Munson Slough below Lake Munson, Godby Ditch, Central Drainage Ditch, Lake Bradford, Silver Lake Drain (Bradford Brook), Lake Hiawatha, Lake Cascade, Grassy Lake, and East Drainage Ditch. 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 coliforms.

## 3.2 Applicable Water Quality Standards and Numeric Water Quality Target

Numeric criteria for bacterial quality are expressed in terms of fecal coliforms 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 Coliforms Bacteria:***

*The most probable number (MPN) or membrane filter (MF) counts per 100 mL of fecal coliforms 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 waterbody (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 coliforms bacteria. Therefore, the criterion selected for the TMDL was not to exceed 400 in 10 percent of the samples.

## Chapter 4: ASSESSMENT OF SOURCES

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### 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).

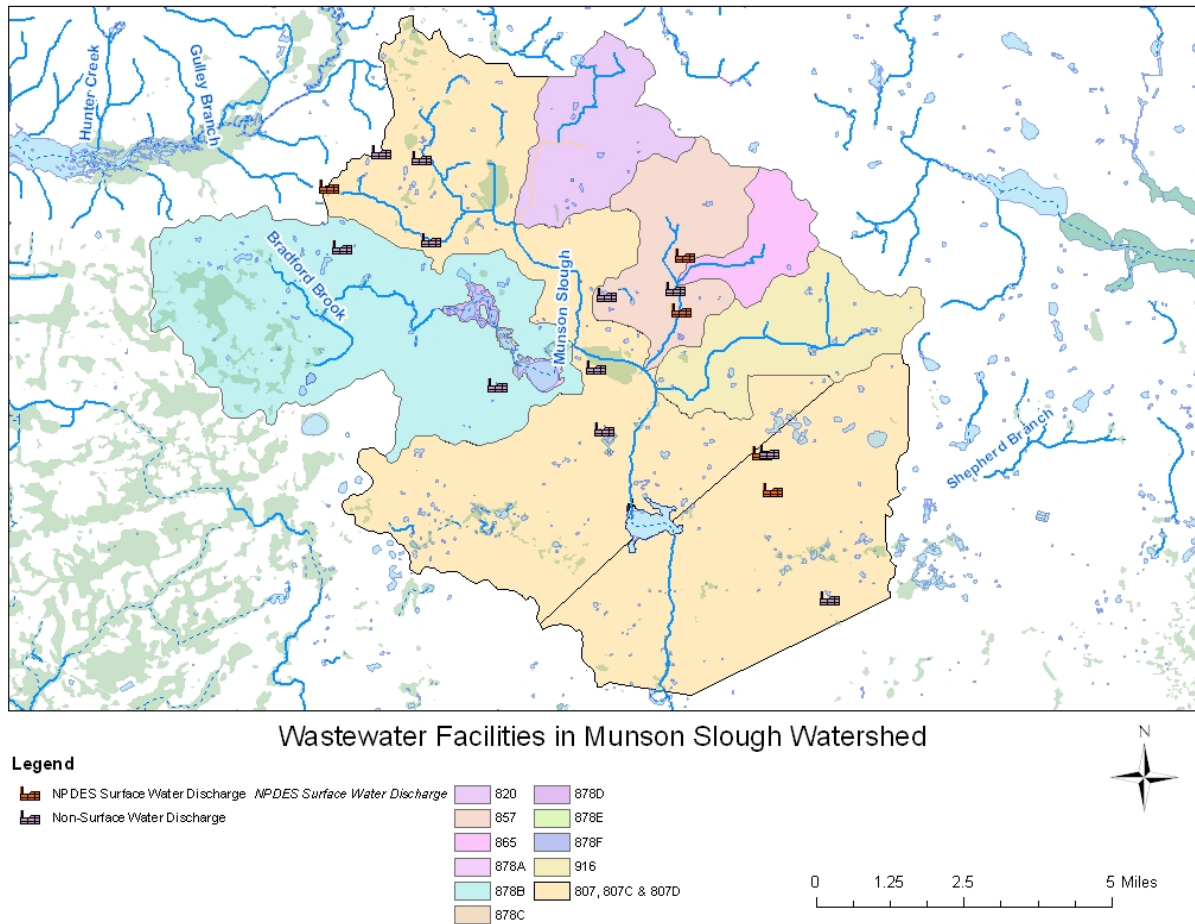
To be consistent with Clean Water Act definitions, the term “point source” will be used to describe traditional point sources (such as domestic and industrial wastewater discharges) **AND** stormwater systems requiring an NPDES stormwater permit when allocating pollutant load reductions required by a 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 Coliforms in the Munson Slough Watershed

#### 4.2.1 Point Sources

In Leon County, there are currently 15 permitted WWTFs located in the Munson Slough Watershed (**Figure 4.1**). Of these, 5 do not have a direct surface discharge and 10 potentially have an indirect surface discharge. These facilities are permitted through the NPDES Program in Florida. During the past decade, several treatment plants have changed their discharge points and/or treatment processes (**Appendix C**).

Figure 4.1. Wastewater Facilities in the Munson Slough Watershed



The following 10 permittees have a potential discharge site in the watershed:

- *Ready Mix USA-Mosely Street Plant (FLG11358),*
- *Florida Rock-Tallahassee (FLG110319),*
- *Trinity Materials Plant 32 (FLG110307),*
- *Lake Bradford Estates Sewage Treatment Plant (STP) (FLA010148),*
- *Sandstone Ranch WWTF (FLA010167),*
- *National High Magnetic Field Laboratory-Florida State University (FSU) (FLA01633),*
- *Southern Bell Trailer Park (FLA010151),*
- *Western Estates Mobile Home Park (MHP) (FLA010152),*

- *Lake Bradford Road WWTP (FLA010140), and*
- *T.P. Smith Water Reclamation Facility (WRF) (FLA010139).*

Ready Mix USA-Mosely Street Plant, Florida Rock-Tallahassee, and Trinity Materials Plant 32 are considered general industrial waste permits and discharge to a Type I pond. No monitoring is required for these ponds, and they only discharge during wet-weather events. Fecal coliforms are probably not a factor. Ready Mix USA-Mosely Street Plant was recently permitted on May 7, 2007, and is not due for permit renewal until May 6, 2012. Florida Rock-Tallahassee, which was originally permitted on February 5, 2001, has a current status of active and is not due for renewal until February 5, 2011. Trinity Materials Plant 32, which was originally permitted on December 28, 1995, has a current status of active and is not due for renewal until January 18, 2012.

The National High Magnetic Field Laboratory-FSU (NHMFL) is located south of Roberts Ave. and east of WDD/Munson Slough. NHMFL develops and operates high-magnetic field facilities that are used for several scientific research projects. NHMFL buildings produce wastewater from air conditioning condensate and cooling tower blowdown water. This wastewater is then land applied by a timed and zone irrigation system to the public area surrounding the NHMFL facilities. The table in **Appendix C** lists permit limits.

The Sandstone Ranch WWTF is located south of Blountstown Highway and north of Bradford Brook. It has a 0.0707 million gallon per day (mgd) annual average daily flow (AADF) WWTF with a rapid infiltration basin system consisting of two percolation ponds. This system currently contains surge tanks, influent screening, aeration, an anoxic zone, a reaeration zone clarification, and disinfection. The facility will be undergoing construction to expand the existing WWTP from 0.070 to 0.25 mgd AADF. The proposed headwork will consist of a mechanical screen unit, two-basin aerobic Sequential Batch Reactor (SBR) system to be operated on a four-cycle-per-day-per-basin schedule, two chlorine contact chambers, two sludge digesters, and two sludge-drying beds. Residuals are aerobically digested on beds and transported to the Lake Jackson WWTP. The table in **Appendix C** lists permit limits.

The Southern Bell Trailer Park is located north of U.S. 90 and west of North Gum Branch Creek. This 0.025 mgd AADF activated sludge WWTF has a slow-rate public access system and surface drip irrigation system, consisting of two half-acre fields. It contains a grease trap, a wet well, a surge tank, an anoxic tank, 5 aeration tanks, 2 clarifiers, 2 pyradeck polishing clarifiers, 2 chlorine contact chamber, 2 digester tanks, a microaeration tank, and a reclaimed water pump tank. Recently Southern Bell Trailer Park has had a number of compliance issues, ranging from a failure to have a certified operator, to not complying with permit monitoring requirements. It recently also had a sewage leak, which is believed to be due to a lack of maintenance. The table in **Appendix C** lists permit limits.

The Lake Bradford Estates MHP is located east of Lake Bradford Road and west of Black Swamp. It is a 0.043 mgd AADF activated sludge WWTF with an absorption field and land application system. The system consists of 3 absorption beds with a capacity of 0.043 mgd. The Lake Bradford Estates MHP process uses equalization, nitrification/denitrification, reaeration, secondary clarification, chlorination, and a digester. Residuals are transported to the T.P. Smith WRF for treatment and disposal. In the past, Lake Bradford Estates has had a

compliance issue with not meeting the permit limits. The table in **Appendix C** lists permits limits.

The Western Estates MHP is located north of Blountstown Highway and south of West Gum Branch Creek. It is a 0.02 mgd AADF activated sludge WWTF. The system contains a Part IV rapid-rate land application system, consisting of 2 dual absorption beds. Western Estates MHP operates in an extended aeration mode. The treatment facility has provisions for nitrification, denitrification, reaeration, secondary clarification, filter, disinfection, dosing tank, and aerobic digestion of residuals. Residuals will be transported to a Class I or II landfill or a residual management facility for further treatment and disposal. In the past, Western Estates MHP has had a number of compliance issues due the lack of maintenance on the system. At one point in time, it was trying to tie into the city of Tallahassee (COT) sewer service. It is currently not known whether this effort was successful. The table in **Appendix C** lists permit limits.

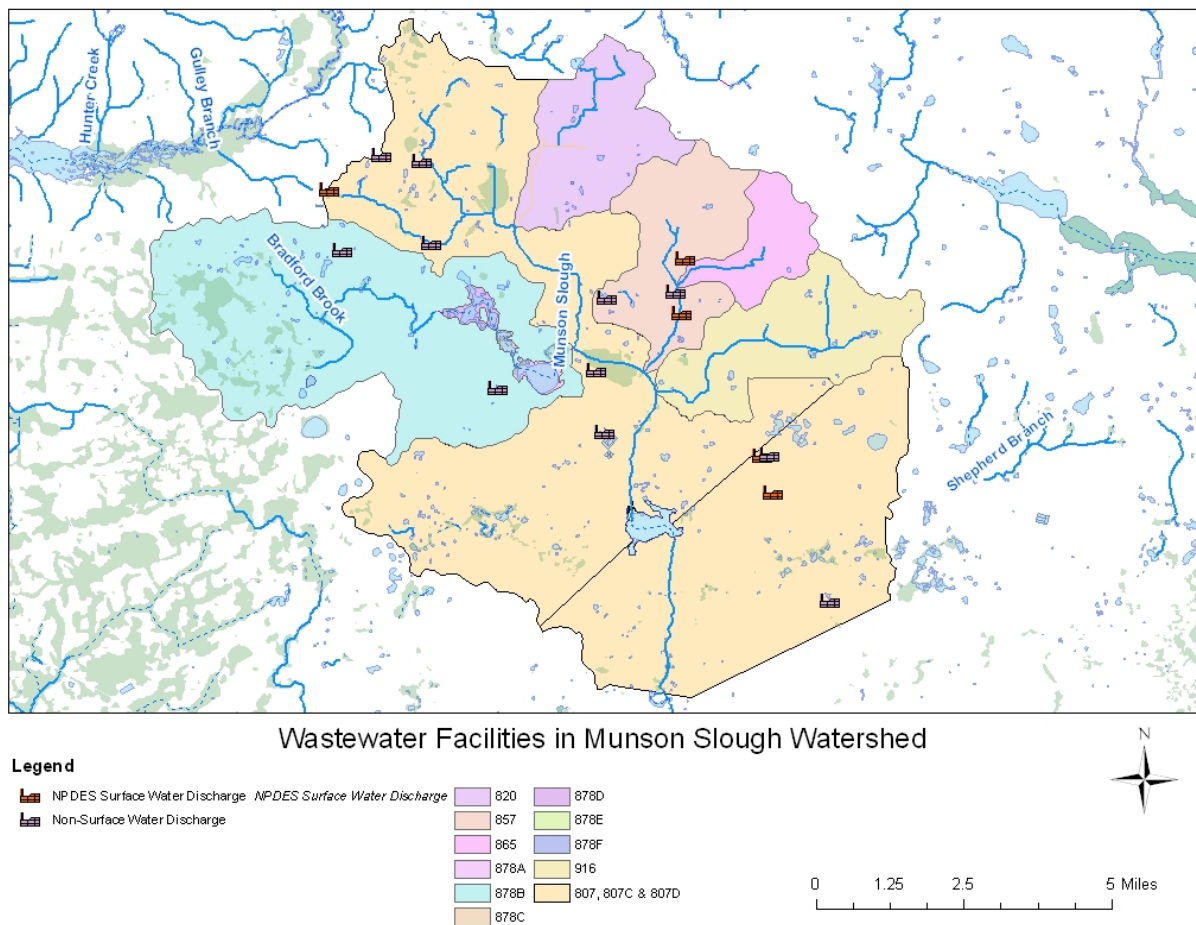
The Lake Bradford Road WWTF is located between Lake Bradford Road and the Central Drainage Ditch. It is a 4.5 mgd AADF but will be modified to a membrane bioreactor process advanced wastewater treatment (AWT) plant producing reclaimed water. The system currently contains reclaimed water that is pumped to an existing slow rate restricted public access facility outside the Munson Slough watershed. The Southeast Farm Spray Field is operated and monitored by the T.P. Smith WRF and is regulated by Permit Number FLA010139. Along with the Southeast Farm Spray Field, a new 4.5 mgd AADF slow-rate public access system will be built. The construction date will be determined after a feasibility study is conducted. The modified treatment process will include coarse screening, grit removal, a flow equalization tank, primary clarification, fine screening, a 4-stage Bardenpho nitrogen removal process, membrane filtration, high-level disinfection using sodium hypochlorite, and a 1.0 mgd reclaimed water storage tank. All or part of the influent flow can be redirected to the T.P. Smith WRF for treatment. Residuals are not treated at this facility; primary sludge from the primary clarifiers and waste activated sludge from the Bardenpho process are transferred via the COT sewage collection system to the T.P. Smith WRF for further treatment. As of February 3, 2008, the Lake Bradford Road WWTF discontinued processing flows because upgrades are being carried out at the plant. It is not likely to be a source of fecal coliforms to the watershed. The table in **Appendix C** lists permit limits.

The T.P. Smith WRF is located at the corner of Capital Circle and Springhill Rd. and west of Munson Slough. It is a modified 26.5 mgd AADF existing treatment system but will be modified to a 4-stage Bardenpho-type activated sludge process, AWT plant producing reclaimed water. The T.P. Smith WRF contains 23.25 mgd AADF and a 7.31 mgd AADF slow-rate restricted public access system, located outside the Munson Slough watershed at the Southeast Farm Spray Field. A 0.8 mgd AADF slow-rate restricted public access system is located inside the Munson Slough watershed at the T.P. Smith WRF. A new 1.2 mgd AADF slow-rate public access system is the planning stages and will consist of reclaimed water. The modified treatment system consists of new headworks and 3 substantially modified treatment trains: Train 2 (6.9 mgd), Train 3 (6.9 mgd), and Train 4 (12.7 mgd). Pretreatment at the new headworks consists of coarse screening, grit removal odor mitigation, and flow equalization. Flow equalization is used if storm flows exceed 53 mgd peak hourly flow; it consists of a diversion structure and a 30 mgd flow equalization basin. The modified treatment process at each of the three trains includes primary clarification, primary effluent pumping, 4-stage Bardenpho nitrogen removal process, secondary clarification, tertiary filtration with deep-bed sand filters, high-level disinfection using chlorine, and 97 mgd of reclaimed water storage in 6 effluent storage ponds at the T.P. Smith WRF. The current permit states that over a 30-day

period, at least 75 percent of the fecal coliforms values shall be below the detection limit. No sample shall exceed 25 cfu/100mL. The table in **Appendix C** lists permit limits. Reported data for R-002 in the Discharge Monitoring Reports database is sparse, but the data that were entered into the database indicate there are no samples above the 400 cfu/100mL surface water criterion.

The table in **Appendix E** summarizes effluent data for each facility. The NFWFMD has also compiled a comprehensive summary of wastewater loading to the Ochlockonee–St. Marks Basin (Chellette, 2002).

Figure 4.1. Wastewater Facilities in the Munson Slough Watershed



### Municipal Separate Storm Sewer System Permittees

Within the Munson Slough Watershed, there are two stormwater collection systems with Phase I NPDES municipal separate storm sewer system (MS4) permits. One is owned and operated by copermittees Leon County and the Florida Department of Transportation (FDOT), and is covered by MS4 Permit FLS000033. The other is owned and operated by COT, and is covered by NPDES MS4 Permit FLS000034. Several other local governments in the watershed are also

approved for coverage under the Phase II NPDES MS4 permit, including Florida State University (FLR04E051) and Florida Agricultural and Mechanical University (FLR04E095).

#### **4.2.2 Land Uses and Nonpoint Sources**

Additional fecal coliforms loadings to the Munson Slough 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**

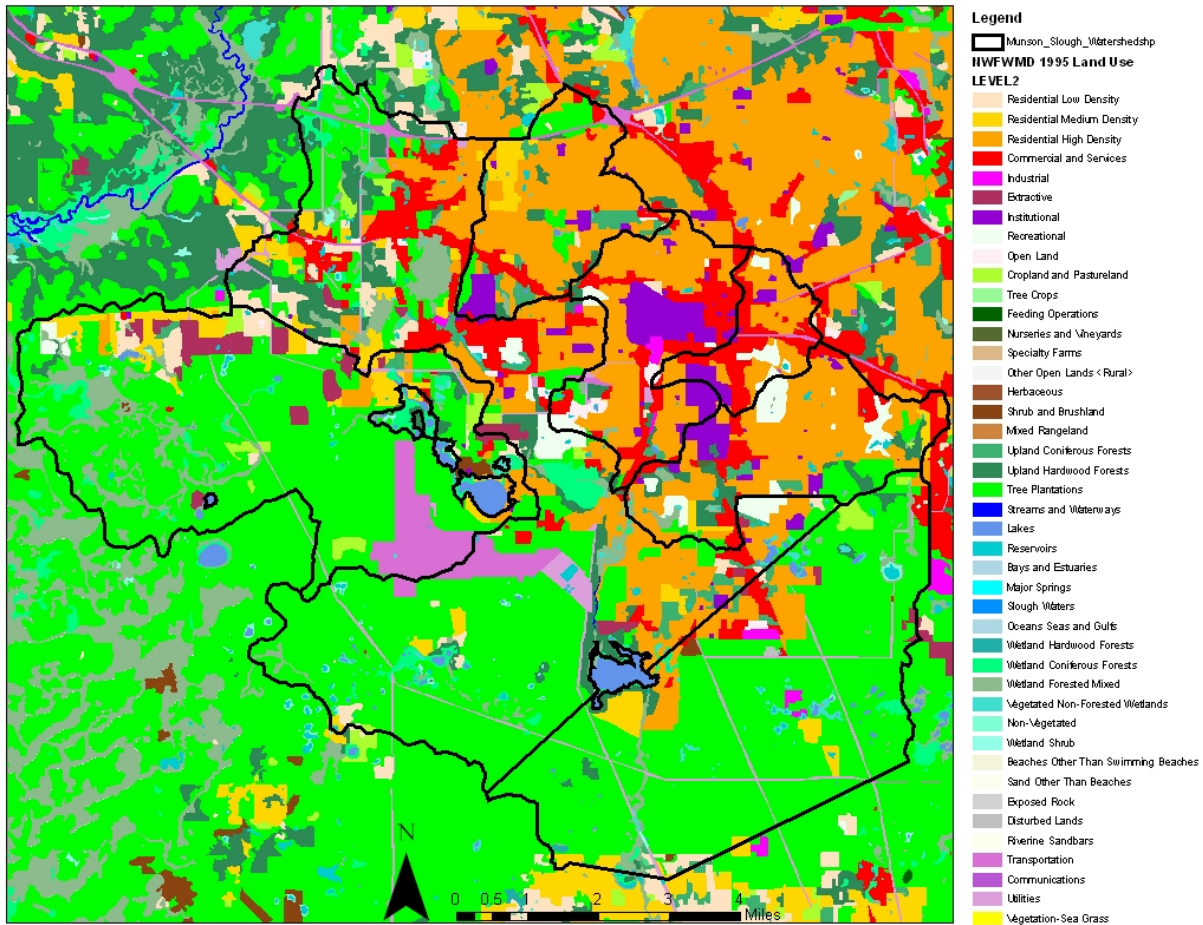
The spatial distribution and acreage of different land use categories were identified using the COT and Leon County land use coverage (COT, 2007; Leon County, 2007). Land use categories in the watershed were aggregated using the simplified Level 1 codes tabulated in **Table 4.1** (totals are to Capital Circle). **Figure 4.2** shows the acreage of the principal land uses in the watershed (Level 2 is used in the figures to show land use in more detail than the Level 1 tables). As shown in **Table 4.1**, land use is heavily dominated by the urban and built-up area, which comprises 44.05 percent of the entire watershed. Other non-natural land uses in the watershed include transportation, communication, and utilities (8.88 percent) and agriculture (0.18 percent).

Table 4.1. Classification of Land Use Categories in the Munson Slough Watershed

Code	Land Use	Acreage	Mi <sup>2</sup>	% of COT
<b>COT</b>				
1000	Urban and Built-up	8,060.45	12.5904	81.1854
2000	Agriculture	0.0000	0.0000	0.0000
3000	Rangeland	0.0000	0.0000	0.0000
4000	Upland Forests	0.0000	0.0000	0.0000
5000	Water	6.5696	0.0103	0.0662
6000	Wetlands	0.0000	0.0000	0.0000
7000	Barren Land	0.0000	0.0000	0.0000
8000	Transportation, Communication, and Utilities	1,861.4210	2.9075	18.7484
<b>Total</b>		<b>9,928.4356</b>	<b>15.5082</b>	<b>100.0000</b>
<b>Leon County</b>				
1000	Urban and Built-up	5,624.10	8.7848	26.6071
2000	Agriculture	56.7000	0.0886	0.2682
3000	Rangeland	5,591.2000	8.7335	26.4514
4000	Upland Forests	6,461.9000	10.0935	30.5706
5000	Water	0.0000	0.0000	0.0000
6000	Wetlands	2,507.1000	3.9161	11.8609
7000	Barren Land	0.0000	0.0000	0.0000
8000	Transportation, Communication, and Utilities	896.6000	1.4005	4.2417
<b>Total</b>		<b>21,137.6000</b>	<b>33.0169</b>	<b>100.0000</b>
<b>Munson Slough Watershed (COT plus Leon County)</b>				
1000	Urban and Built-up	13,684.55	21.38	44.0499
2000	Agriculture	56.70	0.09	0.1825
3000	Rangeland	5,591.20	8.73	17.9978
4000	Upland Forests	6,461.90	10.09	20.8005
5000	Water	6.57	0.01	0.0211
6000	Wetlands	2,507.10	3.92	8.0702
7000	Barren Land	0.00	0.00	0.0000
8000	Transportation, Communication, and Utilities	2,758.02	4.31	8.8779
<b>Total</b>		<b>31,066.0356</b>	<b>48.5251</b>	<b>100.0000</b>



Figure 4.2. Principal Land Uses in the Munson Slough Watershed

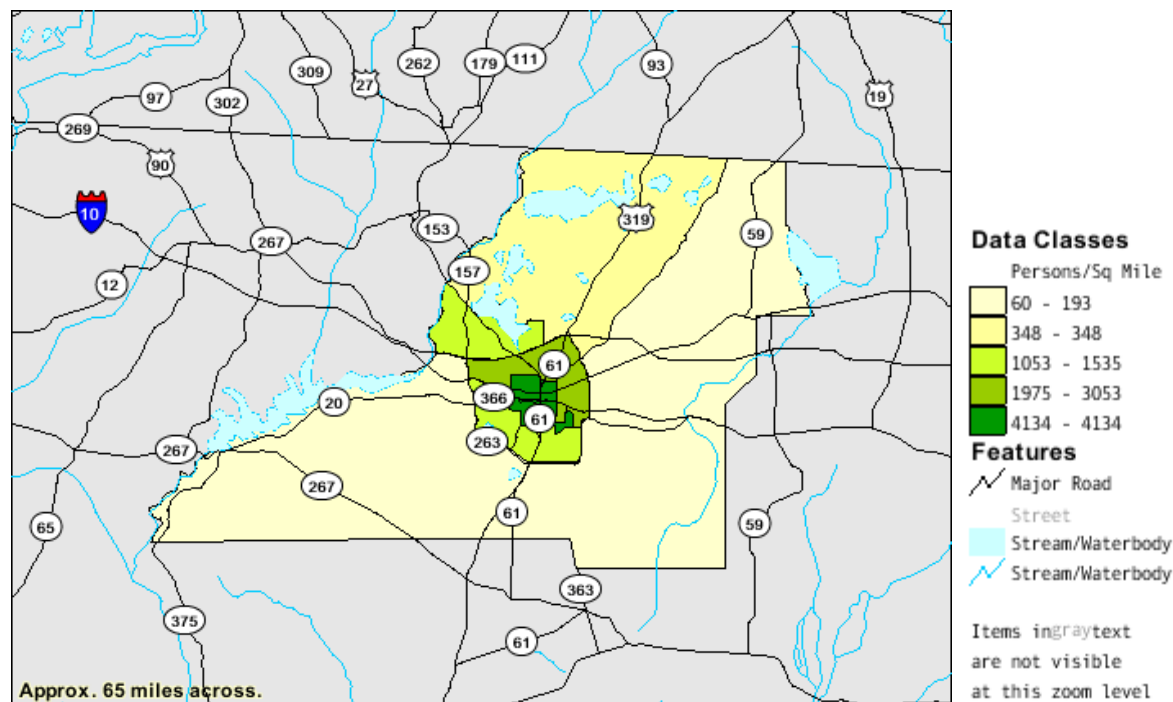


Map was prepared by the Department using the NFWMD 1995 land use coverage.

## 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<sup>2</sup> (10 persons/mi<sup>2</sup> is the minimum used by the Census Bureau) (**Figure 4.3**). The Bureau reports that Leon County (which contains WBIDs 807, 807C, 807D, 820, 857, 878A, 878B, 878C, 878D, 878E, and 916) had a total population for 2000 of 239,452, with 96,521 occupied housing units (households) and 103,974 total housing units. For all of Leon County, the Census Bureau reported a housing density of 155.9 housing units/mi<sup>2</sup>.

Figure 4.3. Population Density in Leon County, Florida



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

## Septic Tanks

On-site 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 2006, 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 60.08 percent of the housing units are connected to a WWTF, with the remaining 39.92 percent (38,530/96,521) using septic tank systems (U.S. Census Bureau, 1990).

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 (%)	1.0441	1.1292	1.1712	1.2643	1.0114	0.7967	1.07
Failure rate (%)*	5.2203	5.6458	5.856	6.3214	5.0572	3.9834	5.35

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

The Munson Slough Watershed comprises 48.52 mi<sup>2</sup>, or approximately 6.91 percent of the land area of Leon County (701.73 mi<sup>2</sup>). 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 (0.1756), the number of septic tanks is estimated to be 6,768. Using these numbers (FDOH Website, 2008) and 70 gallons/day/person (EPA, 2001), a loading of 2.33E+12 colonies/day is derived. The standard loading for 1 septic tank is 6.89E+09 colonies/day. These estimations, as shown in **Table 4.2b**, constitute 11.46 percent of the total load to the Munson Slough Watershed (see **Table 4.4**).

Table 4.2b. Estimation of Coliforms Loading from Failed Septic Tanks in the Munson Slough 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
Munson Slough Watershed	6,768	338	1.00E+06	70	2.6	2.33E+12
Leon County	38,530	1,927	1.00E+06	70	2.6	1.33E+13

### 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 0.18 percent of the Munson Slough Watershed is specifically categorized as Level 1 agricultural land use. **Appendix B** summarizes the loads from all livestock, which are 7.4364E+11 colonies/day, or 1.30 percent of the total loading to the watershed.

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

Livestock	Year 2002	
	Inventory	Sold
Cattle and Calves	2,841	1489
Dairy Cattle	N/A	N/A
Beef Cattle	N/A	N/A

Source: U.S. Department of Agriculture (USDA), 2002.  
N/A – Not Available

Table 4.3b. Summary of Agricultural Animal Populations (Excluding Cattle) in Leon County, 2002

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

**Source:** USDA 2002 Census of Agriculture  
 See **Appendix B** for a summary of land use loads by category.  
 N/A – Not Available

### Pets–Domestic Animals

Pets are another possible source of fecal coliforms bacteria in the Munson Slough Watershed. 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 reaches the waterbody and is viable upon reaching it, the approximate loading to the watershed from dogs is 4.9164E+13 counts per day (see **Appendix B** for details). Similarly, the number of horses and ponies is estimated to contribute a load of 3.5602E+11 colonies/day. The potential total load of fecal coliforms from domestic animals is 4.9520E+13 colonies/day, or 86.50 percent of the total to the watershed.

### Boats

There are no houseboats in the watershed.

### Wildlife

The most recent TMDL work (Benham, 2007) quantifying wildlife contributions to fecal coliforms divides the load among eight wildlife categories: 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 is estimated at various densities (12.8/mi<sup>2</sup>), as shown in

**Appendix B.** Migratory waterfowl and other bird populations are estimated annually from 1998–2006 (Florida Fish and Wildlife Conservation Commission [FFWCC] Website, 2008). The value used (0.44/mi<sup>2</sup>) is a composite of the largest species in size. The total load from wildlife is estimated at 4.2735E+11 colonies/day, or 0.75 percent of the total.

## Spills

The Florida Department of Community Affairs (FDCA) (2007) maintains a Website ([www.eoconline.org](http://www.eoconline.org)) that lists pollutant spills by date, time, county, reported amount, and description. Pollutants may be wastewater, petroleum, or other types of waste. Using the annual estimate of gallons spilled and a fecal concentration corresponding to raw sewage, an estimate of annual loading can be made. However, at this time, basin-specific data are not available to make this calculation.

The most recent spill to occur in Munson Slough (114,000 gallons) took place at the Springhill Rd. location on June 4, 2008, when a 36-inch water main broke, spilling untreated domestic wastewater into Munson Slough. COT water services worked on the cleanup.

## Sewage Line Leaks–Infiltration/Exfiltration

Estimates of chronic sewage line leaks to ground water or nearby streams and lakes are not readily available for most municipalities. A review of engineering texts by Department drinking water staff (Hoofnagle, 2008) suggests that about 15 percent of usage (drinking water line flow) is unaccounted-for water. This includes drinking water line leaks, firefighting, and line flushing. Recent EPA Permitting Policy (Mehan, 2003) estimates that leaking sewer lines contribute about 5 percent of the WWTP design flow before reaching the treatment facility.

## 4.3 Source Summary

### 4.3.1 Summary of Fecal Coliforms Loadings into Munson Slough from Various Sources

**Table 4.4** summarizes the daily average fecal coliforms loadings (roughly corresponding to the period from 1997 through 2006) from livestock, wildlife, domestic animals, and septic tanks in the Munson Slough Watershed. **Table 4.5** summarizes external loads to the watershed.

The EPA has developed fecal coliforms TMDLs for three of the waters located in the watershed: Central Drainage Ditch (WBID 857), St. Augustine Branch (WBID 865), and East Drainage Ditch (WBID 916). When the TMDLs are fully implemented, the Central Drainage Ditch will achieve a 56 percent reduction; St. Augustine Branch, a 75 percent reduction; and the East Drainage Ditch, an 83 percent reduction (EPA, 2005). These upstream improvements will help to reduce fecal coliforms levels in the Munson Slough Watershed.

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

Table 4.4. Average Daily Quantity of Internal Fecal Coliforms Loads to the Munson Slough Watershed

Nonpoint Source Category	Internal Loads to Munson Slough Watershed (cfu/day)	% of Total
Total Livestock (from 2002)	7.4364E+11	1.30
Total Wildlife	4.2735E+11	0.75
Total Domestic Animals (Excluding Cats)	4.9520E+13	86.50
Total Septic (through 2006)	6.5596E+12	11.46
<b>TOTAL</b>	<b>5.7251E+13</b>	<b>100.00</b>

The Total Septic category includes sewer line leaks and failed septic tanks. See **Appendix B** for a summary of land use loads by category.

Table 4.5. Summary of External Fecal Coliforms Loads to the Munson Slough Watershed

WBID	Name	Average Fecal Coliforms Load (cfu/100mL)	Average Flow (cfs)	Load (cfu/day)
820	Godby Ditch	3.2645E+03	2.7436E+00	2.1915E+11
857	Central Drainage Ditch	1.6041E+04	2.6047E+01	1.0223E+13
865	St. Augustine Branch	7.4950E+03	3.7297E+00	6.8400E+11
916	East Drainage Ditch	8.7676E+02	2.4447E+00	5.2447E+10

See **Appendix D** for a summary of measured external loads.

# Chapter 5: DETERMINATION OF ASSIMILATIVE CAPACITY

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## 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 coliforms TMDLs, but this method could not be used because there are stream gauging stations on Munson Slough has not been up to date. 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

For this TMDL analysis, the Department evaluated data from three different locations in the watershed to anticipate different loadings coming into Munson Slough from its tributaries. The first location is WDD/Munson Slough at Roberts Ave. (WBID 807D), with a 15.84 mi<sup>2</sup> drainage area. The second location is Munson Slough at Springhill Rd. (WBID 807D), with a 41.59 mi<sup>2</sup> drainage area. The third location is Munson Slough at Capital Circle (WBID 807D), with a 48.55 mi<sup>2</sup> drainage area. The three locations are listed from upstream to downstream and the drainage areas are cumulative.

Eleven sampling stations at the Roberts Ave. location have coliforms observations (**Figure 5.1a**). The primary collector of data is Leon County (STORET IDs: 21FLLEONLCCM3044584353, 21FLLEONLCCM3044784362, 21FLLEONLCCM3046284370, and 21FLLEONLCCM3047084370). Additional sampling was conducted by the Department’s Watershed Assessment Section and the NFWFMD. **Figure 5.1a** shows the locations of these sites, while **Table 5.1a** provides a brief statistical overview of the observed data at these sites. **Figure 5.2a** is a chart showing the observed data over time, and **Appendix G** contains the observations from these sites.

Six sampling stations at the Springhill Rd. location have coliforms observations (**Figure 5.1b**). The primary collector of data is the Department’s Watershed Assessment Section (STORET IDs: 21FLDEP 30241470841827, 21FLWQA 302414708418287, 21FLWQA 302441108419441, 21FLWQA 302446408419479, and 949). Leon County conducted additional sampling. **Figure 5.1b** shows the locations of these sites, while **Table 5.1b** provides a brief statistical overview of the observed data at these sites. **Figure 5.2b** is a chart showing the observed data over time, and **Appendix G** contains the observations from these sites.

Ten sampling stations at the Capital Circle location have coliforms observations (**Figure 5.1c**). The primary collector of data is Leon County (STORET IDs: 21FLLEONLCCM3037584313, 21FLLEONLCCM3039084312, 21FLLEONLCCM3039584309, 21FLLEONLCCM3040184306, 21FLLEONLCCM3040384307, and 21FLLEONLCMU13037584309). Additional sampling was conducted by the Department’s Watershed Assessment Section and the NFWFMD. **Figure 5.1c** shows the locations of these sites, while **Table 5.1c** provides a brief statistical overview of



the observed data at these sites. **Figure 5.2c** is a chart showing the observed data over time, and **Appendix G** contains the observations from these sites.

Flow measurements for this analysis were obtained from a NFWWMD gaging station (S20) located on WDD/Munson Slough (NFWWMD S20, WDD/Munson Slough at Roberts Ave., Latitude: 30°25'46", Longitude: 84°19'46", **Figure 5.1a**).

Figure 5.1a. Monitoring Sites for WDD/Munson Slough at Roberts Ave. (WBID 807D)

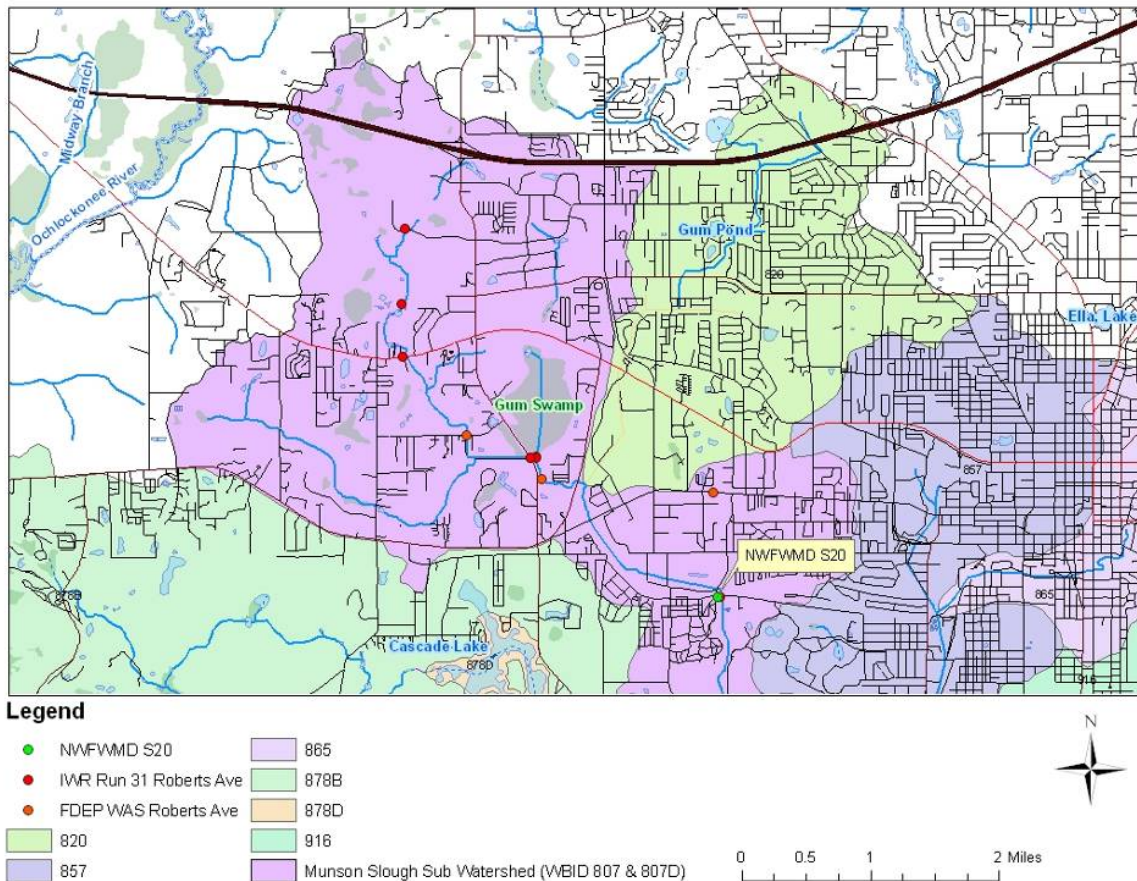


Figure 5.1b. Monitoring Sites for Munson Slough at Springhill Rd. (WBID 807D)

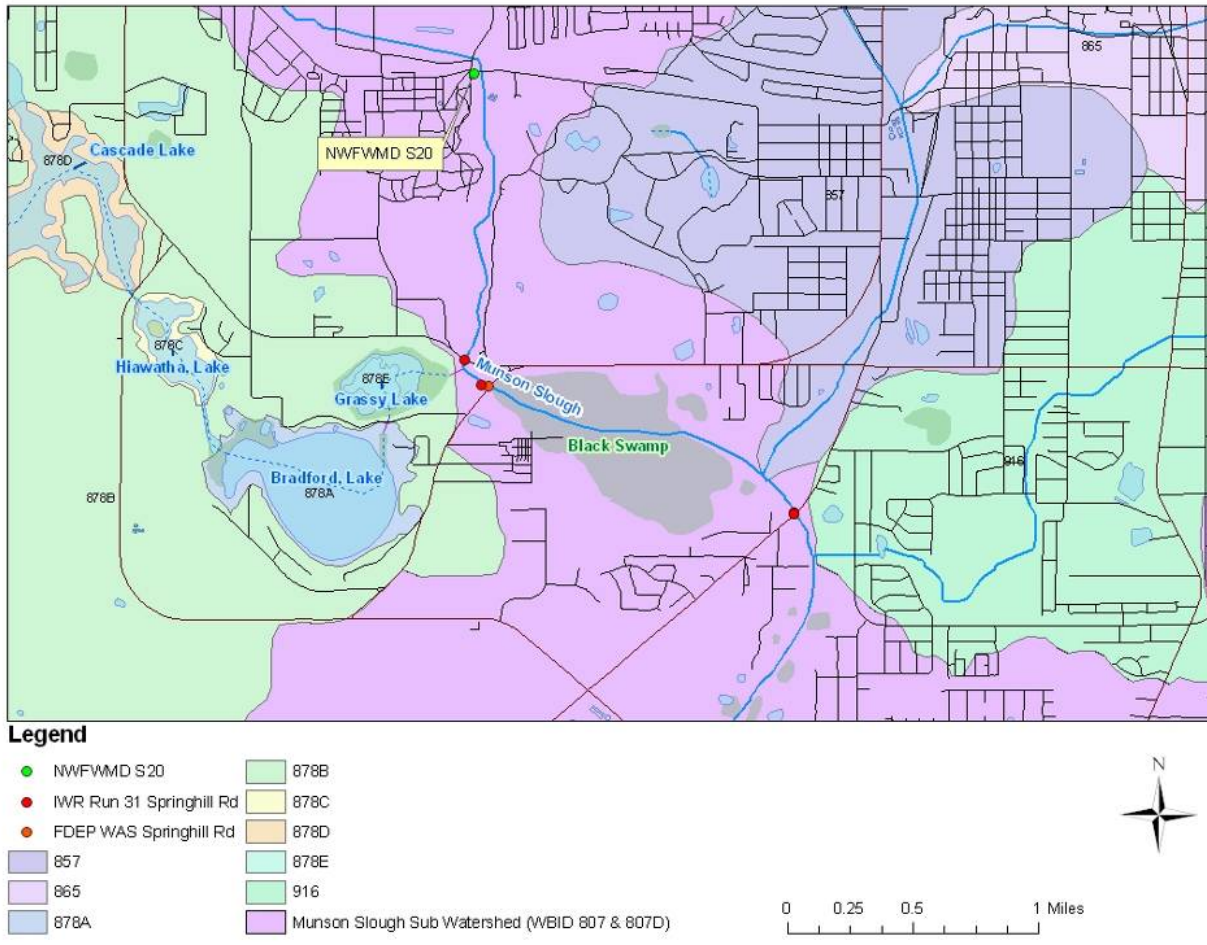


Figure 5.1c. Monitoring Sites for Munson Slough at Capital Circle (WBID 807D)

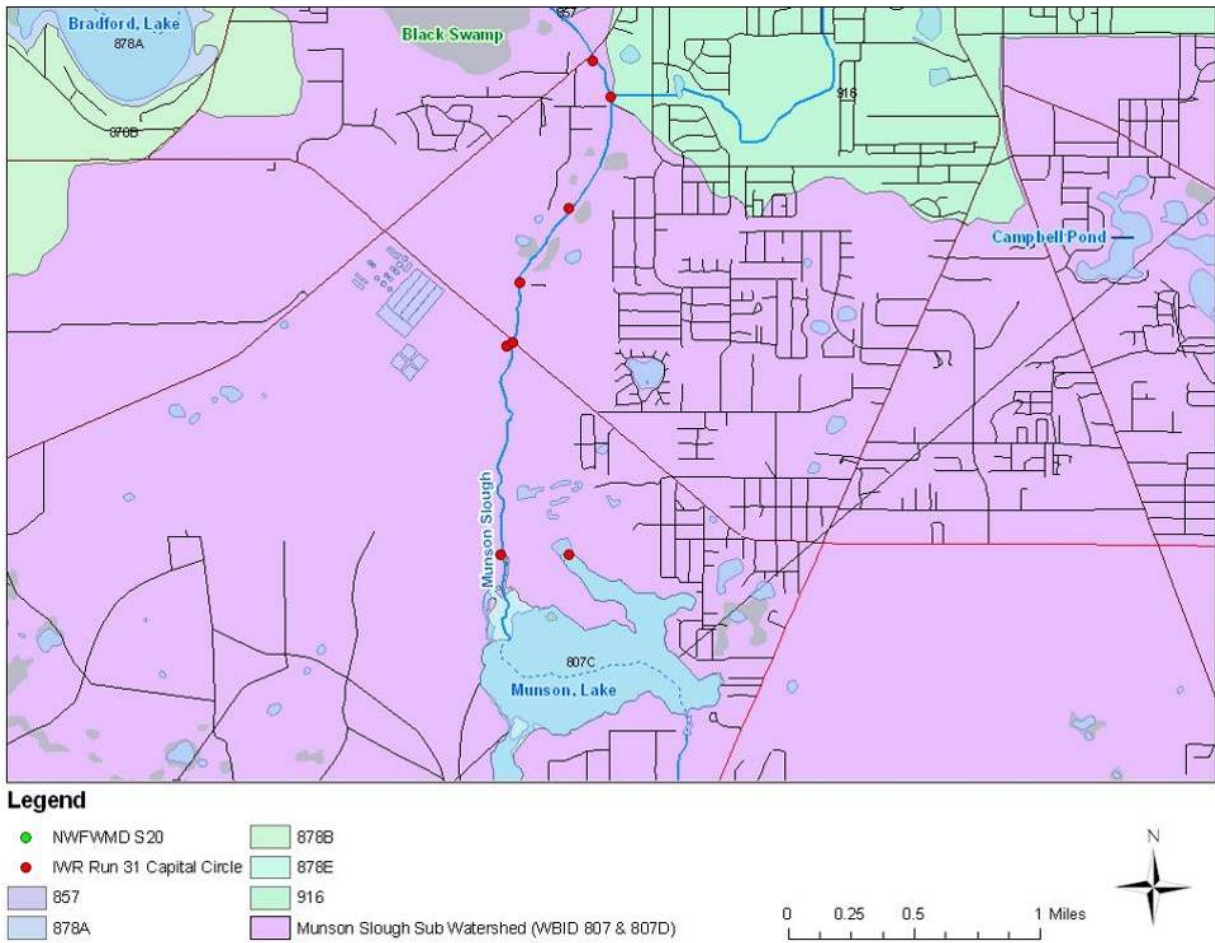


Table 5.1a. Statistical Table of Observed Data for WDD/Munson Slough at Roberts Ave. (WBID 807D)

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)
Munson Slough @ Roberts Ave. (WBID 807C)	Fecal Coliforms	20	104.74	3	2	650

Table 5.1b. Statistical Table of Observed Data for Munson Slough at Springhill Rd. (WBID 807D)

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)
Munson Slough @ Springhill Rd (WBID 807C)	Fecal Coliforms	6	314.16	2	2	39,200

Table 5.1c. Statistical Table of Observed Data for Munson Slough at Capital Circle (WBID 807D)

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)
Munson Slough @ Capital Circle (WBID 807C)	Fecal Coliforms	67	134.20	16	2	33,750

Figure 5.2a. Chart of Observations of Fecal Coliforms for WDD/Munson Slough at Roberts Ave. (WBID 807D)

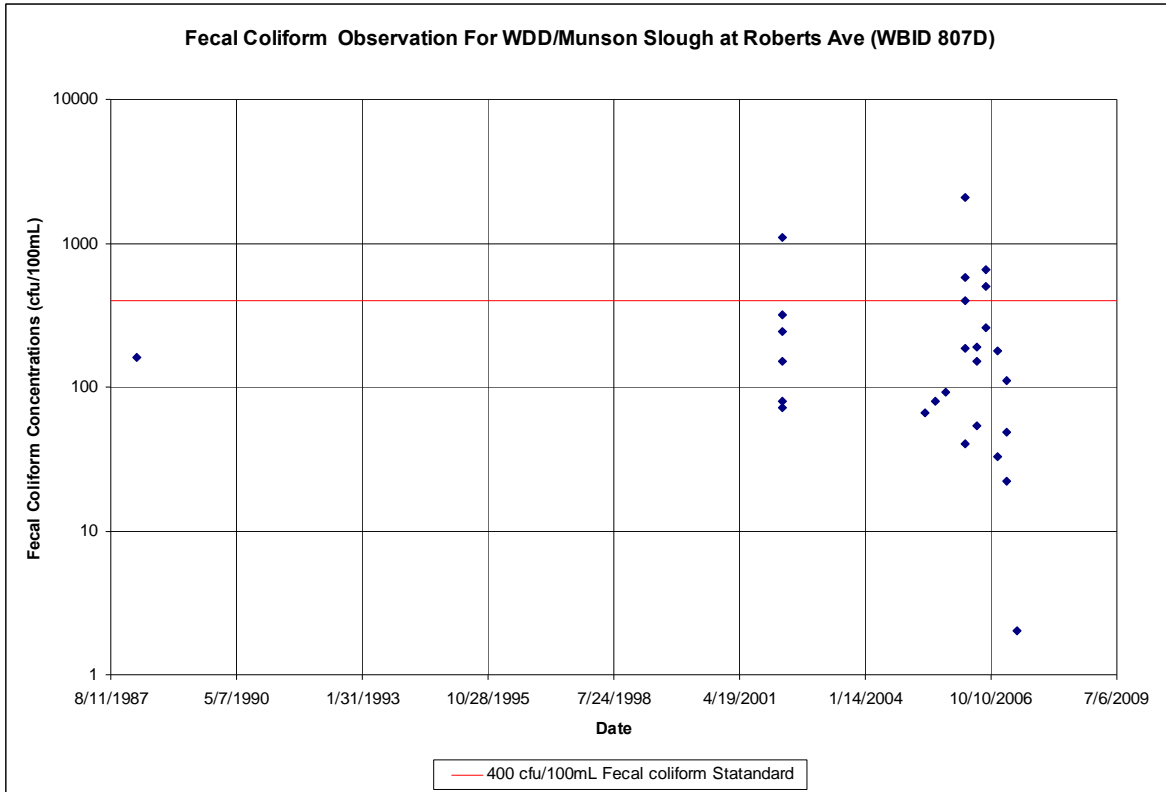




Figure 5.2b. Chart of Observations of Fecal Coliforms for Munson Slough at Springhill Rd. (WBID 807D)

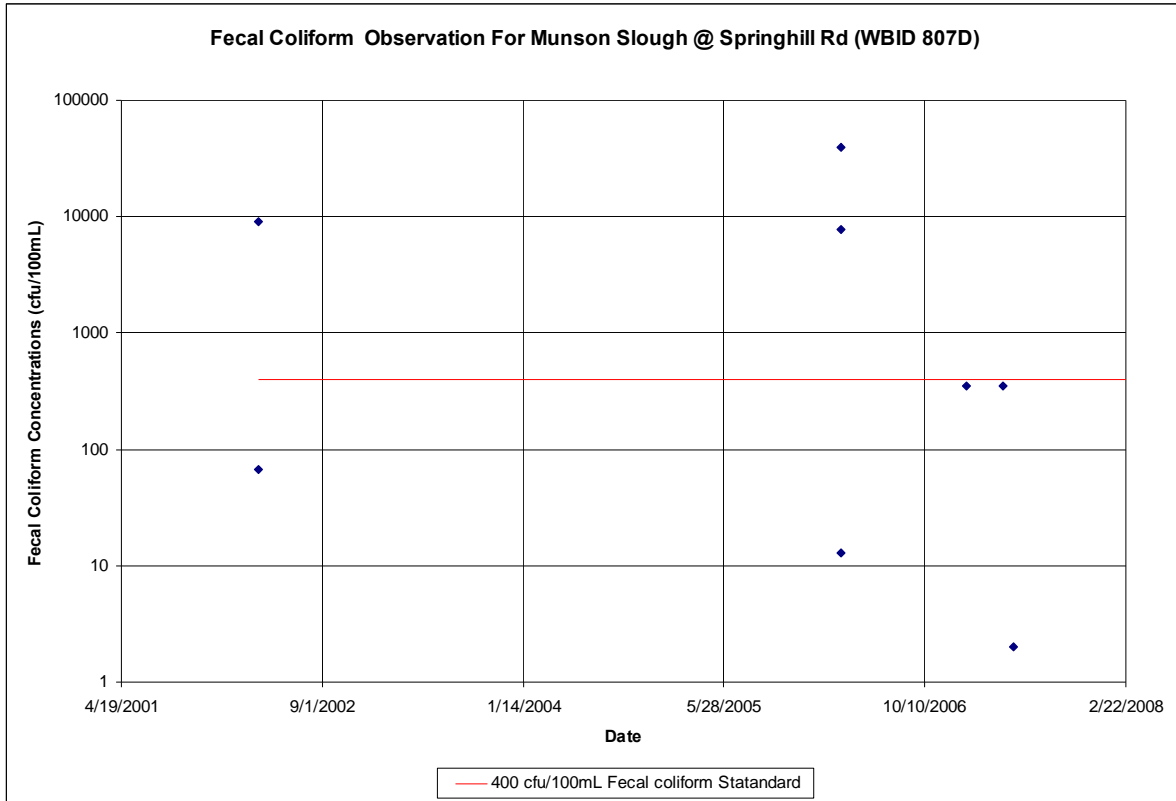
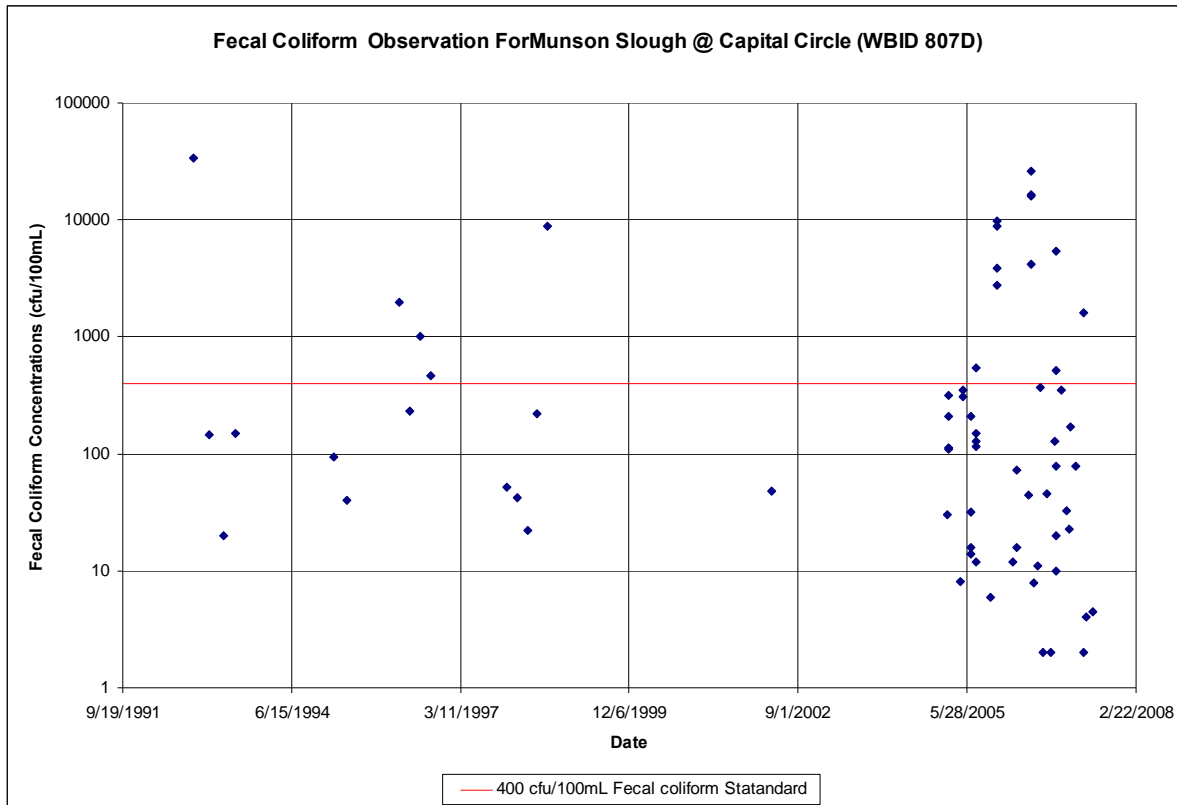


Figure 5.2c. Chart of Observations of Fecal Coliforms for Munson Slough at Capital Circle (WBID 807D)



### 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 to be 31.57 percent at Roberts Ave., 96.89 percent at Springhill Rd., and 91.53 percent at Capital Circle. This means that in order to meet the state criterion of 400 counts/100mL, a 31.57 percent reduction in current loading is necessary at Roberts Ave., a 96.89 percent reduction at Springhill Rd., and a 91.53 percent reduction at Capital Circle, and this would therefore be the TMDL for Munson Slough. **Tables 5.2a** through **5.2c** show the individual reduction calculations for Munson Slough, including all exceedances, and **Tables 5.1a** through **5.2c** provide annual summaries of data used in the calculation of the TMDL.



Table 5.2a. Calculation of Reductions for the Fecal Coliforms TMDL for Munson Slough at Roberts Ave.

WBID	Station Number	Date	Time	Result (counts/ 100mL)	Remark Code	% Reduction
<b>807D</b>	<b>21FLLEONLCLM3047084370</b>	<b>3/21/2006</b>	<b>920</b>	<b>584.5</b>	<b>B</b>	31.56544055
807D	21FLLEONLCLM3044784362	8/29/2006	1100	650	B	38.46153846
<b>807D</b>	<b>21FLLEONLCLM3047084370</b>	<b>8/29/2006</b>	<b>940</b>	<b>504</b>	<b>B</b>	20.63492063
	<b>Median</b>			<b>584.5</b>		<b>31.56544055</b>

Rows with bold type indicate the presence of more than one sample on that date at that particular location. In these cases, an average of the values was calculated and used as the coliforms concentration for that date

**Remark Code:**

B – Results based on colony counts outside the acceptable range

Table 5.2b. Calculation of Reductions for the Fecal Coliforms TMDL for Munson Slough at Springhill Rd.

WBID	Station Number	Date	Time	Result (counts/ 100mL)	Remark Code	% Reduction
807D	21FLWQA 302446408419479	3/14/2006	1435	7,700	B	94.80519481
807D	21FLWQA 302414708418287	3/15/2006	1248	39,200	B	98.97959184
	<b>Median</b>			<b>23,450</b>		<b>96.89239332</b>

**Remark Code:**

B – Results based on colony counts outside the acceptable range

Table 5.2c. Calculation of Reductions for the Fecal Coliforms TMDL for Munson Slough at Capital Circle

WBID	Station Number	Date	Time	Result (counts/100mL)	Remark Code	% Reduction
807D	21FLLEONLCLM3039584309	7/21/2005	904	548	B	27.007
807D	21FLLEONLCLM3039084312	11/21/2005	1205	3,900	B	89.744
807D	21FLLEONLCLM3039584309	11/21/2005	1105	2,800	B	85.714
807D	21FLLEONLCLM3040184306	11/21/2005	505	9,700	B	95.876
807D	21FLLEONLCLM3040384307	11/21/2005	445	8,800	B	95.455
807D	21FLLEONLCLM3039084312	6/13/2006	1200	15,800	B	97.468
807D	21FLLEONLCLM3039584309	6/13/2006	1145	4,200		90.476
807D	21FLLEONLCLM3040184306	6/13/2006	1100	16,400	B	97.561
807D	21FLLEONLCLM3040384307	6/13/2006	1020	26,400	B	98.485
807D	21FLLEONLCLM3040184306	11/7/2006	1040	510		21.569
807D	21FLLEONLCLM3040384307	11/7/2006	1005	5,400		92.593
807D	21FLLEONLCLM3037584313	4/17/2007	1040	1,600	L	75.000
	<b>Median</b>			<b>4,800</b>		<b>91.53439</b>

**Remark Code:**

B – Results based on colony counts outside the acceptable range

L – Actual value is known to be greater than value given

## 5.2 Critical Conditions/Seasonality

The critical condition for coliforms 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 coliforms 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 coliforms 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

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### 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:

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

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

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

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[1]), 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 Munson Slough Watershed is expressed in terms of percent reduction, and represents the maximum annual fecal coliforms load the watershed can assimilate and maintain the fecal coliforms criterion (**Tables 6.1a** through **6.1c**).

Table 6.1a. TMDL Components for Munson Slough at Roberts Ave.

WBID	Parameter	TMDL (% reduction)	WLA		LA (% reduction)	MOS
			Wastewater (counts/100mL)	NPDES Stormwater		
WDD/Munson Slough at Roberts Ave. (WBID 807D)	Fecal Coliforms	32%	Point sources must meet permit limits	32%	32%	Implicit

Table 6.1b. TMDL Components for Munson Slough at Springhill Rd.

WBID	Parameter	TMDL (% reduction)	WLA		LA (% reduction)	MOS
			Wastewater (counts/100mL)	NPDES Stormwater		
Munson Slough at Springhill Rd. (WBID 807D)	Fecal Coliforms	97%	Point sources must meet permit limits	97%	97%	Implicit

Table 6.1c. TMDL Components for Munson Slough at Capital Circle

WBID	Parameter	TMDL (% reduction)	WLA		LA (% reduction)	MOS
			Wastewater (counts/100mL)	NPDES Stormwater		
Munson Slough at Capital Circle (WBID 807D)	Fecal Coliforms	92%	Point sources must meet permit limits	92%	92%	Implicit

## 6.2 Load Allocation

Based on a percent reduction approach, a fecal coliforms percent reduction of 32 percent is needed at Roberts Ave., 97 percent at Springhill Rd., and 92 percent at Capital Circle. 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, 10 permittees have potential discharge sites in the Munson Slough Watershed: Ready Mix USA-Mosely Street Plant (FLG11358), Florida Rock-Tallahassee (FLG110319), Trinity Materials Plant 32 (FLG110307), Lake Bradford Estates STP (FLA010148), Sandstone Ranch WWTF (FLA010167), National High Magnetic Field Laboratory-FSU (FLA01633), Southern Bell Trailer Park (FLA010151), Western Estates MHP (FLA010152), and T.P. Smith WRF (FLA010139). Any new potential discharger is expected to comply with the Class III criterion for coliforms bacteria.

#### **6.3.1 NPDES Wastewater Discharges**

As mentioned previously, 10 permittees currently have potential discharge sites in the Munson Slough Watershed. Any new potential discharger is expected to comply with the Class III criterion for fecal coliforms bacteria.

#### **6.3.2 NPDES Stormwater Discharges**

The Munson Slough Watershed, located in Leon County, falls under the Phase I MS4 permits for Leon County and coapplicant (FLS000033) and COT (FLS000034), and the Phase II NPDES MS4 permits for Florida State University (FLR04E051) and Florida Agricultural and Mechanical University (FLR04E095). The wasteload allocation for this MS4 permit is a 32 percent reduction at Roberts Ave. of current anthropogenic fecal coliforms loading from the MS4, a 97 percent reduction at Springhill Rd., and a 92 percent reduction at Capital Circle . It should be noted that any MS4 permittee is only responsible for reducing the loads associated with stormwater outfalls that it owns or otherwise has responsible control over, and it is not responsible for reducing other nonpoint source loads in its jurisdiction.

### **6.4 Margin of Safety**

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

For fecal coliforms, an implicit MOS was inherently incorporated by using 400 MPN/100mL of fecal coliforms 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 coliforms 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

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## 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 Munson Slough 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

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## 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 Rule 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 FDOT throughout the 15 counties meeting the population criteria. The Department received authorization to implement the NPDES Stormwater Program in 2000.

An important difference between the federal NPDES and the state's stormwater/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 Munson Slough watershed

Land Use		Leon County, Florida		Munson Slough Watershed	
Level 1		Total (mi <sup>2</sup> )	%	Total (mi <sup>2</sup> )	%
1000	Urban and Built-up	1.2170E+02	1.7342E+01	2.1375E+01	4.4050E+01
2000	Agriculture	5.5492E+01	7.9079E+00	8.8565E-02	1.8251E-01
3000	Rangeland	6.8390E+00	9.7459E-01	8.7335E+00	1.7998E+01
4000	Upland Forests	3.7942E+02	5.4069E+01	1.0093E+01	2.0801E+01
5000	Water	2.1210E+01	3.0225E+00	1.0262E-02	2.1147E-02
6000	Wetlands	1.1027E+02	1.5714E+01	3.9161E+00	8.0702E+00
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	4.3080E+00	8.8779E+00
	Total Land	6.8052E+02	9.6977E+01	4.8515E+01	9.9979E+01
	Total Land+Water	7.0173E+02	1.0000E+02	4.8525E+01	1.0000E+02
	Total Census 2000	7.0178E+02		1.2326E+02	
	Urban Ratio WBID/County	1.0000E+00		1.7564E-01	
	Agriculture Ratio WBID/County	1.0000E+00		1.5960E-03	
	Natural Ratio WBID/County	1.0000E+00		4.1360E-02	
	Total Septic Tanks through 2006	3.8530E+04		6.7675E+03	
	Total Repairs 1991 through 2006	5.8490E+03		1.0273E+03	
	Total Failures	1.9265E+03		3.3838E+02	
	Total 2000 Households	9.6521E+04		1.6953E+04	
	Total Houseboats				
	Total 1990 Public Sewer	5.8881E+04		1.0342E+04	
	Total 1990 Septic	2.2090E+04		3.8800E+03	
	Total 1990 Other	3.5400E+02		6.2178E+01	
	Total 2000 Population	2.3945E+05		4.2058E+04	

### Fecal coliforms loading from animals in the Munson Slough watershed

Animal Type	Load Produced by Animal (counts/animal/day)	Number of Animals in Leon County	County Area (mi <sup>2</sup> )	Animal Density in Leon County (#/mi <sup>2</sup> )	References	Munson Slough Watershed Drainage Area (mi <sup>2</sup> )	Number of Animals in Munson Slough Watershed	Load Produced by Animals in Munson Slough Watershed (counts/day)
<b>Livestock</b>								
Cattle and Calves Inventory	1.04E+11	2841	7.0173E+02			4.8525E+01	4.5342E+00	4.7156E+11
Cattle and Calves Sold	1.04E+11	1489	7.0173E+02			4.8525E+01	2.3764E+00	2.4715E+11
Dairy Cattle Inventory	1.01E+11		7.0173E+02		C	4.8525E+01	0.0000E+00	0.0000E+00
Beef Cattle Inventory	1.04E+11		7.0173E+02		C	4.8525E+01	0.0000E+00	0.0000E+00
Sheep and Lambs Inventory	1.20E+10	72	7.0173E+02		C	4.8525E+01	1.1491E-01	1.3789E+09
Sheep and Lambs Sold	1.20E+10		7.0173E+02			4.8525E+01	0.0000E+00	0.0000E+00
Horses and Ponies Inventory	4.20E+08	1070	7.0173E+02		C	4.8525E+01	1.7077E+00	7.1724E+08
Horses and Ponies Sold	4.20E+08	83	7.0173E+02			4.8525E+01	1.3247E-01	5.5637E+07
Mules, Burros, and Donkeys Inventory	4.20E+08		7.0173E+02		C,E	4.8525E+01	0.0000E+00	0.0000E+00
Mules, Burros, and Donkeys Sold	4.20E+08		7.0173E+02			4.8525E+01	0.0000E+00	0.0000E+00
Llamas (~Sheep)	1.20E+10	18	7.0173E+02		C,E	4.8525E+01	2.8728E-02	3.4474E+08
Bison (~Beef Cattle)	1.04E+11		7.0173E+02		C,E	4.8525E+01	0.0000E+00	0.0000E+00
Deer	5.00E+08		7.0173E+02		C,E	4.8525E+01	0.0000E+00	0.0000E+00
Elk	5.00E+08		7.0173E+02		C,E	4.8525E+01	0.0000E+00	0.0000E+00
Goats, All (~Sheep) Inventory	1.20E+10	201	7.0173E+02		C,E	4.8525E+01	3.2080E-01	3.8496E+09
Goats, All (~Sheep) Sold	1.20E+10	83	7.0173E+02			4.8525E+01	1.3247E-01	1.5896E+09
Hogs and Pigs Inventory	1.08E+10	493	7.0173E+02		C	4.8525E+01	7.8683E-01	8.4978E+09
Hogs and Pigs Sold	1.08E+10	400	7.0173E+02			4.8525E+01	6.3840E-01	6.8947E+09
Layer Chickens Inventory	1.40E+08	436	7.0173E+02		C	4.8525E+01	6.9586E-01	9.7420E+07
Layer Chickens Sold	1.40E+08		7.0173E+02			4.8525E+01	0.0000E+00	0.0000E+00
Broilers Inventory	1.40E+08	50	7.0173E+02		C	4.8525E+01	7.9800E-02	1.1172E+07

Animal Type	Load Produced by Animal (counts/animal/day)	Number of Animals in Leon County	County Area (mi <sup>2</sup> )	Animal Density in Leon County (#/mi <sup>2</sup> )	References	Munson Slough Watershed Drainage Area (mi <sup>2</sup> )	Number of Animals in Munson Slough Watershed	Load Produced by Animals in Munson Slough Watershed (counts/day)
Broilers Sold	1.40E+08	0	7.0173E+02			4.8525E+01	0.0000E+00	0.0000E+00
Turkeys Inventory	9.50E+07	25	7.0173E+02		C	4.8525E+01	3.9900E-02	3.7905E+06
Turkeys Sold	9.50E+07	0	7.0173E+02			4.8525E+01	0.0000E+00	0.0000E+00
Ducks Inventory	2.50E+09	80	7.0173E+02		C	4.8525E+01	1.2768E-01	3.1920E+08
Ducks Sold	2.50E+09	0	7.0173E+02			4.8525E+01	0.0000E+00	0.0000E+00
Geese Inventory	4.90E+10	15	7.0173E+02		C	4.8525E+01	2.3940E-02	1.1731E+09
Geese Sold	4.90E+10	0	7.0173E+02			4.8525E+01	0.0000E+00	0.0000E+00
Emus (~Geese)	4.90E+10		7.0173E+02		C,E	4.8525E+01	0.0000E+00	0.0000E+00
Ostriches (~Geese)	4.90E+10		7.0173E+02		C,E	4.8525E+01	0.0000E+00	0.0000E+00
Pheasants (~Geese) Inventory	4.90E+10		7.0173E+02		C,E	4.8525E+01	0.0000E+00	0.0000E+00
Pheasants (~Geese) Sold	4.90E+10		7.0173E+02			4.8525E+01	0.0000E+00	0.0000E+00
Pigeons or Squab Inventory	1.60E+08		7.0173E+02		C	4.8525E+01	0.0000E+00	0.0000E+00
Pigeons or Squab Sold	1.60E+08	0	7.0173E+02			4.8525E+01	0.0000E+00	0.0000E+00
Quail (~Pigeon)	1.60E+08		7.0173E+02		C	4.8525E+01	0.0000E+00	0.0000E+00
Other			7.0173E+02		C	4.8525E+01	0.0000E+00	0.0000E+00
Rabbits Inventory	2.53E+09		7.0173E+02		J,K	4.8525E+01	0.0000E+00	0.0000E+00
Rabbits Sold	2.53E+09		7.0173E+02		J,K	4.8525E+01	0.0000E+00	0.0000E+00
<b>Total Livestock</b>			<b>7.0173E+02</b>		<b>C</b>	<b>4.8525E+01</b>	<b>0.0000E+00</b>	<b>7.4364E+11</b>
<b>Wildlife</b>			<b>7.0173E+02</b>		<b>C</b>	<b>4.8525E+01</b>		
Alligators			7.0173E+02		C	4.8525E+01	0.0000E+00	0.0000E+00
Black Bears			7.0173E+02		C	4.8525E+01	0.0000E+00	0.0000E+00
Raccoons	1.25E+08		7.0173E+02		C	4.8525E+01	0.0000E+00	0.0000E+00
Beavers	2.50E+08		7.0173E+02		C	4.8525E+01	0.0000E+00	0.0000E+00
Deer	5.00E+08	8.9822E+03	7.0173E+02		Cl	4.8525E+01	3.7150E+02	1.8575E+11
Dolphin, Porposee, Manatee			7.0173E+02		C	4.8525E+01	0.0000E+00	0.0000E+00
Waterfowl	4.90E+10	1.1921E+02	7.0173E+02		Cl	4.8525E+01	4.9307E+00	2.4160E+11
Wild Pigs	1.08E+10		7.0173E+02		Cl	4.8525E+01	0.0000E+00	0.0000E+00
<b>Total Wildlife</b>			<b>7.0173E+02</b>		<b>C</b>	<b>4.8525E+01</b>		<b>4.2735E+11</b>

Animal Type	Load Produced by Animal (counts/animal/day)	Number of Animals in Leon County	County Area (mi <sup>2</sup> )	Animal Density in Leon County (#/mi <sup>2</sup> )	References	Munson Slough Watershed Drainage Area (mi <sup>2</sup> )	Number of Animals in Munson Slough Watershed	Load Produced by Animals in Munson Slough Watershed (counts/day)
<b>Domestic Animals</b>			<b>7.0173E+02</b>		<b>C</b>	<b>4.8525E+01</b>		
Dogs	5.00E+09	4.6388E+03	7.0173E+02	0.58*HH	F	4.8525E+01	9.8329E+03	4.9164E+13
Cats	5.00E+09	5.2787E+03	7.0173E+02	0.66*HH	F	4.8525E+01	1.1189E+04	5.5946E+13
Horses and Ponies-Pets	4.20E+08	3.9990E+02	7.0173E+02	0.05*HH	F	4.8525E+01	8.4766E+02	3.5602E+11
<b>Total Domestic</b>			<b>7.0173E+02</b>			<b>4.8525E+01</b>		<b>1.0547E+14</b>
<b>Septic-Human Impacts</b>			<b>7.0173E+02</b>			<b>4.8525E+01</b>		
Human	2.00E+09		7.0173E+02			4.8525E+01		
Sewer Line Leaks	6.89E+09		7.0173E+02			4.8525E+01		4.2286E+12
Houseboats-Nonmarina	2.00E+09		7.0173E+02		C	4.8525E+01		
Boats-Marina Slips	2.00E+09		7.0173E+02			4.8525E+01		0.0000E+00
Septic Tanks Failed	6.89E+09		7.0173E+02			4.8525E+01	3.3838E+02	2.3311E+12
Septic Tanks Normal			7.0173E+02			4.8525E+01		
Septic Tanks-ATU	2.76E+08		7.0173E+02		H	4.8525E+01		
<b>Total Septic</b>			<b>7.0173E+02</b>			<b>4.8525E+01</b>		<b>6.5596E+12</b>
<b>Aquaculture</b>								
Fish Farms			7.0173E+02			4.8525E+01	0.0000E+00	
Fish Farms Sold			7.0173E+02			4.8525E+01	0.0000E+00	
Oyster Houses			7.0173E+02			4.8525E+01	0.0000E+00	
<b>Total Aquaculture</b>			<b>7.0173E+02</b>			<b>4.8525E+01</b>	<b>0.0000E+00</b>	
<b>Total</b>			<b>7.0173E+02</b>			<b>4.8525E+01</b>	<b>0.0000E+00</b>	<b>1.1320E+14</b>

**References:**

- A U.S. Department of Agriculture, 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](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 Florida Department of Agriculture and Consumer Services Website, 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, 2008. Available: <http://www.doh.state.fl.us/environment/ostds/statistics/newInstallations.pdf>
- L FDOH, 2008. Available: <http://www.doh.state.fl.us/environment/ostds/statistics/repairs.pdf>



## Appendix C: Summary of Permitted Point Source Loads

### NPDES facilities permitted for fecal coliforms

NPDES Permit Number	Facility Name	Units	Maximum/Minimum	Reclaimed Water Limitations				Monitoring Requirements			Discharges to Munson Slough Watershed
				Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	
FLA010148	Lake Bradford Estates MHP WWTF	#/100mL	Maximum	See Permit				Monthly	Grab	EFF-01	Yes
FLA010151	Southern Bell Trailer Park WWTP	#/100mL	Maximum	See Permit				Monthly	Grab	EFF-02	Yes
FLA016533	National High Magnetic Field Lab-FSU			See Permit				Quarterly	Grab	EFF-1	Yes
FLA010167	Sandstone Ranch WWTF	#/100mL	Maximum	See Permit				Monthly	Grab	EFF-01	Yes
FLA010152	Western Estates MHP WWTP			See Permit				Monthly	Grab	911	Yes
FLA010139	T P Smith WRF	Percent	Maximum	See Permit				Daily	Grab	EFF-01	Yes, only 0.8 mgd AADF
FLA010139	T P Smith WRF	#/100mL	Maximum	See Permit				Daily	Grab	EFF-01	Yes, only 0.8 mgd AADF
FLA010140	Lake Bradford Road WWTP	Percent	Maximum	See Permit				Daily	Grab	EFF-01	No
FLA010140	Lake Bradford Road WWTP	#/100mL	Maximum	See Permit				Daily	Grab	EFF-01	No

**NPDES facilities permitted to discharge but not regulated for fecal coliforms**

NPDES Permit Number	Facility Name	Discharges to Munson Slough Watershed
FLG110319	Florida Rock - Tallahassee Plant	Yes, only during wet weather
FLG110358	Ready Mix USA - Mosley St. Plant	Yes, only during wet weather
FLG110307	AMGI PLANT #21	Yes, only during wet weather

**NPDES facilities without a permitted discharge**

NPDES Permit Number	Facility Name	Permitted To Discharge
FLA470759	Woodville Hwy. Sand Mine	No
FLG110726	Superior Redi-Mix-Plant #2	No
FLA188590	Neff Rental	No
FLA010163	Dollar Rent A Car	No
FLA010160	Flint Equipment Company	No

## Appendix D: Summary of Measured External Loads

WBID	Name	Average Fecal (cfu/100mL)	Average Flow (cubic feet per second [cfs])	Load (cfu/day)
820	Godby Ditch	3.2645E+03	2.7436E+00	2.1915E+11
857	Central Drainage Ditch	1.6041E+04	2.6047E+01	1.0223E+13
865	St. Augustine Branch	7.4950E+03	3.7297E+00	6.8400E+11
916	East Drainage Ditch	8.7676E+02	2.4447E+00	5.2447E+10

820 – Average years are 1988, 2002, 2006, and 2007.

857 – Average years for flow are October 24, 1989, through December 31, 2000; fecal coliforms data average years are 1974, 1975, 1988, 2002, and 2006.

865 – Average years are 1988, 2002, and 2006.

916 – Average years are 2000, 2002, 2006, and 2007.

For WBIDs 820, 865, and 916, external loads were calculated by averaging the flows for the years (from the above table), then averaging the fecal coliforms data for the same years (from the above table), and then using the formula of  $((\text{Average Fecal} * \text{Average Flow}) * 24468480) = \text{Load}$ . For WBID 857, the flow years were different than the fecal coliforms years (see above years). However, the same concept was used to calculate the external loads.

WBID	Name	NFWMD Gage Used To Calculate External Load
820	Godby Ditch	S6
857	Central Drainage Ditch	S19
865	St. Augustine Branch	S22
916	East Drainage Ditch	S128

## Appendix E: Summary of Effluent Data, by Facility

Facility ID	Facility Name	Office	Facility Type	County	Monitoring Group	Date	Monitoring Location	PCS Code	Parameter Code	Description	Result Qualifier	Result	Units	Statistical Base
FLA010139	T.P. Smith WRF	NWD	DW	Leon	R-002	11/30/1999	EFA-2	1	P 74055	Coliforms, Fecal		123	#/100mL	9A
FLA010139	T.P. Smith WRF	NWD	DW	Leon	R-002	11/30/1999	EFA-2	Y	P 74055	Coliforms, Fecal		29	#/100mL	AB
FLA010139	T.P. Smith WRF	NWD	DW	Leon	R-002	11/30/1999	EFA-2	1	P 74055	Coliforms, Fecal		290	#/100mL	MB
FLA010139	T.P. Smith WRF	NWD	DW	Leon	R-002	11/30/1999	EFA-2	1	P 74055	Coliforms, Fecal		36	#/100mL	MM
FLA010139	T.P. Smith WRF	NWD	DW	Leon	R-002	4/30/2003	EFA-2	1	P 74055	Coliforms, Fecal		1	#/100mL	9A
FLA010139	T.P. Smith WRF	NWD	DW	Leon	R-002	4/30/2003	EFA-2	Y	P 74055	Coliforms, Fecal		5	#/100mL	AB
FLA010139	T.P. Smith WRF	NWD	DW	Leon	R-002	4/30/2003	EFA-2	1	P 74055	Coliforms, Fecal		1	#/100mL	MB
FLA010139	T.P. Smith WRF	NWD	DW	Leon	R-002	4/30/2003	EFA-2	1	P 74055	Coliforms, Fecal		1	#/100mL	MM
FLA010139	T.P. Smith WRF	NWD	DW	Leon	R-002	1/31/2004	EFA-2	1	P 74055	Coliforms, Fecal		2	#/100mL	9A

Please refer to the CD to obtain the entire dataset.

PCS – Permit Compliance System.

NWD – Northwest District.

DW – Drinking water.

Facility ID	Facility Name	Office	Facility Type	County	Monitoring Group	Date	Monitoring Location	PCS Code	Parameter Code	Description	Result Qualifier	Result	Units	Statistical Base
FLA010148	Lake Bradford Estates STP	NWD	DW	Leon	R-001	2/28/1998	AB		P 31616	Coliforms, Fecal Mf, M-Fc Broth,44 5c		0.2	#/100mL	AB
FLA010148	Lake Bradford Estates STP	NWD	DW	Leon	R-001	2/28/1998	EFF		P 31616	Coliforms, Fecal Mf, M-Fc Broth,44 5c	LT	2	#/100mL	DD
FLA010148	Lake Bradford Estates STP	NWD	DW	Leon	R-001	2/28/1998	EFF		P 31616	Coliforms, Fecal Mf, M-Fc Broth,44 5c	LT	2	#/100mL	MM
FLA010148	Lake Bradford Estates STP	NWD	DW	Leon	R-001	3/31/1998	EFF-01	Y	P 74055	Coliforms, Fecal		anc	#/100mL	AB
FLA010148	Lake Bradford Estates STP	NWD	DW	Leon	R-001	3/31/1998	EFF-01	1	P 74055	Coliforms, Fecal		2	#/100mL	DD
FLA010148	Lake Bradford Estates STP	NWD	DW	Leon	R-001	3/31/1998	EFF-01	1	P 74055	Coliforms, Fecal		anc	#/100mL	MM
FLA010148	Lake Bradford Estates STP	NWD	DW	Leon	R-001	4/30/1998	AB		P 31616	Coliforms, Fecal Mf, M-Fc Broth,44 5c		0.2	#/100mL	AB
FLA010148	Lake Bradford Estates STP	NWD	DW	Leon	R-001	4/30/1998	EFF		P 31616	Coliforms, Fecal Mf, M-Fc Broth,44 5c	LT	2	#/100mL	DD
FLA010148	Lake Bradford Estates STP	NWD	DW	Leon	R-001	4/30/1998	EFF		P 31616	Coliforms, Fecal Mf, M-Fc Broth,44 5c	LT	2	#/100mL	MM

Please refer to the CD to obtain the entire dataset.

PCS – Permit Compliance System.

NWD – Northwest District.

DW – Drinking water.

Facility ID	Facility Name	Office	Facility Type	County	Monitoring Group	Date	Monitoring Location	PCS Code	Parameter Code	Description	Result Qualifier	Result	Units	Statistical Base
FLA010151	Southern Bell Trailer Park	NWD	DW	Leon	R-001	3/30/1998	EFD	Y	P 74055	Coliforms, Fecal	LT	2	#/100mL	AB
FLA010151	Southern Bell Trailer Park	NWD	DW	Leon	R-001	3/30/1998	EFD	1	P 74055	Coliforms, Fecal	LT	2	#/100mL	MB
FLA010151	Southern Bell Trailer Park	NWD	DW	Leon	R-001	3/30/1998	EFD	1	P 74055	Coliforms, Fecal	LT	2	#/100mL	MM
FLA010151	Southern Bell Trailer Park	NWD	DW	Leon	R-001	4/30/1998	EFD	Y	P 74055	Coliforms, Fecal	LT	2	#/100mL	AB
FLA010151	Southern Bell Trailer Park	NWD	DW	Leon	R-001	4/30/1998	EFD	1	P 74055	Coliforms, Fecal	LT	2	#/100mL	MB
FLA010151	Southern Bell Trailer Park	NWD	DW	Leon	R-001	4/30/1998	EFD	1	P 74055	Coliforms, Fecal	LT	2	#/100mL	MM
FLA010151	Southern Bell Trailer Park	NWD	DW	Leon	R-001	7/30/1998	EFD	Y	P 74055	Coliforms, Fecal	LT	2	#/100mL	AB
FLA010151	Southern Bell Trailer Park	NWD	DW	Leon	R-001	7/30/1998	EFD	1	P 74055	Coliforms, Fecal	LT	2	#/100mL	MB
FLA010151	Southern Bell Trailer Park	NWD	DW	Leon	R-001	7/30/1998	EFD	1	P 74055	Coliforms, Fecal	LT	2	#/100mL	MM

Please refer to the CD to obtain the entire dataset.

PCS – Permit Compliance System. NWD – Northwest District; DW – Drinking water.

Facility ID	Facility Name	Office	Facility Type	County	Monitoring Group	Date	Monitoring Location	PCS Code	Parameter Code	Description	Result Qualifier	Result	Units	Statistical Base
FLA010152	Western Estates MHP	NWD	DW	Leon	R-001	5/31/1999			P 74055	Coliforms, Fecal	LT	2	#/100mL	AB
FLA010152	Western Estates MHP	NWD	DW	Leon	R-001	5/31/1999			P 74055	Coliforms, Fecal		ANC	#/100mL	SA
FLA010152	Western Estates MHP	NWD	DW	Leon	R-001	6/30/1999			P 74055	Coliforms, Fecal		ANC	#/100mL	AB
FLA010152	Western Estates MHP	NWD	DW	Leon	R-001	6/30/1999			P 74055	Coliforms, Fecal	LT	2	#/100mL	SA
FLA010152	Western Estates MHP	NWD	DW	Leon	R-001	7/31/1999			P 74055	Coliforms, Fecal	LT	2	#/100mL	AB
FLA010152	Western Estates MHP	NWD	DW	Leon	R-001	7/31/1999			P 74055	Coliforms, Fecal		ANC	#/100mL	SA
FLA010152	Western Estates MHP	NWD	DW	Leon	R-001	8/31/1999			P 74055	Coliforms, Fecal	LT	2	#/100mL	AB
FLA010152	Western Estates MHP	NWD	DW	Leon	R-001	8/31/1999			P 74055	Coliforms, Fecal		ANC	#/100mL	SA
FLA010152	Western Estates MHP	NWD	DW	Leon	R-001	9/30/1999			P 74055	Coliforms, Fecal	LT	2	#/100mL	AB

Please refer to the CD to obtain the entire dataset.

PCS – Permit Compliance System. NWD – Northwest District; DW – Drinking water.

Facility ID	Facility Name	Office	Facility Type	County	Monitoring Group	Date	Monitoring Location	PCS Code	Parameter Code	Description	Result Qualifier	Result	Units	Statistical Base
FLA010167	Sandstone Ranch WWTF	NWD	DW	Leon	R-001	2/28/1998	EFA-24964	Y	P 31616	Coliforms, Fecal Mf, M-Fc Broth,44 5c		2	#/100mL	AB
FLA010167	Sandstone Ranch WWTF	NWD	DW	Leon	R-001	2/28/1998	EFA-24964	1	P 31616	Coliforms, Fecal Mf, M-Fc Broth,44 5c		ANC	#/100mL	MM
FLA010167	Sandstone Ranch WWTF	NWD	DW	Leon	R-001	2/28/1998	EFA-24964	1	P 31616	Coliforms, Fecal Mf, M-Fc Broth,44 5c		ANC	#/100mL	SA
FLA010167	Sandstone Ranch WWTF	NWD	DW	Leon	R-001	3/31/1998	EFA-24964	Y	P 31616	Coliforms, Fecal Mf, M-Fc Broth,44 5c		2	#/100mL	AB
FLA010167	Sandstone Ranch WWTF	NWD	DW	Leon	R-001	3/31/1998	EFA-24964	1	P 31616	Coliforms, Fecal Mf, M-Fc Broth,44 5c		ANC	#/100mL	MM
FLA010167	Sandstone Ranch WWTF	NWD	DW	Leon	R-001	3/31/1998	EFA-24964	1	P 31616	Coliforms, Fecal Mf, M-Fc Broth,44 5c		ANC	#/100mL	SA
FLA010167	Sandstone Ranch WWTF	NWD	DW	Leon	R-001	4/30/1998	EFA-24964	Y	P 31616	Coliforms, Fecal Mf, M-Fc Broth,44 5c		37	#/100mL	AB
FLA010167	Sandstone Ranch WWTF	NWD	DW	Leon	R-001	4/30/1998	EFA-24964	1	P 31616	Coliforms, Fecal Mf, M-Fc Broth,44 5c		ANC	#/100mL	MM
FLA010167	Sandstone Ranch WWTF	NWD	DW	Leon	R-001	4/30/1998	EFA-24964	1	P 31616	Coliforms, Fecal Mf, M-Fc Broth,44 5c		ANC	#/100mL	SA

Please refer to the CD to obtain the entire dataset.  
 PCS – Permit Compliance System.  
 NWD – Northwest District  
 DW – Drinking water

Facility ID	Facility Name	Office	Facility Type	County	Monitoring Group	Date	Monitoring Location	PCS Code	Parameter Code	Description	Result Qualifier	Result	Units	Statistical Base
FLA016533	National High Magnetic Field Lab-FSU	NWD	IW	Leon	G-001	4/30/1999	EFF-PUMP	1	P 74055	Coliforms, Fecal		anc	#/100mL	DD
FLA016533	National High Magnetic Field Lab-FSU	NWD	IW	Leon	G-001	12/31/1999	EFF-PUMP	1	P 74055	Coliforms, Fecal		4	#/100mL	DD
FLA016533	National High Magnetic Field Lab-FSU	NWD	IW	Leon	G-001	2/28/1999	EFF-PUMP	1	P 74055	Coliforms, Fecal		anc	#/100mL	DD
FLA016533	National High Magnetic Field Lab-FSU	NWD	IW	Leon	G-001	1/31/1999	EFF-PUMP	1	P 74055	Coliforms, Fecal		anc	#/100mL	DD
FLA016533	National High Magnetic Field Lab-FSU	NWD	IW	Leon	G-001	5/31/1999	EFF-PUMP	1	P 74055	Coliforms, Fecal		anc	#/100mL	DD
FLA016533	National High Magnetic Field Lab-FSU	NWD	IW	Leon	G-001	3/31/1999	EFF-PUMP	1	P 74055	Coliforms, Fecal		anc	#/100mL	DD
FLA016533	National High Magnetic Field Lab-FSU	NWD	IW	Leon	G-001	9/30/1999	EFF-PUMP	1	P 74055	Coliforms, Fecal		anc	#/100mL	DD
FLA016533	National High Magnetic Field Lab-FSU	NWD	IW	Leon	G-001	8/31/1999	EFF-PUMP	1	P 74055	Coliforms, Fecal		anc	#/100mL	DD
FLA016533	National High Magnetic Field Lab-FSU	NWD	IW	Leon	G-001	7/31/1999	EFF-PUMP	1	P 74055	Coliforms, Fecal		anc	#/100mL	DD

Please refer to the CD to obtain the entire dataset.  
PCS – Permit Compliance System.  
NWD – Northwest District  
IW – Industrial wastewater



**Appendix F: Summary of Photos and News Articles**

**West Drainage Ditch (WDD)/Munson Slough at Orange Ave.**



**WDD/Munson Slough at Lake Bradford Rd.**



**Munson Slough at Springhill Rd. near new force main and pumping station**



**Munson Slough at Springhill Rd. looking downstream at Lake Henrietta and floating debris near force main**



**Munson Slough at Springhill Rd. showing debris trapped near COT force main on May 13, 2008.** The large amount of decaying debris and proximity to the underwater force main may contribute to the high bacteria levels at this site and increased oxygen demand in both the water column and sediment. Leon County Work Camp inmates periodically gather trash from the shoreline of Lake Henrietta downstream. Other trash barrier sites are on the Central Drainage Ditch upstream and East Drainage Ditch upstream of Jake Gaither Golf Course.



**Munson Slough at Springhill Rd.**



**Munson Slough at first bridge between Lake Henrietta and Munson Slough**



**Munson Slough at first overflow site between Lake Henrietta and Munson Slough**



**Munson Slough at second bridge between Lake Henrietta and Munson Slough**



**Munson Slough at end of Lake Henrietta**



**Munson Slough at end of Lake Henrietta looking downstream**



**Munson Slough at end of Lake Henrietta looking upstream**



**Munson Slough at first overflow site after Lake Henrietta**



**Munson Slough at culvert bridge**



**Munson Slough at culvert bridge looking upstream**





**Munson Slough at culvert bridge looking downstream**



**Munson Slough at Capital Circle looking downstream**



**Lake Munson at boat ramp**



**Lake Munson at entrance canal to dam**



**Lake Munson at dam**



**Munson Slough 100 yards below Lake Munson Dam**



**Munson Slough at Oak Ridge Rd. looking upstream**



**Munson Slough at Oak Ridge Rd. looking downstream**



## Appendix G: Munson Slough Watershed Data

WBID	Station	Date	Time	Result (counts/100mL)	Result Code	Location
807	21FLA 22030044	5/27/1974	1250	1,300		319
807	21FLA 22030044	12/17/1974	1410	3,300		319
807	21FLDEP 302128308418100	3/6/2002	1630	600	Q	319
807	21FLDEP 302128308418100	3/26/2002	1530	11	Q	319
807	21FLLEONLCLM3034484302	1/31/2005	1600	8		319
807	21FLLEONLCLM3036484301	1/31/2005	1520	4		319
807	21FLLEONLCLM3034484302	4/20/2005	1135	6		319
807	21FLLEONLCLM3036484301	4/20/2005	1047	7		319
807	21FLLEONLCLM3034484302	7/21/2005	1455	124	B	319
807	21FLLEONLCLM3036484301	7/21/2005	1154	112	B	319
807	21FLLEONLCLM3034484302	10/17/2005	1420	80		319
807	21FLLEONLCLM3036484301	10/17/2005	1255	59		319
807	21FLLEONLCLM3034484302	3/14/2006	920	200		319
807	21FLLEONLCLM3034884301	3/14/2006	1030	100		319
807	21FLLEONLCLM3034484302	5/24/2006	1000	52		319
807	21FLLEONLCLM3034884301	5/24/2006	1035	15.5	B	319
807	21FLLEONLCLM3034484302	8/8/2006	935	66		319
807	21FLLEONLCLM3034884301	8/8/2006	1015	79		319
807	21FLLEONLCLM3034884301	10/31/2006	1020	275		319
807	21FLLEONLCLM3034484302	1/23/2007	945	43		319
807	21FLLEONLCLM3034884301	1/23/2007	1030	121		319
807	21FLLEONLCLM3036484301	4/17/2007	1010	6.8		319
807D	21FLDEP 302314808418475	3/26/2002	1425	48	Q	CC
807D	21FLLEONLCLM3037584313	1/31/2005	1445	30		CC
807D	21FLLEONLCLM3037584313	4/20/2005	1012	8		CC
807D	21FLLEONLCLM3037584313	7/21/2005	1220	12		CC
807D	21FLLEONLCLM3037584313	10/17/2005	1330	6		CC
807D	21FLLEONLCLM3037584313	3/14/2006	1135	16	B	CC
807D	21FLLEONLCLM3037584313	5/24/2006	1140	44	B	CC
807D	21FLLEONLCLM3037584313	8/8/2006	1115	370		CC
807D	21FLLEONLCLM3037584313	10/31/2006	945	128	B	CC
807D	21FLLEONLCLM3037584313	1/23/2007	1145	23		CC
807D	21FLLEONLCLM3037584313	4/17/2007	1040	1,600	L	CC
807D	21FLLEONLCLM3039084312	2/4/2005	1400	112		CC
807D	21FLLEONLCLM3039084312	6/21/2005	1024	16		CC
807D	21FLLEONLCLM3039084312	7/21/2005	927	150	B	CC
807D	21FLLEONLCLM3039084312	11/21/2005	1205	3,900	B	CC
807D	21FLLEONLCLM3039084312	6/13/2006	1200	15,800	B	CC
807D	21FLLEONLCLM3039084312	11/7/2006	1135	20	B	CC

WBID	Station	Date	Time	Result (counts/100mL)	Result Code	Location
807D	21FLLEONLCLM3039584309	2/4/2005	1400	210		CC
807D	21FLLEONLCLM3039584309	6/21/2005	1014	14		CC
807D	21FLLEONLCLM3039584309	7/21/2005	904	548	B	CC
807D	21FLLEONLCLM3039584309	11/21/2005	1105	2,800	B	CC
807D	21FLLEONLCLM3039584309	6/13/2006	1145	4,200		CC
807D	21FLLEONLCLM3039584309	11/7/2006	1115	10	B	CC
807D	21FLLEONLCLM3040184306	2/4/2005	1400	110		CC
807D	21FLLEONLCLM3040184306	5/1/2005	1250	350	Q	CC
807D	21FLLEONLCLM3040184306	6/21/2005	958	210		CC
807D	21FLLEONLCLM3040184306	7/21/2005	846	128	B	CC
807D	21FLLEONLCLM3040184306	11/21/2005	505	9,700	B	CC
807D	21FLLEONLCLM3040184306	6/13/2006	1100	16,400	B	CC
807D	21FLLEONLCLM3040184306	11/7/2006	1040	510		CC
807D	21FLLEONLCLM3040384307	2/4/2005	1400	320		CC
807D	21FLLEONLCLM3040384307	5/1/2005	1230	310	Q	CC
807D	21FLLEONLCLM3040384307	6/21/2005	942	32		CC
807D	21FLLEONLCLM3040384307	7/21/2005	824	116		CC
807D	21FLLEONLCLM3040384307	11/21/2005	445	8,800	B	CC
807D	21FLLEONLCLM3040384307	6/13/2006	1020	26,400	B	CC
807D	21FLLEONLCLM3040384307	11/7/2006	1005	5,400		CC
807D	21FLLEONLCMU13037584309	6/26/2006	1038	7.8		CC
807D	21FLLEONLCMU13037584309	7/20/2006	958	11		CC
807D	21FLLEONLCMU13037584309	8/23/2006	829	2	U	CC
807D	21FLLEONLCMU13037584309	9/14/2006	938	46		CC
807D	21FLLEONLCMU13037584309	10/4/2006	1215	2		CC
807D	21FLLEONLCMU13037584309	11/8/2006	1341	79		CC
807D	21FLLEONLCMU13037584309	12/6/2006	1620	350		CC
807D	21FLLEONLCMU13037584309	1/4/2007	1407	33		CC
807D	21FLLEONLCMU13037584309	2/2/2007	1355	170		CC
807D	21FLLEONLCMU13037584309	3/5/2007	1635	79		CC
807D	21FLLEONLCMU13037584309	4/17/2007	820	2	U	CC
807D	21FLLEONLCMU13037584309	5/4/2007	830	4		CC
807D	21FLLEONLCMU13037584309	6/11/2007	1355	4.5		CC
807D	21FLNWFD302314084184901	2/21/1995	1200	94	Q	CC
807D	21FLNWFD302314084184901	5/8/1995	815	40	Q	CC
807D	21FLWQA 302314808418475	2/22/2006	1500	12	B	CC
807D	21FLWQA 302314808418475	3/15/2006	1240	73	B	CC
807D	21FLLEONLCLM3044584353	5/4/2005	858	66		RA
807D	21FLLEONLCLM3044584353	7/20/2005	1230	80		RA
807D	21FLLEONLCLM3044584353	10/13/2005	1113	92		RA
807D	21FLLEONLCLM3044584353	3/21/2006	1120	40		RA
807D	21FLLEONLCLM3044584353	6/19/2006	1130	151	B	RA

WBID	Station	Date	Time	Result (counts/100mL)	Result Code	Location
807D	21FLLEONLCLM3044584353	8/29/2006	1140	260		RA
807D	21FLLEONLCLM3044584353	11/28/2006	1100	33	B	RA
807D	21FLLEONLCLM3044584353	2/7/2007	1205	49		RA
807D	21FLLEONLCLM3044784362	3/21/2006	1100	400		RA
807D	21FLLEONLCLM3044784362	6/19/2006	1105	54		RA
807D	21FLLEONLCLM3044784362	8/29/2006	1100	650	B	RA
807D	21FLLEONLCLM3044784362	2/7/2007	1135	22		RA
807D	21FLLEONLCLM3046284370	5/1/2007	950	2		RA
807D	21FLLEONLCLM3047084370	3/21/2006	920	584.5	B	RA
807D	21FLLEONLCLM3047084370	6/19/2006	950	190		RA
807D	21FLLEONLCLM3047084370	8/29/2006	940	504	B	RA
807D	21FLLEONLCLM3047084370	11/28/2006	930	180	B	RA
807D	21FLLEONLCLM3047084370	2/7/2007	1000	110		RA
807D	21FLNWF302723084221401	3/3/1988	1730	160		RA
807D	21FLWQA 302546208419445	3/14/2006	1400	2,100	Q	RA
807D	21FLWQA 302642308421141	3/14/2006	1510	187	B	RA
807D	930.5	3/26/2002	1310	72	Q	RA
807D	935	3/26/2002	1350	1,100	Q	RA
807D	980	3/26/2002	819	245	Q	RA
807D	995	3/26/2002	1000	152	Q	RA
807D	997.9	3/26/2002	1020	320	Q	RA
807D	998	3/26/2002	1045	80	Q	RA
807D	21FLDEP 302414708418287	3/26/2002	1350	68	Q	SP
807D	21FLLEONLCLM3040484308	1/22/2007	1310	350		SP
807D	21FLLEONLCLM3040484308	4/24/2007	1400	350		SP
807D	21FLLEONLCLM3040484308	5/17/2007	1100	2		SP
807D	21FLWQA 302414708418287	3/15/2006	1248	39,200	B	SP
807D	21FLWQA 302441108419441	3/15/2006	1125	13	B	SP
807D	21FLWQA 302446408419479	3/14/2006	1435	7,700	B	SP
807D	949	3/27/2002	1130	9,000	Q	SP

**Result Code:**

B – Results based on colony counts outside the acceptable range

L – Actual value is known to be greater than value given

Q – Sample held beyond normal holding time

U – Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed

## Appendix H: Public Comments

### Leon County Comments



**Leon County**  
Board of County Commissioners  
301 South Monroe Street, Tallahassee, Florida 32301  
(850) 606-5302 www.leoncountyfl.gov

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

#### Commissioners

BILL PROCTOR  
District 1

JANE G. SAULS  
District 2

JOHN DAILEY  
District 3

BRYAN DESLOGE  
District 4

BOB RACKLEFF  
District 5

CLIFF THAELL  
At-Large

ED DePUY  
At-Large

PARWEZ ALAM  
County Administrator

HERBERT W.A. THIELE  
County Attorney

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 Fecal Coliform TMDLs for Munson Slough**

**(WBID 807D)**

Dear Mr. Mandrup-Poulsen:

Leon County, Florida hereby submits its comments on the proposed draft TMDL for fecal coliform for Munson Slough (WBID 807D) (Wieckowicz 2008, Draft). The County's general comments regarding the TMDL approach to Lake Munson and Munson Slough are included in its comments on the nutrient, dissolved oxygen, and un-ionized ammonia TMDLs, and are incorporated by reference herein. Specific comments on the fecal coliform TMDL are as follows:

***Comment 1: The contributing watersheds/"external loads" to the specified WBIDs are not clearly included in the loading calculation or the wasteload allocation.***

- The FDEP WBIDs are described as 48.5 square miles to Capital Circle, although the graphic display in GIS measures 68.8 square miles.
- Leon County GIS topography calculates the contributing area upstream of Capital Circle as 55.8 square miles.
- Table 5-2 of the EPA guidance for pathogen TMDL development identifies a fecal coliform "background" level ranging from 15 to 450,000 MPN/100 mL. The large contributing area warrants consideration of background influence on the exceedances.

An equal opportunity employer



**Comment 2: *The Apalachicola National Forest accounts for 12.3 square miles of the contributing area, or anywhere from 18 to 25% of the land area.***

- Wildlife population density will be greater than an urban forest.
- Hunting with dogs will increase likelihood that waste (from cleaning kills) and is routinely placed in the streams and wetlands. (see Black Creek comments)

**Comment 3: *The anthropogenic loads are calculated based on relative land use in the WBIDs.***

- Leon County modified the NFWFMD land use data referenced in the TMDL for the NPDES MS4 Year 3 Pollutant Loading study to correlate better for stormwater management purposes.
- The calculated population of 42,058 is substantially less than the 95,300 identified in the 2000 census blocks for the listed WBIDs.
- The countywide percentage of septic tank usage is applied to the WBID population although 97% of the WBID population (census) resides within the Urban Services Area (USA). The USA is predominately served by central sewer. The DOH County Health Unit can confirm the number of septic tanks in either the WBIDs or watershed.

**Comment 4: *Point sources are assumed to be compliant with permits.***

- Although this TMDL does not, the Nutrient TMDLs for Munson Slough/Lake Munson acknowledges the significant input from leaking sewers (pp. 36-37). Leaking sewers are likely a significant contributor of fecal coliform and should be taken into account.
- The wastewater treatment facilities for the City are located in the WBID/watershed, so the sewer system within the WBID carries the load for more than the proportionate population.
- Small domestic package plants are located in areas of known flooding and operational problems are noted in report. They should be incorporated into the load analysis.
- The exceedances were prevalent during moist and high flow conditions, indicating stormwater rather than baseflow influence.

**Comment 5: *Domestic pets are calculated to contribute 87% of the fecal coliform load to the WBID.***

- The full fecal coliform load from domestic pets is applied to the waterbody as though all waste was placed directly in the stream and no bacteria die-off occurs.

Comments Fecal Coliform TMDL for Munson Slough (WBID 807D)  
September 12, 2008  
Page Three

**Comment 5: Domestic pets are calculated to contribute 87% of the fecal coliform load to the WBID.**

- The full fecal coliform load from domestic pets is applied to the waterbody as though all waste was placed directly in the stream and no bacteria die-off occurs.
- The domestic pet population is calculated as proportional to the human population, reinforcing the calculated versus 2000 census data problem noted above.
- The assumption is made that all cats are indoor only, substantially different from staff experience that at least 50% would be outside. No references available.

Sincerely,



Jan Mandrup-Poulsen, Environmental Administrator  
Watershed Assessment Section

jmp/wa/ew



## 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 12, 2008

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

Dear Mrs. Heiker:

Thank you for your July 21, 2008 letter, providing comments on the draft Total Maximum Daily Load (TMDL) Report, Fecal Coliform TMDL for Munson Slough (WBID 807D). In your letter, you identified a number of general issues, which we will address in the order in they were made:

***Comment 1: The contributing watersheds/"external loads" to the specified WBIDs are not clearly included in the loading calculation or the wasteload allocation.***

- The FDEP WBIDs are described as 48.5 square miles to Capital Circle, although the graphic display in GIS measures 68.8 square miles.
- Leon County GIS topography calculates the contributing area upstream of Capital Circle as 55.8 square miles.
- Table 5-2 of the EPA guidance for pathogen TMDL development identifies a fecal coliform "background" level ranging from 15 to 450,000 MPN/100 mL. The large contributing area warrants consideration of background influence on the exceedances.

Yes, you are correct, there are several different drainage areas for the Munson Slough Basin. The Department chose to use the Stormwater Management Plan, 1991 from the Northwest Florida Water Management District. Closed Basins were not used in our Drainage Area determination.

*"More Protection. Less Process"*  
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For comments 2 – 5, a statement has been added to the document on page 21. The statement reads as the follows: "The information in this chapter are estimates and are presented for reference purposes. The material presented is here to help guide the BMAP process. This information was not used in the determination of this TMDL."

***Comment 2: The Apalachicola National Forest accounts for 12.3 square miles of the contributing area, or anywhere from 18 to 25% of the land area.***

- Wildlife population density will be greater than an urban forest.
- Hunting with dogs will increase likelihood that waste (from cleaning kills) and is routinely placed in the streams and wetlands. (see Black Creek comments)

***Comment 3: The anthropogenic loads are calculated based on relative land use in the WBIDs.***

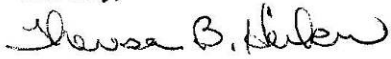
- Leon County modified the NFWMD land use data referenced in the TMDL for the NPDES MS4 Year 3 Pollutant Loading study to correlate better for stormwater management purposes.
- The calculated population of 42,058 is substantially less than the 95,300 identified in the 2000 census blocks for the listed WBIDs.
- The countywide percentage of septic tank usage is applied to the WBID population although 97% of the WBID population (census) resides within the Urban Services Area (USA). The USA is predominately served by central sewer. The DOH County Health Unit can confirm the number of septic tanks in either the WBIDs or watershed.

***Comment 4: Point sources are assumed to be compliant with permits.***

- Although this TMDL does not, the Nutrient TMDLs for Munson Slough/Lake Munson acknowledges the significant input from leaking sewers (pp. 36-37). Leaking sewers are likely a significant contributor of fecal coliform and should be taken into account.
- The wastewater treatment facilities for the City are located in the WBID/watershed, so the sewer system within the WBID carries the load for more than the proportionate population.
- Small domestic package plants are located in areas of known flooding and operational problems are noted in report. They should be incorporated into the load analysis.
- The exceedances were prevalent during moist and high flow conditions, indicating stormwater rather than baseflow influence.

- The domestic pet population is calculated as proportional to the human population, reinforcing the calculated versus 2000 census data problem noted above.
- The assumption is made that all cats are indoor only, substantially different from staff experience that at least 50% would be outside. No references available.

Sincerely,



Theresa B. Heiker, P.E.  
Stormwater Management Coordinator

City of Tallahassee comments



JUL 21 2008

WATERSHED ASSESSMENT SECTION DEPT. ENVIRONMENTAL PROT.

July 21, 2008

Mr. Jan Mandrup-Poulsen
Total Maximum Daily Load Program
Florida Department of Environmental Protection
2600 Blair Stone Road, Mail Station 3555
Tallahassee, Fl. 32399-2400

SUBJECT: Review Comments for 6/17/08 Draft Nutrient, Dissolved Oxygen and Unionized Ammonia TMDL for Munson Slough/Lake Munson Watershed and Draft Fecal Coliform TMDL for Munson Slough Watershed

The City of Tallahassee (City) has reviewed the above referenced draft TMDLs and is hereby submitting formal comments as part of the 30-day public review process to the Florida Department of Environmental Protection (FDEP). The City, as a stakeholder, shares the same commitment with the Department to protect water quality in the Munson Slough Watershed. The comments below are provided to ensure that the TMDLs are developed with sound, justifiable data so that all stakeholders can meet achievable goals. Specific TMDLs and percent reductions for each parameter are discussed followed by general comments and other concerns.

Biochemical Oxygen Demand (BOD5)

TMDL:

The BOD5 target for the lake (807C) is set below the reporting limit or Practical Quantitation Limit (PQL) of 2.0 mg/L. The PQL is considered the lowest concentration that can be confidently measured. Therefore, in addition to being unreasonable and scientifically indefensible, the lake target of 1.17 mg/L is essentially unattainable, since this number is well below the PQL. We are requesting that the target value be adjusted to an attainable level that is above the PQL.

Also, the lake (807C) median value was derived using data that included many data points that were at or below the PQL. Instances where the reported value was 2.0 mg/L or less probably should have been qualified. These data were treated as real numbers, when the true value was probably lower. There were a total of 343 data points for WBID 807C and approximately 22% of these were equal to or less than 2.0 mg/L. In order to

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ANDREW D. GILLUM
Commissioner

GARY HERNDON
City Treasurer-Clerk

ALLAN J. KATZ
Commissioner

SAM M. McCALL
City Auditor

MARK MUSTIAN
Commissioner

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arrive to the 4.78 mg/L median value, it does appear that data below the PQL were removed from the data set, however, the report is silent on this. Similarly, the report does not explain how the reference lake data below the PQL were handled. For consistency, these two data sets should be evaluated in the same manner. We are requesting that the process/methodology for evaluation of these data be provided to the City and other stakeholders. This is a critical element in our review for the applicability and validity of the proposed TMDLs. The comment period should be extended to provide time for such review.

Reductions:

The percent reduction for Lake Munson is based on BOD<sub>5</sub> values from reference lakes, the Bradford chain-of-lakes specifically. The reduction is calculated using the 1.17 mg/L value; however, the reduction should reflect an attainable and measurable TMDL.

Table 5.10 presents two different TMDL targets and reductions for Lake Munson, one using the reference lake value (1.17 mg/L) and another using the lake screening level (2.90 mg/L). The City questions why the screening level was not chosen as the target for the lake, but was selected for the slough. We are requesting a justification for using one value over the other.

The targets for the slough (807 and 807D) are based on screening levels. It is not clear in the report how BOD<sub>5</sub> screening levels are derived and what they represent. There is no information provided in this report other than a reference under Table 5.10 to the IWR run 31.1. The City was unable to locate any guidance in the IWR run 31.1 to identify screening levels. Please provide us with clarification for setting this target limit. The comment period should be extended to provide time for review and comment on the methodologies, when provided.

**Nutrients (Total Nitrogen (TN) and Total Phosphorus (TP))**

TMDL:

Lake Munson has evolved into a watershed that is very different than that associated with the reference lakes selected by FDEP for their analysis. The Bradford Chain is located in a watershed predominated by closed basins in the national forest. The contributory area is primarily below the Cody Scarp. On the other hand, a sizeable portion of the contributory area for Lake Munson has always been the Tallahassee Red Hills. This means that, hydrologically, Lake Munson is quite divergent from the Cascade Chain. It will never be able to achieve a TMDL target based on reference conditions established using WQ data from a chain in such a different hydrogeologic setting.

The 0.02 mg/L TP target set by FDEP also fails to provide for assimilative capacity within the lake. Consequently, this approach does not provide any indication of the allowable loading that can enter the lake and have it remain in balance. The Method 2

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approach (Table 5.6) using the TSI values in the lake to determine upstream nutrient values is more scientifically defensible. There are sufficient data to determine the nutrient concentrations needed to maintain a TSI less than 60 in Lake Munson. Also, the TMDLs should be based on target values calculated from data collected after 1985 when inputs to the lake would be similar to those the lake has received for more than 20 years.

The City asserts that applying the reference lake TP target of 0.02 mg/L to WBID 807D is inappropriate. Other information presented in the assessment report show that such a low level target for phosphorus is not needed to eliminate impairment.

Reductions:

Using the TP target of 0.02 mg/L requires an 89.50% reduction before the water enters the lake. If the alternative target of 0.13 mg/L is applied, the percent reduction would be 13.33% and would achieve the desired goal of maintaining a TSI below 60 in Lake Munson.

Ammonia (NH3-N, NH3-U)

TMDL:

The Monte Carlo exercise used to determine the TMDL target for ammonia was done for the slough below the lake (WBID 807), which is a very different waterbody than the lake. Not only functionally, but ecologically. Data presented below demonstrate that ammonia concentrations in the slough below the lake are not related to inputs from Lake Munson. Therefore, this target should not be applied to Lake Munson.

Typical ammonia (NH3-N) values in Lake Munson are below the TMDL target of 0.32 mg/L. Of the 464 data values, only 30 or 6.5% of them are greater than the TMDL target. This level is not sufficient to trip the IWR threshold for impairment in Lake Munson. The mean and median values for the Lake are presented in the table below. Ammonia values in the slough below the lake are considerably higher on average, such that 44.1% (15/34) of samples had concentrations greater than 0.32 mg/L. Therefore, to make a connection between the lake and high unionized-ammonia concentrations downstream FDEP must demonstrate the presence of physical/chemical conditions that convert another form of nitrogen to ammonia. The report is silent about this issue.

Furthermore, the FDEP approach of setting a TMDL in a waterbody that is not impaired to address impairment in a downstream waterbody is contrary to the TMDL statute (F.S. 403.067). According to the statute, a TMDL can only be established when impairment has been verified. The data show that such impairment cannot be demonstrated. This approach also violates FDEP's TMDL definition provided in the reports. The data show that the lake can still "meet water quality standards" for this pollutant and therefore a TMDL is not needed.



Table 1

Munson TMDL Unionized Ammonia			Values of all data (mean/median)		Values when NH3-U > 0.02 mg/L (mean/median)	
WBID	Waterbody	Parameter	Mean	Median	Mean	Median
807C	Lake Munson	NH3-N (mg/L)	0.17	0.067	0.697	0.069
	Lake Munson	Temperature (°C)	21.8	22.5	26.6	27.3
	Lake Munson	pH (SU)	7.2	6.9	9.5	9.5
807	Munson Slough below Lake Munson	NH3-N (mg/L)	0.68	0.10	1.22	1.11
	Munson Slough below Lake Munson	Temperature (°C)	22.1	24.2	23.3	24.6
	Munson Slough below Lake Munson	pH (SU)	7.4	7.3	7.9	7.9

As the table indicates, even in the lake when the unionized ammonia exceeds the Class III criterion ( $\leq 0.02$  mg/L, 62-302.530(3) F.A.C.), the values in the slough are much higher. This condition indicates the presence of another source in WBID 807, below the lake.

Reductions:

Because the unionized ammonia TMDL for the lake (WBID 807C) is not needed, the proposed reductions should be deleted. If FDEP feels that a TMDL for this pollutant is needed for the slough below Lake Munson (WBID 807), then the Department should perform the analyses/calculations required for establishing a TMDL and its corresponding load reductions.

Fecal Coliform

TMDL:

Perhaps the primary issue that the City has with these TMDLs is the use of inappropriate and/or inadequate data to establish the TMDLs and subsequent load reductions. To this end, the City believes that FDEP's over reliance on questionable monitoring data renders these fecal coliform TMDLs as extremely rudimentary. This TMDL assessment is based on a data set shown in Appendix G of the report and 47% of it is qualified. Exceedance of holding times and use of data consisting of colony counts outside the method-accepted range constitute 62% of the qualified data. As a result these fecal coliform TMDLs do not reflect the level of sound science upon which the City of Tallahassee would be willing to allocate scarce fiscal resources nor does it help to foster coordination, cooperation and cost effective environmental protection as envisioned in either federal or state regulations.

As you are aware, the City conducted an intensive bi-weekly monitoring effort in June 2004 - 05, at considerable expense (\$250,000) in association with the TMDL established by the Environmental Protection Agency (EPA) in November 2006 for the Northeast Drainage Ditch (NEDD) WBID 756A. Much of the high cost associated with this and

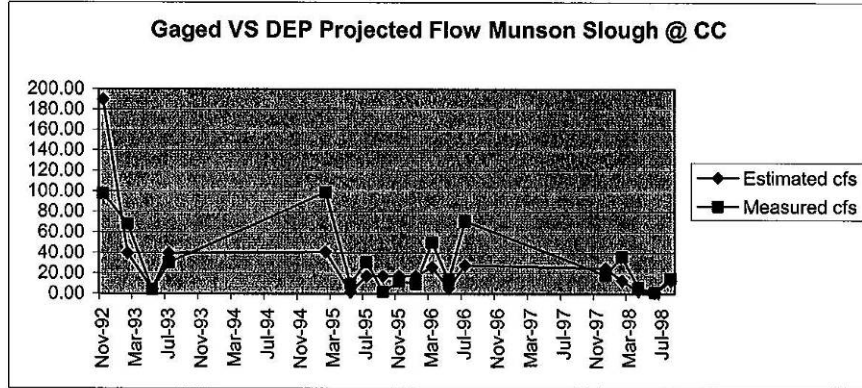
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subsequent monitoring efforts by the City is associated with compliance with Quality Assurance objectives established by EPA. EPA did not utilize qualified data for previous TMDLs. FDEP should not do so either. It is the City's position that the TMDL assessment for the Munson Slough watershed should be based on only data that satisfies consistent QA/QC protocols.

Reductions:

The Flow Duration Curve or Kansas Method, which was used by FDEP to develop the allowable loading and percent reduction in loading, is not an appropriate assessment method given the limited amount and lack of reliable water quality and flow data available for the three portions of WBID 807D. Extreme variations in rainfall intensity, duration and frequency and the resultant runoff over a region even out over the long term. However, area weighted flow-proportioning works poorly from one tributary to another for estimating daily discharge, and this is at the heart of the FDEP flow duration method. This point is well illustrated in the graph that follows wherein discharge values recorded by the Northwest Florida Water Management District (NFWFMD) for Munson Slough at Capital Circle from 1992 through 1998 are presented in comparison to the values estimated by FDEP for this site over that same period. As may be seen, the estimated flow is highly divergent from the values actually observed at the site. The City recommends that FDEP reconsider the use of this complicated and difficult to understand method in favor of the more simplistic approach for the determination of loading capacity that was used by EPA for the NEDD and the other Lake Munson Ditches.

As pointed out at the public workshop held in Tallahassee on July 9, 2008 guidelines on the conditions necessary for use of the Kansas Method may be found in the November 2006 TMDL Assessment Reports published by EPA for Tallahassee. In these reports EPA states, "*The approach for calculating coliform TMDLs depends on the number of bacteria samples and the availability of flow data. When long-term records of water quality and flow data are available, load duration curves, which establish a relationship between concentration and flow, are used to develop TMDLs. Load duration curves utilize a mass balance approach to estimate loadings transported in the stream. Otherwise, when water quality and/or flow data are scarce or not available as it is the case in the Northeast Drainage Ditch, TMDLs are expressed as percent reductions.*"



Spreadsheets formulated on the percent reduction approach were previously developed and used by the City to evaluate the FDEP group 1 round 1 fecal coliform TMDL assessment for the NEDD. The City similarly evaluated several iterations of the FDEP data set shown in Appendix G of the Munson Slough Assessment Report. Table 2 in this letter summarizes the results for each scenario in terms of the percent reductions required for each of the three reaches of the watershed.

As may be seen, when data associated with both qualifiers B and Q (that are typically associated with microbiological samples) were eliminated from the assessment, no reductions were needed at 2 of the 3 locations. The reason is that the 10 % exceedance criteria associated this WQ Standard was not attained. Ideally, FDEP would delay TMDL adoption until the stakeholders and/or FDEP can compile better quality data. The City demonstrated its willingness to participate and take the lead in such an alternative as evidenced during round 1 relative to the 12-month supplemental monitoring effort that was conducted for the WBID 756 TMDLs. As an alternative the proposed TMDLs could be adjusted to reflect the reduction shown in the second column of Table 2.

Table 2  
**A COMPARISON OF METHODS USED TO DETERMINE FECAL COLIFORM  
 TMDL  
 FOR ALL DATA, AND WITH QUALIFIED DATA REMOVED**

*These % reductions are based on the Florida Class III Surface Water Criterion.*

Sampling Station	All Data from Appendix G	Data without Q qualifier from Appendix G	Data without B & Q qualifiers from Appendix G
	% Reduction Mean	% Reduction Mean	% Reduction Mean
Munson Slough@Roberts Ave.	26%	21%	0%
Munson Slough@Springhill Rd.	95%	95%	0%
Munson Slough@Capital Cir.	64%	64%	42%

**General comments**

Data

WBID 807D is not on the May 29, 2008 verified list for turbidity, yet it is stated in this document that it was verified for this parameter. WBID 807C is on the May 29, 2008 verified list for turbidity. There is nothing presented in this report that appears to address such an impairment. However, there is some discussion in the Nutrient TMDL report on transparency. The City questions the purpose of this discussion and wonders if it was included to address the turbidity listing. If not, then all information regarding transparency should be removed from this document. Furthermore, the City is unsure which WBID may or may not be listed for turbidity. If neither WBID is verified for turbidity, then all references to it should also be removed.

In Section 3.2 of the Nutrient TMDL document, there is mention of apple snails that suggests the snails are indicative of high nutrient concentrations. This is not the case. When these snails moved into the lake there was an abundance of macrophytes, which provided a bountiful supply of food for the snails. Their presence does not meet the "imbalance of flora or fauna due to nutrient enrichment" criterion. However, that criterion would apply to the abundance of macrophytes before the snails and the subsequent algal blooms. Further down in this section of the report, there is a reference to "benthic algal mats" being problematic. This issue is not related to the Trophic State Index, but is indicative of sediment nutrients. This discussion should be more comprehensive.

There are numerous instances throughout this document when data that are 30 and 40 years old were used. The City questions the justification for using data that are so dated.

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There have been many technological advances and method revisions over this duration that have affected detection and reporting limits, not to mention changes in land uses and water quality protection.

More than half of the report and appendices are related to information that is neither used nor necessary to develop the TMDL presented herein. Much of the extraneous information presented appears to serve little purpose other than to incite the public and sensationalize a problem that is the opinion of the author. A few of the more obvious include the following:

Photographs taken in the Munson Slough watershed, several of which show large accumulations of floating debris near the County debris removal device at Lake Henrietta, used by the FDEP however; to support the premise that large amounts of decaying debris and a City force main shown in the photo are responsible for high bacteria and high sediment and water column BOD<sub>5</sub>. No mention that these BMPs appear to be working as intended to keep debris where it can be removed! If the water quality data taken at this site (i.e., Springhill Rd) is known to be influenced by the diversion and trash removal device, it should not be used for TMDL analysis. The FDEP has overlooked the fact that the water quality data would be characteristic of water in a treatment device and not the ditch (WBID) itself.

Seven pages of groundwater well monitoring statistics covering the entire Ochlocknee/St Marks Basin beginning with indicator bacteria and without any discussion nor maps showing where wells above Maximum Contaminant Level (MCL) or having risk factors are in fact located. The reader by default is left with the impression that the 807D watershed is at the heart of any problem shown in these statistics.

Summary tables of external loads for the 4 ditches that already have TMDLs established by EPA and showing average concentrations well in excess of the data set used to establish the load reductions. No discussion is included as to how they may be used by FDEP nor are the data tables included within this document or the appendices for the City's review.

Including potentially misleading information increases the risk that stakeholders will not support these TMDLs. The most expedient way to resolve the issue within the adoption schedule is to eliminate these elements from the report.

#### Sources/Loading

The assessment of sources is presented in Chapter 4 of the reports. The FDEP TMDL reports all follow the same format listing sources such as wastewater treatment facilities, NPDES permitted facilities, wildlife, agricultural animals, domestic animals, on-site sewage treatment and disposal systems and land use categories. Final FDEP TMDL reports for fecal coliform, such as Lower Sweetwater Creek and Long Branch Creek only

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list the known and possible sources, but do not assess the loading from these sources. Including source assessments, data and loading values is not appropriate, as they may be mistakenly interpreted as reference values once published in the final report. Assessing loading is especially complex, methods are still under development and assumptions and presumptions are debatable. For example, much effort and focus is currently underway in the Leon and Wakulla Counties to reduce the impacts and promote increased efficiency of septic systems, yet Table 4.4 of the fecal coliform report would indicate that the level and direction of focus should be on domestic animals rather than septic systems. The scope of this report does not allow for the depth of analysis and review needed to quantify fecal or nutrient loading. Therefore, they should be removed from the reports. The estimation of fecal coliform or nutrient loading in the Munson watershed are not needed for the development of these TMDLs and haven't been included in other FDEP adopted TMDLs.

If the fecal coliform loading analyses were not removed from the report, then, at a minimum, the City would have issues regarding the domestic and wildlife animal assessment and septic system loading.

#### Editorial Comments

The City has editorial comments that, due to time constraints to meet the June 21, 2008 deadline, cannot be included in the format of this letter. We intend to provide editorial comments within the next few weeks.

#### Other Issues

Since TMDLs are adopted by rule, they must result in a valid exercise of the Department's delegated legislative authority. In the past, the City has been appreciative of the Department's deliberative approach to establishing TMDLs emphasizing science over schedule. Unfortunately, it appears that the Department's desire to meet a deadline is the driving force behind these TMDLs resulting in the numerous shortcomings detailed above.

The waters at issue were listed June 3, 2008, less than 60 days ago. The period for challenging the listing was barely over when very detailed draft TMDLs were noticed and the July 9th workshop was held. At the workshop, the public was advised that the TMDLs are targeted for adoption by September 1, 2008—less than 60 days from the workshop. Accounting for lead time required to file the FAW notices, the decision to adopt the TMDLs will have had to have been made weeks before September 1st. Consequently, unlike the City's past experiences in working with the Department on difficult technical matters, it appears that the Department's request for comments is an exercise of administrative procedure and that the decision has been made to adopt these TMDLs with no possibility of any extension of time and no real consideration of the City's detailed comments and concerns.

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The City understands that EPA's consent-decree driven September 30th deadline is a driving force behind these expedited TMDLs. However, the Department has always prided itself on science over schedule. Respectfully, and fully understanding that the Department's TMDL staff are working diligently on hundreds of waters throughout the State, the City must object to the consent-decree driven accelerated process and requests that additional time be provided for a legitimate, detailed and reasoned analysis of the City's comments.

Additionally, the City is concerned with the apparent lack of analysis underlying the gross wasteload allocations. Section 403.067(6)(b), Fla. Stat., states in relevant part: The *initial* and detailed allocations shall be designed to attain the pollutant reductions established pursuant to paragraph (a) and shall be based on consideration of the following:

1. Existing treatment levels and management practices;
2. Best management practices established and implemented pursuant to paragraph (7)(c);
3. Enforceable treatment levels established pursuant to state or local law or permit;
4. Differing impacts pollutant sources and forms of pollutant may have on water quality;
5. The availability of treatment technologies, management practices, or other pollutant reduction measures;
6. Environmental, economic, and technological feasibility of achieving the allocation;
7. The cost benefit associated with achieving the allocation;
8. Reasonable timeframes for implementation;
9. Potential applicability of any moderating provisions such as variances, exemptions, and mixing zones; and
10. The extent to which non-attainment of water quality standards is caused by pollution sources outside of Florida, discharges that have ceased, or alterations to water bodies prior to the date of this act.

It does not appear that the factors detailed above were applied in establishing the initial allocations appearing in the draft TMDLs. While it is understood that the Department intends to pursue detailed allocations through the Basin Management Action Plan process, at which time the various factors would be applied, the statute is clear that this

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careful deliberative process is supposed to be employed in establishing initial and detailed allocations.

Additionally, EPA is on record concluding that the fecal coliform criterion is not protective of designated use yet the Department continues to expend time and resources adopting fecal coliform TMDLs and imposing wasteload allocations on MS4 permittees such as the City of Tallahassee. It is doubtful EPA, or FDEP, could successfully defend the continued use of the criterion yet the criterion continues to be maintained and applied with no legitimate scientific basis.

The City shares the goal of protecting water quality with the Department. During the last several years, the City has built multiple multi-million dollar projects to improve water quality in the Munson basin; and it will continue to do so, as there are already more projects planned to be built in the future. The City embarked on improving Lake Munson water quality well before the TMDL process was initiated. With regard to TMDLs, addressing pollution reductions can best be accomplished by establishing technically defensible, science-based water quality goals. Based on the information available, proposed TMDLs do not appear to measure up to that standard. As such, they have the potential to lead to unnecessary waste of citizen's funds. Managing and improving water quality is an expensive endeavor and we must use due diligence to ensure the limited funding that is available, is effectively utilized. Failure to do so actually works against the goal of preserving water quality.

We are hereby requesting that the issues identified within this letter be resolved prior to adopting the proposed TMDL. We look forward to working with FDEP in this process and remain committed to the enhancement of the area's water resources. Should you have any questions regarding these comments, please feel free to contact Blas Gomez at 850-891-6862 or John Cox at 850-891-6867.

Respectfully,

WATER RESOURCES ENGINEERING

*Blas J. Gomez*  
for John Buss, Director

cc: Linda Hudson  
Jim English  
Mike Tadros  
Winston Borkowski

Please refer to Department's letter dated August 25, 2008, for reply.



## Hopping Green & Sams

Attorneys and Counselors  
August 14, 2008

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

Re: Proposed Rule 62-304.300 – Munson Slough Fecal Coliform TMDLs

Dear Jan,

This letter is provided on behalf of the City of Tallahassee in response to the Notice of Proposed Rule published August 8, 2008, addressing Munson Slough Fecal Coliform TMDLs.

The City of Tallahassee participated in the TMDL workshop held July 9, 2008, and provided the Department with detailed comments in its letter of July 21, 2008. In its comment letter, the City expressed concerns that approximately 47% of the data used to establish the proposed fecal coliform TMDLs, and resulting dramatic load reductions, were associated with qualified data that should not be used. EPA Region IV rejected similarly qualified fecal coliform values when it established TMDL's for other WBIDs in the Lake Munson and Lafayette Basins in November 2006. A considerable number of the data points were associated with data qualifiers B and Q. Data associated with data qualifier B are based upon colony counts outside the acceptable range; Q coded data have been held beyond the appropriate holding time.

Additionally, the load reduction now required for WBID 807D at Capital Circle is proposed as a 91.5% reduction in the August 8th notice, but was presented as a 73% reduction at the July 9th workshop. In contrast, as the City noted in its letter of July 21st, a 42% reduction would result if all B and Q qualified data were omitted.

Subsequent to the July 9th workshop, City staff received a phone call from FDEP staff to discuss the City's comments. City staff members were left with the impression that the proposed load reduction would be adjusted according to the City alternative recommendation on page 6 of the City's comment letter. However, the proposed rule reductions are drastically different from the load reductions presented at the July 9th workshop and the City's recommendations. A similar comment can be made of the proposed reduction at Roberts Avenue. The proposed rule would require a 31.6% reduction whereas the City's alternative recommended a 21% reduction. At this point, the public has not been provided with the technical/scientific methodology to derive the proposed reductions.

Additionally, the specific portion of Munson Slough subject to the load reductions should be clarified by reference to the WBID number (807D) or some descriptive term (Munson Slough above Lake Munson). The June 17, 2008, TMDL Report seems to include segments beyond WBID 807D and the rule simply refers to Munson Slough (e.g. WBID 807 is Munson Slough below Lake Munson).

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Post Office Box 6526 Tallahassee, Florida 32314 123 South Calhoun Street (32301) 850.222.7500 850.224.8551 fax www.hgstlaw.com

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Based on the above concerns, the City respectfully requests the following:

1. If qualified data were used, please state the basis (statute, rule, policy, guidance) for using any such qualified data to establish TMDLs and the proposed load reductions;
2. Please provide the City with any data and technical support documents that will allow the City to determine the means by which the fecal coliform TMDLs and resulting load reductions were derived.

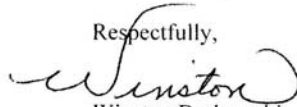
Please provide a written response at your earliest conveniences and within sufficient time to allow the City to review the methodology and data prior to the deadline to request a hearing.

In its July 21st comment letter, the City also expressed its concern with the rapid rate at which these TMDLs are being run through the administrative process and questioned whether its comments would be fully evaluated and properly weighed by the Department. These concerns have been exacerbated by the inexplicable increase in the Capital Circle load reductions and the fact that the July 8th Notice of Proposed Rule came only a week after the Notice of Rule Development. This means that the Notice of Proposed Rule would have been submitted to the Florida Administrative Weekly the Wednesday before the August 1st publication of the Notice of Rule Development, i.e., the rule was finalized before the rule was noticed for development.

The City has consistently enjoyed a very good working relationship with the Department based upon mutual respect between staff members and has always appreciated the Department's meaningful consideration of its comments and concerns. However, the Munson Slough Fecal Coliform TMDLs appear not to have been afforded the same careful consideration.

We look forward to your response and appreciate the opportunity to be part of the rule development process.

Respectfully,



Winston Borkowski  
Hopping Green & Sams  
on behalf of the City of Tallahassee

Copy to:

John Buss  
Jim English

Hopping Green & Sams

Attorneys and Counselors



## Florida Department of Environmental Protection

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2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

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Governor

Jeff Kottkamp  
Lt. Governor

Michael W. Sole  
Secretary

August 25, 2008

Mr. Winston Borkowski  
Hopping Green & Sams  
123 South Calhoun Street  
Tallahassee, Florida 32314

Dear Mr. Borkowski:

Thank you for your letter dated August 14 regarding the Department's Notice of Proposed Rule for the Munson Slough TMDL for fecal coliform. We appreciate the City of Tallahassee's participation in the July 9, 2008 TMDL public workshop on the Total Maximum Daily Loads (TMDLs) for waters in the St. Marks River and Ochlockonee River basins and its' on-going interest in restoring Florida's water resources.

Due to the long history of active involvement by the City, we have come to rely on their expertise and ability to aid us in developing high quality TMDLs for this area. The points made by the City at the workshop were good ones and the Department moved to modify the draft TMDLs per those suggestions. Specifically, we changed the calculation approach to use the percent reduction method (in lieu of the flow duration approach) and we re-evaluated the all the available fecal coliform data in light of the laboratory remark codes. Based on comments received at and after the workshop, edited versions of the fecal coliform TMDLs for Black Creek, Juniper Creek, Munson Slough, and Swamp Creek were posted on the Department's TMDL web page during the week of August 4<sup>th</sup>.

To address the question regarding the use of data, and specifically qualified 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. As the product of that statutory language, we would direct you to 62-303.320(1), Florida Administrative Code, that states "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 should be retained and used for TMDL Program purposes. As we discussed on August 20<sup>th</sup>, 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 Munson Slough TMDL for fecal coliforms.

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Mr. Winston Borkowski  
Hopping Green & Sams  
August 22, 2008  
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Again, we greatly appreciate the interest displayed by the City and particularly its' efforts to implement TMDLs and improve water quality in Tallahassee and the surrounding areas.

You can contact Ms Erin Wilcox, of the Watershed Assessment Section, should you have any questions or need access to any additional information regarding these TMDLs. She can be reached at 245-8442.

Sincerely,



Jan Mandrup-Poulsen, Administrator  
Watershed Assessment Section

cc: Drew Bartlett  
Erin Wilcox  
David Whiting  
Leslee Williams

WA/jmp/pw



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August 29, 2008

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

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 17<sup>th</sup> version and the July 31<sup>st</sup> 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.*

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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.

<b>Date</b>	<b>Result</b>	<b>Qualifier</b>	<b>State Criterion</b>	<b>% Reduction</b>
<b>11/12/1992</b>	<b>33750</b>	<b>M</b>	<b>400</b>	<b>98.81</b>
<b>3/11/1996</b>	<b>2000</b>	<b>M</b>	<b>400</b>	<b>80.00</b>
<b>7/15/1996</b>	<b>1000</b>	<b>M</b>	<b>400</b>	<b>60.00</b>
<b>8/10/1998</b>	<b>8800</b>	<b>D</b>	<b>400</b>	<b>95.45</b>
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
<b>Median</b>	<b>4800</b>			<b>91.53</b>

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 if 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.

<b>Date</b>	<b>Result</b>	<b>Remark Code</b>	<b>State Criterion</b>	<b>% Reduction</b>
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
<b>Median</b>	<b>4800</b>			<b>91.53</b>

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.

<b>Date</b>	<b>Result</b>	<b>Qualifier</b>	<b>State criterion</b>	<b>%Reduction</b>
<i>11/12/1992</i>	1100	Q	400	<b>63.64</b>
<i>2/10/1993</i>	190		400	-110.53
<i>5/13/1993</i>	1100	Q	400	<b>63.64</b>
<i>7/13/1993</i>	450	A	400	<b>11.11</b>
<i>2/15/1995</i>	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	<b>75.00</b>
10/25/2006	30	B	400	-1233.33
1/22/2007	540		400	<b>25.93</b>
4/26/2007	410		400	<b>2.44</b>
4/26/2007	636	B	400	<b>37.11</b>
5/1/2007	690	B	400	<b>42.03</b>
5/1/2007	920		400	<b>56.52</b>
5/1/2007	560		400	<b>28.57</b>
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
<b>Median</b>				<b>39.57 (Current TMDL number)</b>

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	<b>75.00</b>
10/25/2006	30	B	400	-1233.33
1/22/2007	540		400	<b>25.93</b>
4/26/2007	410		400	<b>2.44</b>
4/26/2007	636	B	400	<b>37.11</b>
5/1/2007	690	B	400	<b>42.03</b>
5/1/2007	920		400	<b>56.52</b>
5/1/2007	560		400	<b>28.57</b>
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



<b>Median</b>	<b>37.11</b>
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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 or 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	<b>11.11</b>
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	<b>75.00</b>
10/25/2006	30	B	400	-1233.33
1/22/2007	540		400	<b>25.93</b>
4/26/2007	410		400	<b>2.44</b>
4/26/2007	636	B	400	<b>37.11</b>
5/1/2007	690	B	400	<b>42.03</b>

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

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	<b>75.00</b>
10/25/2006	30	B	400	-1233.33
1/22/2007	540		400	<b>25.93</b>
4/26/2007	410		400	<b>2.44</b>
4/26/2007	636	B	400	<b>37.11</b>
5/1/2007	690	B	400	<b>42.03</b>
5/1/2007	920		400	<b>56.52</b>
5/1/2007	560		400	<b>28.57</b>
6/12/2007	220		400	-81.82
6/12/2007	250		400	-60.00
6/21/2007	54		400	-640.74
<b>Median</b>				<b>37.11</b>

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	<b>75.00</b>
10/25/2006	30	B	400	-1233.33
1/22/2007	540		400	<b>25.93</b>
4/26/2007	410		400	<b>2.44</b>
4/26/2007	636	B	400	<b>37.11</b>
5/1/2007	805	<i>B</i>	<i>400</i>	<i>50.31</i>
5/1/2007	560		400	<b>28.57</b>
6/12/2007	220		400	-81.82
6/12/2007	250		400	-60.00
6/21/2007	54		400	-640.74
<b>Median</b>				<b>32.84</b>

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.

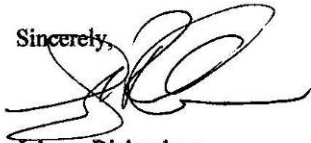
WBID	Station Number	Date	Time	Result	Remark Code	%Reduction
1024	21FLLEONLCOC3032584638	10/17/2006	1359	1600		75.000
1024	21FLLEONLCOC3032584638	1/22/2007	1154	540		25.926
1024	21FLPNS301932708441365	4/26/2007	1215	410		2.439
1024	21FLPNS301932208441442	4/26/2007	1255	636	B	37.107

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

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

Sincerely,



Johnny Richardson  
Water Quality Scientist  
Leon County Public Works  
2280 Miccosukee Rd.  
Tallahassee, FL 32308  
(850) 606-1500  
[richardsonjo@leoncountyfl.gov](mailto:richardsonjo@leoncountyfl.gov)



## Florida Department of Environmental Protection

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

September 12, 2008

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Governor

Jeff Kotkamp  
Lt. Governor

Michael W. Sole  
Secretary

Johnny Richardson  
Leon County Public Works  
2280 Miccosukee Road  
Tallahassee, FL 32308

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 Munson Slough (WBID 807D), the July 31, 2008 version.

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 Munson Slough 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, Administrator  
Watershed Assessment Section

jmp/wa/ew

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[www.dep.state.fl.us](http://www.dep.state.fl.us)



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