**FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION**

Division of Environmental Assessment and Restoration, Bureau of Watershed Management

NORTHWEST DISTRICT • PERDIDO RIVER AND BAY BASIN

## TMDL Report

# Fecal Coliform TMDL for Elevenmile Creek, WBID 489, and Tenmile Creek, WBID 489A

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**October 22, 2008**

# Acknowledgments

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

**For additional information on the watershed management approach and impaired waters in the Elevenmile Creek watershed, contact**

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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

**Criteria for Surface Water Quality Classifications**

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

**Basin Status Report: Perdido River and Bay**

ftp://ftp.dep.state.fl.us/pub/water/basin411/perdido/status/Perdido.pdf

**Water Quality Assessment Report: Perdido River and Bay**

ftp://ftp.dep.state.fl.us/pub/water/basin411/perdido/assessment/G5AS-PerdidoRiverBayLowResMerged.pdf

**HSPF and EFDC/EFDC_Explorer Training**

www.dsllc.com

### U.S. Environmental Protection Agency

**National STORET Program**

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

**Region 4: Total Maximum Daily Loads in Florida**

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

# Chapter 1: INTRODUCTION

## 1.1 Purpose of Report

This report presents the Total Maximum Daily Load (TMDL) for fecal coliform for the Elevenmile Creek watershed in the Perdido River and Bay Basin. Elevenmile Creek and one of its tributaries, Tenmile Creek, were verified as impaired for fecal coliform, and were included on the Verified List of impaired waters for the Perdido Basin that was adopted by Secretarial Order in December 2007. The TMDL establishes the allowable loadings to Elevenmile Creek and Tenmile Creek that would restore these waterbodies so that they meet their applicable water quality criteria for fecal coliform.

## 1.2 Identification of Waterbody

The Elevenmile Creek watershed, which is located in Escambia County, Florida, has a 47.97-square-mile ($mi^2$) drainage area that reaches from Cantonment to Perdido Bay (**Figure 1.1**). Elevenmile Creek is about 13 miles long. This fourth-order stream receives water from Tenmile Creek. Both waterbodies are fed by the sand and gravel aquifer. Additional information about the stream's hydrology and geology are available in the Basin Status Report for the Perdido River and Bay Basin (Florida Department of Environmental Protection [Department], 2006).

For assessment purposes, the Department has divided the Perdido River and Bay Basin into water assessment polygons with a unique **w**ater**b**ody **id**entification (WBID) number for each watershed or stream reach. The Perdido Basin has been divided into numerous segments, as shown in **Figure 1.2,** and this TMDL addresses primarily Elevenmile Creek (WBID 489). However, tributaries to the creek, including Tenmile Creek (WBID 489A), Coffee Creek/Beulah Landfill (WBID 489B), Eightmile Creek (WBID 624), and Hurst Branch (WBID 681), are also addressed in the analysis.

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

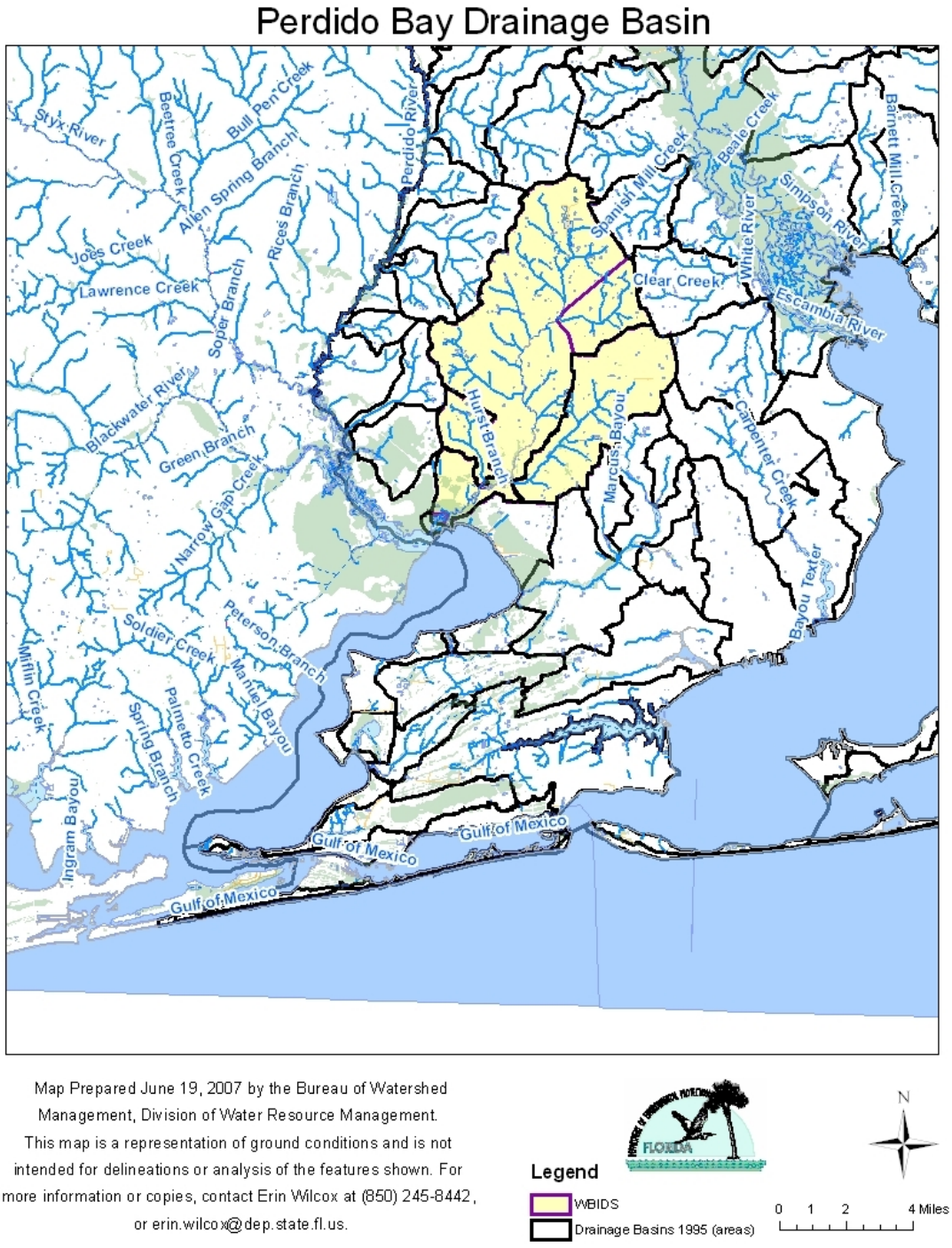
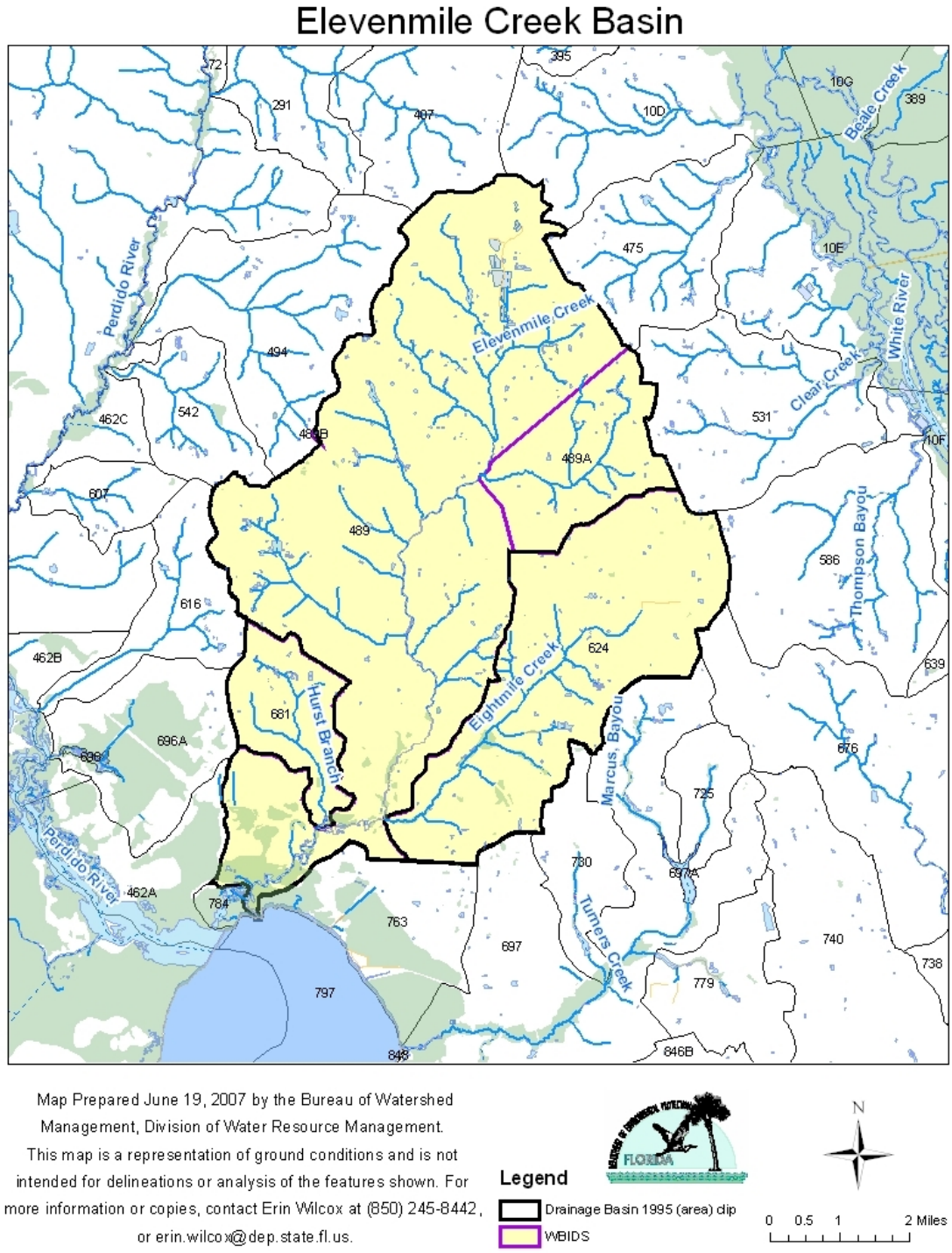


Figure 1.2. Elevenmile Creek Watershed, WBIDs 489, 489A, 489B, 624, and 681



## 1.3 Background

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

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

This TMDL report will be followed by the development and implementation of a Basin Management Action Plan, or BMAP, to reduce the amount of fecal coliform that caused the verified impairment of the Elevenmile Creek watershed. These activities will depend heavily on the active participation of the Northwest Florida Water Management District (NWFWMD), local governments, businesses, and other stakeholders. The Department will work with these organizations and individuals to undertake or continue reductions in the discharge of pollutants and achieve the established TMDLs for impaired waterbodies.

# Chapter 2: DESCRIPTION OF WATER QUALITY PROBLEM

## 2.1 Statutory Requirements and Rulemaking History

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

Florida's 1998 303(d) list included 15 waterbodies in the Perdido 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 Perdido Basin and has verified the impairments listed in **Table 2.1**. **Table 2.2** provides selected assessment results for fecal coliform within the verification period (which was January 1, 1999, through June 30, 2006) for the Elevenmile Creek watershed. Two of the four waterbody segments in the watershed—Elevenmile Creek and Tenmile Creek—have been verified impaired for fecal coliform. This TMDL analysis addresses the fecal coliform impairment in the Elevenmile Creek watershed, and includes the impairment for Tenmile Creek.

There were a total of 183 fecal coliform samples collected within the verified period. The samples used in the TMDL calculation range from 10 to 17,500 colony-forming units per 100 milliliters (cfu/100mL), while the 168 samples that were omitted because they were collected prior to the U.S. Geological Survey (USGS) flow gage data ranged from 2 to 160,000 cfu/100mL. Values of zero were changed to one for the purposes of calculating the TMDL. **Table 2.3** briefly summarizes the fecal coliform data for Elevenmile Creek.

## Table 2.1. Verified Impaired Segments in the Perdido River and Bay Basin

| WBID | Waterbody Segment | Parameters Assessed Using the IWR | Priority for TMDL Development | Projected Year for TMDL Development |
|---|---|---|---|---|
| 489 | Elevenmile Creek | Dissolved Oxygen/ Biological Oxygen Demand | High | 2007 |
| **489** | **Elevenmile Creek** | **Fecal Coliform** | **High** | **2007** |
| 489 | Elevenmile Creek | Unionized Ammonia | Low | 2012 |
| 697 | Marcus Creek | Fecal Coliform | Low | 2012 |
| 797 | Upper Perdido Bay | Nutrients | Low | 2012 |
| 797 | Upper Perdido Bay | Mercury (in Fish Tissue) | Low | 2011 |
| 872 | Bridge Creek | Mercury (in Fish Tissue) | Low | 2011 |
| 935 | Unnamed Stream | Fecal Coliform | Low | 2012 |
| 945 | Tarkiln Bayou | Mercury (in Fish Tissue) | Low | 2011 |
| 974 | Perdido Bay | Mercury (in Fish Tissue) | Low | 2011 |
| 991 | Direct Runoff to Bay | Mercury (in Fish Tissue) | Low | 2011 |
| 1004 | Big Lagoon | Mercury (in Fish Tissue) | Low | 2011 |
| 1014 | Direct Runoff to Bay | Mercury (in Fish Tissue) | Low | 2011 |
| 1018 | Direct Runoff to Bay | Mercury (in Fish Tissue) | Low | 2011 |
| **489A** | **Tenmile Creek** | **Fecal Coliform** | **High** | **2007** |
| 4 | Brushy Creek | Fecal Coliform | Low | 2012 |
| 542 | Rest Area Run | Turbidity | Low | 2012 |
| 2F | Perdido River | Mercury (in Fish Tissue) | Low | 2011 |
| 462A | Perdido River | Fecal Coliform | Low | 2012 |
| 462A | Perdido River | Mercury (in Fish Tissue) | Low | 2011 |
| 462B | Perdido River | Fecal Coliform | Low | 2012 |
| 462B | Perdido River | Mercury (in Fish Tissue) | Low | 2011 |
| 462C | Perdido River | Mercury (in Fish Tissue) | Low | 2011 |
| 72, 72D-F | Direct Runoff to STM | Mercury (in Fish Tissue) | Low | 2011 |
| 8999 | Gulf Coast | Mercury (in Fish Tissue) | Low | 2011 |

**Note:** The parameters listed in **Table 2.1** provide a complete picture of the impairment in the Perdido Basin, but this TMDL only addresses the fecal coliform impairment in the Elevenmile Creek and Tenmile Creek watersheds.

## Table 2.2. Summary of Fecal Coliform Data for the Elevenmile Creek Watershed, WBID 489

| WBID | STATION | DATE | TIME | FECAL A-1 (MPN/1010ML) (31621) | FECAL MEMBR (CFU/100ML) (31616) | FECAL TUB (MPN/100ML) (31614) | FECAL TUBE (MPN/100ML) (31615) | OTHER FECAL |
|---|---|---|---|---|---|---|---|---|
| 489 | 1113S050640410 | 12/5/1966 | 1420 | | | | 490 | |
| 489 | 1113S050640410 | 12/6/1966 | 1330 | | | | 490 | |
| 489 | 1113S050640410 | 12/7/1966 | 1350 | | | | 230 | |
| 489 | 1113S050640410 | 12/9/1966 | 1306 | | | | 2100 | |
| 489 | 1113S050640410 | 12/12/1966 | 945 | | | | 3500 | |
| 489 | 1113S050640410 | 12/13/1966 | 1120 | | | | 790 | |
| 489 | 1113S050640410 | 12/14/1966 | 1343 | | | | 790 | |
| 489 | 1113S050640410 | 12/29/1966 | 1125 | | | | 160000 | |
| 489 | 1113S000640066 | 6/12/1972 | 1445 | | | | 490 | |
| 489 | 1113S000640069 | 6/12/1972 | 950 | | | | 2800 | |
| 489 | 1113S000640072 | 6/12/1972 | 1055 | | | | 230 | |
| 489 | 1113S000640072 | 6/13/1972 | 1110 | | | | 110 | |
| 489 | 21FLA 33010011 | 9/5/1973 | 820 | | | 540 | | |
| 489 | 21FLA 33010013 | 9/5/1973 | 905 | | | 2400 | | |
| 489 | 21FLA 33010011 | 9/7/1973 | 1130 | | | 540 | | |
| 489 | 21FLA 33010011 | 9/7/1973 | 1130 | | | 540 | | |
| 489 | 21FLA 33010013 | 10/30/1973 | 850 | | | 19 | | |
| 489 | 21FLA 33010011 | 11/1/1973 | 815 | | | 1600 | | |
| 489 | 21FLA 33010011 | 11/1/1973 | 815 | | | 1600 | | |
| 489 | 21FLA 33010040 | 10/9/1974 | 1200 | | | 79 | | |
| 489 | 21FLA 33010041 | 10/9/1974 | 1225 | | | 350 | | |
| 489 | 21FLA 33010012 | 12/11/1975 | 1400 | | | 2 | | |
| 489 | 21FLA 33010011 | 6/3/1976 | 1120 | | | | 350 | |
| 489 | 21FLA 33010040 | 10/1/1978 | 1110 | | | | 490 | |
| 489 | 21FLA 33010010 | 1/7/1979 | 830 | | | | 330 | |
| 489 | 21FLA 33010011 | 1/7/1979 | 900 | | | | 13000 | |
| 489 | 21FLA 33010012 | 1/7/1979 | 915 | | | | 2300 | |
| 489 | 21FLA 33010013 | 1/7/1979 | 935 | | | | 7900 | |
| 489 | 21FLA 33010014 | 1/7/1979 | 1000 | | | | 4900 | |
| 489 | 21FLA 33010013 | 8/3/1980 | 930 | | | | 930 | |
| 489 | 21FLA 33010043 | 10/7/1980 | 1050 | | | | 23 | |
| 489 | 21FLA 33010011 | 2/1/1981 | 930 | | 10 | | | |
| 489 | 21FLA 33010046 | 12/14/1995 | 955 | | 230 | | | |
| 489 | 21FLBFA 33010011 | 1/10/1996 | 1015 | | 60 | | | |
| 489 | 21FLBFA 33010011 | 9/8/1996 | 855 | | 5200 | | | |
| 489 | 21FLBFA 33010014 | 9/8/1996 | 941 | | 1860 | | | |
| 489 | 21FLBFA 33010011 | 12/1/1996 | 925 | | 800 | | | |
| 489 | 21FLBFA 33010014 | 12/1/1996 | 1005 | | 480 | | | |
| 489 | 21FLBFA 33010011 | 6/1/1997 | 1010 | | 580 | | | |
| 489 | 21FLBFA 33010014 | 6/1/1997 | 1135 | | 2000 | | | |
| 489 | 21FLBFA 33010011 | 5/17/1998 | 1445 | | 440 | | | |
| 489 | 21FLBFA 33010011 | 8/24/1998 | 1240 | | 100 | | | |
| 489 | 21FLGW 3565 | 10/20/1998 | 1245 | 700 | | | | |
| 489 | 21FLGW 3565 | 11/17/1998 | 1415 | 118 | | | | |
| 489 | 21FLBFA 33010011 | 11/23/1998 | 1505 | | 3900 | | | |
| 489 | 21FLGW 3565 | 12/21/1998 | 1030 | 88 | | | | |
| 489 | 21FLGW 3565 | 5/16/2006 | 630 | 104 | | | | |
| 489 | 21FLPNS 33010011 | 6/12/2006 | 1200 | 1018 | | | | |
| 489 | 21FLPNS 33010013 | 6/12/2006 | 1330 | 109 | | | | |
| 489 | 21FLPNS 33010093 | 6/12/2006 | 1130 | 400 | | | | |
| 489 | 21FLGW 3565 | 6/21/2006 | 645 | 520 | | | | |
| 489 | 21FLBRA 489-A | 6/27/2006 | 1548 | 550 | | | | |

| WBID | STATION | DATE | TIME | FECAL A-1 (MPN/1010ML) (31621) | FECAL MEMBR (CFU/100ML) (31616) | FECAL TUB (MPN/100ML) (31614) | FECAL TUBE (MPN/100ML) (31615) | OTHER FECAL |
|---|---|---|---|---|---|---|---|---|
| 489 | NICOLE KILBURN AFTER BOIL STATION 3, AT SR 297A | 11/15/1995 | | | | | | 2000 |
| 489 | NICOLE KILBURN AFTER BOIL STATION 3, AT SR 297A | 11/20/1995 | | | | | | 540 |
| 489 | NICOLE KILBURN AFTER BOIL STATION 3, AT SR 297A | 11/21/1995 | | | | | | 320 |
| 489 | NICOLE KILBURN AFTER BOIL STATION 3, AT SR 297A | 11/27/1995 | | | | | | 220 |
| 489 | NICOLE KILBURN AFTER BOIL STATION 3, AT SR 297A | 11/28/1995 | | | | | | 360 |
| 489 | NICOLE KILBURN AFTER BOIL STATION 3, AT SR 297A | 11/30/1995 | | | | | | 460 |
| 489 | NICOLE KILBURN AFTER BOIL STATION 3, AT SR 297A | 12/4/1995 | | | | | | 2000 |
| 489 | NICOLE KILBURN AFTER BOIL STATION 3, AT SR 297A | 12/7/1995 | | | | | | 1300 |

**Note: Appendix G** contains the entire table.

## Table 2.3. Summary of Fecal Coliform Data for the Elevenmile Creek Watershed

| Dataset | Minimum | Maximum | Mean | Median | Range |
|---|---|---|---|---|---|
| Verified period data | 1 | 4,700 | 337.02 | 123 | 1-4,700 |
| Period of record data | 1 | 160,000 | 964.97 | 195 | 1-160,000 |

**Note:** Fecal coliform data are in cfu/100mL.

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

## 3.1 Classification of the Waterbody and Criteria Applicable to the TMDL

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

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

The Elevenmile Creek watershed contains a number of Class III fresh waterbodies: Elevenmile Creek, Tenmile Creek, Eightmile Creek, Coffee Creek, and Hurst Branch. These have a designated use of recreation, propagation, and the maintenance of a healthy, well-balanced population of fish and wildlife. The water quality criterion applicable to the impairment addressed by this TMDL is the Class III criterion for fecal coliform.

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

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

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

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

# Chapter 4: ASSESSMENT OF SOURCES

## 4.1 Types of Sources

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

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

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

## 4.2 Potential Sources of Coliform in the Elevenmile Creek Watershed

### *4.2.1 Point Sources*

There is currently one permitted wastewater treatment facility that discharges loads either directly or indirectly into Elevenmile Creek. International Paper (former owners include Champion Paper, St. Regis, and Florida Pulp & Paper), an industrial pulp mill, has discharged to the headwaters of the creek near Cantonment since 1939 (EPA, 1988). The Cantonment wastewater treatment plant (WWTP) was a domestic facility that discharged to the headwaters of the creek just upstream of State Road (S.R.) 186 until May 20, 1998 (**Table 4.1**).

These facilities were permitted through the NPDES Program in Florida. When examining long-term trends in the Elevenmile Creek system, this analysis includes (where possible) the loads from formerly active facilities. Another permitted facility, the Beulah Landfill, is located in the Coffee Creek watershed, north of the USGS stream gage at U.S. Highway 90.

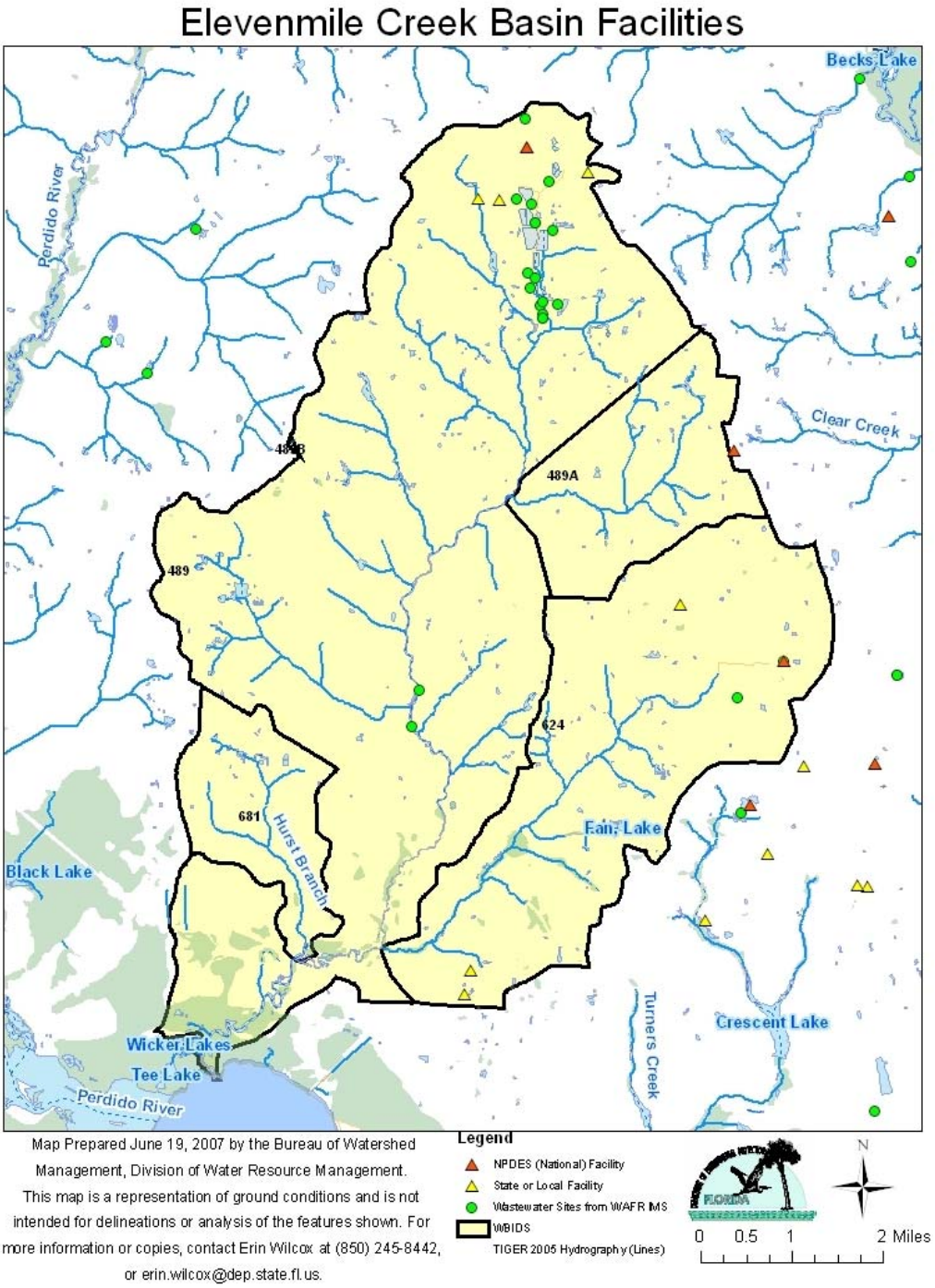
**Appendix C** summarizes all point source loads for the facilities discharging to the Perdido Basin, and **Appendix E** summarizes effluent data for those facilities. The EPA (1988) has summarized the history of the mill treatment system from 1939 through 1988, while Livingston et al. (1998) has also summarized mill treatment from 1958 through 1998, in addition to conducting various water quality studies of Elevenmile Creek and Perdido Bay.

### Table 4.1. Point Sources in the Elevenmile Creek Watershed, WBID 489

| Permit Number | Facility Name | City | Type of Facility | Facility Status | Design Capacity (mgd)* | Watershed | WBID |
|---|---|---|---|---|---|---|---|
| FL0002526 | International Paper | Cantonment | Industrial | Active | 24 | Elevenmile Creek | 489 |
| FL0038504 | Cantonment WWTP | Cantonment | Domestic Waste | Inactive | 1.228 | Elevenmile Creek | 489 |
| FLR05A334 | Beulah Landfill | Escambia County | Solid Waste | Closed | | Coffee Creek | 489 |

* mgd – Million gallons per day

Figure 4.1. Wastewater Facilities in the Elevenmile Creek Watershed, WBIDs 489, 489A, 489B, 624, and 681



### Municipal Separate Storm Sewer System Permittees

Within Escambia County, the stormwater collection systems owned and operated by co-permittees Escambia County, city of Pensacola, town of Century, and Florida Department of Transportation (FDOT) District 3 in Escambia County are covered by an NPDES municipal separate storm sewer system (MS4) permit (FLS000019). Several other local governments in the watershed have also applied for coverage under the Phase 2 NPDES MS4 permit. These include Santa Rosa County, Milton, Gulf Breeze, and FDOT in Santa Rosa County (Jozwiak, 2007).

## *4.2.2 Land Uses and Nonpoint Sources*

Additional fecal coliform loadings to the Elevenmile Creek watershed are generated from nonpoint sources in the watershed. Potential nonpoint sources of coliform include loadings from surface runoff, wildlife, livestock, pets, and leaking septic tanks. **Appendix B** summarizes land use loads, by category.

### Land Uses

The spatial distribution and acreage of different land use categories were identified using the 1995 NWFWMD land use coverage (scale 1:40,000) contained in the Department's geographic information system (GIS) library. Land use categories in the watershed were aggregated using the simplified Level 1 codes tabulated in **Table 4.2. Figures 4.2a** and **4.2b** show the acreage of the principal land uses in the area surrounding the watershed and in the watershed itself (Level 2 is used in the figures to present the watershed's land use in more detail than the Level 1 tables). As shown in **Table 4.2**, land use in the Elevenmile Creek watershed (WBIDs 489, 489A, 489B, 624, and 681) is heavily dominated by upland forests, which comprise 38.60 percent of the entire watershed. Other non-natural land uses in the watershed include transportation, communication, and utilities (3.69 percent) and agriculture (9.30 percent).

Table 4.2. Classification of Land Use Categories in the Elevenmile Creek Watershed, WBIDs 489, 489A, 489B, 624, and 681

| Level 1 Code | Land Use | Acreage | $Mi^2$ | % of Watershed |
|---|---|---|---|---|
| **Elevenmile Creek Watershed, WBIDs 489, 489A, 489B, 624 and 681** | | | | |
| 1000 | Urban and Built-up | 11,100.00 | 17.40 | 36.20 |
| 2000 | Agriculture | 2,860.00 | 4.46 | 9.30 |
| 3000 | Rangeland | 488.00 | 0.76 | 1.59 |
| 4000 | Upland Forests | 11,800.00 | 18.50 | 38.60 |
| 5000 | Water | 357.00 | 0.56 | 1.16 |
| 6000 | Wetlands | 2,890.00 | 4.52 | 9.42 |
| 7000 | Barren Land | 30.40 | 0.05 | 0.10 |
| 8000 | Transportation, Communication, and Utilities | 1,130.00 | 1.77 | 3.69 |
| | **TOTAL:** | **30,700.00** | **48.00** | **100.00** |

| Level 1 Code | Land Use | Acreage | $Mi^2$ | % of Watershed |
|---|---|---|---|---|
| **Elevenmile Creek, WBID 489** | | | | |
| 1000 | Urban and Built-up | 5,270.40 | 8.24 | 28.57 |
| 2000 | Agriculture | 1,976.50 | 3.09 | 10.72 |
| 3000 | Rangeland | 383.26 | 0.60 | 2.08 |
| 4000 | Upland Forests | 7,698.90 | 12.03 | 41.74 |
| 5000 | Water | 259.11 | 0.40 | 1.40 |
| 6000 | Wetlands | 2,203.20 | 3.44 | 11.95 |
| 7000 | Barren Land | 19.23 | 0.03 | 0.10 |
| 8000 | Transportation, Communication, and Utilities | 634.28 | 0.99 | 3.44 |
| | **TOTAL:** | **18,445.00** | **28.82** | **100.00** |
| **Level 1 Code** | **Land Use** | **Acreage** | **$Mi^2$** | **% of Watershed** |
| **Tenmile Creek, WBID 489A** | | | | |
| 1000 | Urban and Built-up | 1,680.00 | 2.62 | 60.40 |
| 2000 | Agriculture | 120.00 | 0.19 | 4.33 |
| 3000 | Rangeland | 29.80 | 0.05 | 1.07 |
| 4000 | Upland Forests | 810.00 | 1.27 | 29.20 |
| 5000 | Water | 26.10 | 0.04 | 0.94 |
| 6000 | Wetlands | 61.10 | 0.10 | 2.20 |
| 7000 | Barren Land | 5.26 | 0.01 | 0.19 |
| 8000 | Transportation, Communication, and Utilities | 45.10 | 0.07 | 1.63 |
| | **TOTAL:** | **2,780.00** | **4.34** | **100.00** |
| **Level 1 Code** | **Land Use** | **Acreage** | **$Mi^2$** | **% of Watershed** |
| **Coffee Creek, WBID 489B** | | | | |
| 1000 | Urban and Built-up | 0.00 | 0.00 | 0.00 |
| 2000 | Agriculture | 0.00 | 0.00 | 0.00 |
| 3000 | Rangeland | 0.00 | 0.00 | 0.00 |
| 4000 | Upland Forests | 0.00 | 0.00 | 0.00 |
| 5000 | Water | 0.00 | 0.00 | 0.00 |
| 6000 | Wetlands | 0.00 | 0.00 | 0.00 |
| 7000 | Barren Land | 0.00 | 0.00 | 0.00 |
| 8000 | Transportation, Communication, and Utilities | 0.00 | 0.00 | 0.00 |
| | **TOTAL:** | **0.00** | **0.00** | **0.00** |

| Level 1 Code | Land Use | Acreage | $Mi^2$ | % of Watershed |
|---|---|---|---|---|
| **Eightmile Creek, WBID 624** | | | | |
| 1000 | Urban and Built-up | 3,880.00 | 6.07 | 51.00 |
| 2000 | Agriculture | 612.00 | 0.96 | 8.05 |
| 3000 | Rangeland | 56.20 | 0.09 | 0.74 |
| 4000 | Upland Forests | 2,290.00 | 3.58 | 30.10 |
| 5000 | Water | 48.00 | 0.08 | 0.63 |
| 6000 | Wetlands | 266.00 | 0.42 | 3.49 |
| 7000 | Barren Land | 5.94 | 0.01 | 0.08 |
| 8000 | Transportation, Communication, and Utilities | 446.00 | 0.70 | 5.87 |
| | **TOTAL:** | **7,610.00** | **11.90** | **100.00** |
| **Level 1 Code** | **Land Use** | **Acreage** | **$Mi^2$** | **% of Watershed** |
| **Hurst Branch, WBID 681** | | | | |
| 1000 | Urban and Built-up | 280.00 | 0.44 | 15.00 |
| 2000 | Agriculture | 147.00 | 0.23 | 7.86 |
| 3000 | Rangeland | 18.90 | 0.03 | 1.01 |
| 4000 | Upland Forests | 1,040.00 | 1.62 | 55.30 |
| 5000 | Water | 23.60 | 0.04 | 1.26 |
| 6000 | Wetlands | 361.00 | 0.57 | 19.30 |
| 7000 | Barren Land | 0.00 | 0.00 | 0.00 |
| 8000 | Transportation, Communication, and Utilities | 5.91 | 0.01 | 0.32 |
| | **TOTAL:** | **1,870.00** | **2.93** | **100.00** |

## Figure 4.2a. Principal Land Uses Surrounding the Elevenmile Creek Watershed

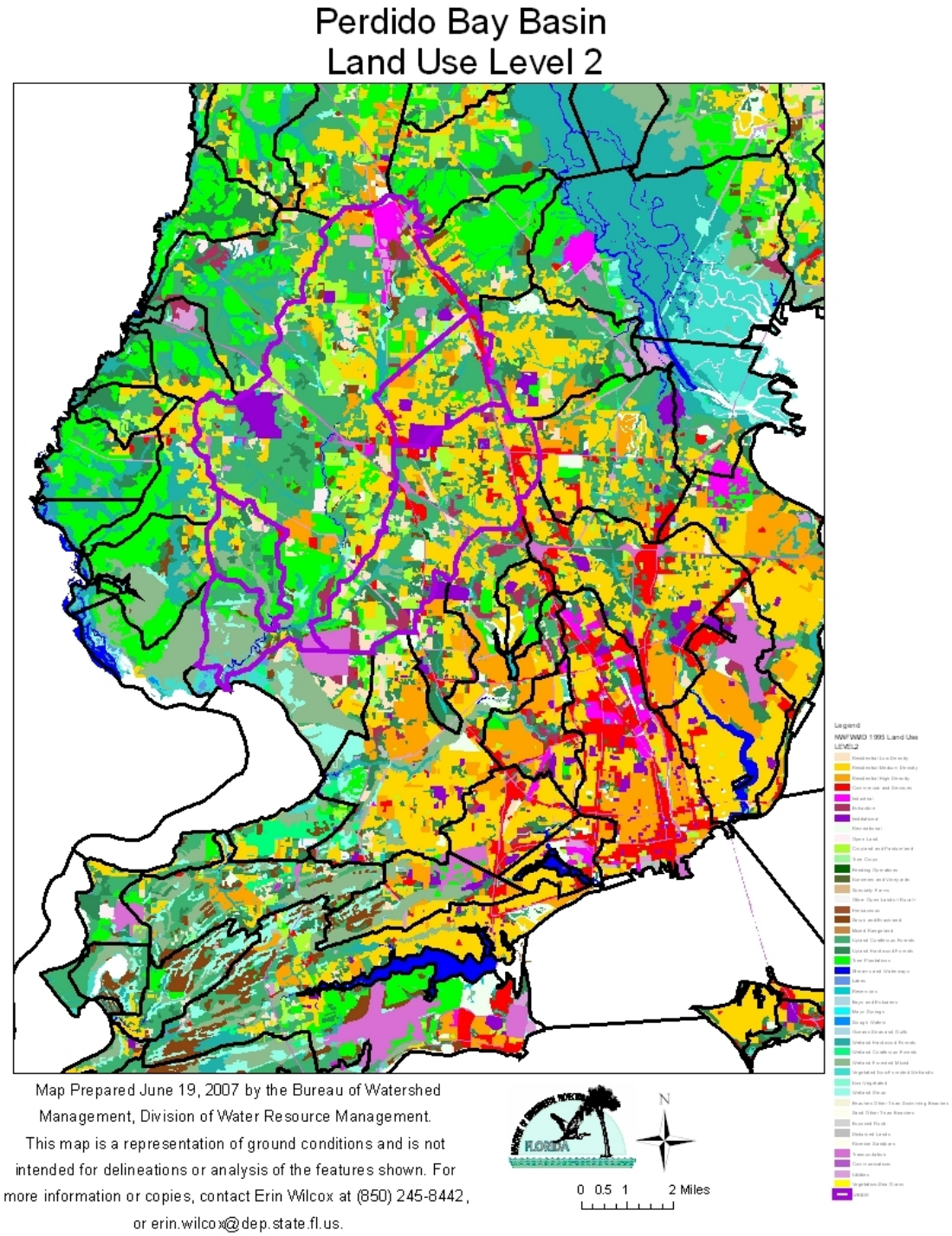
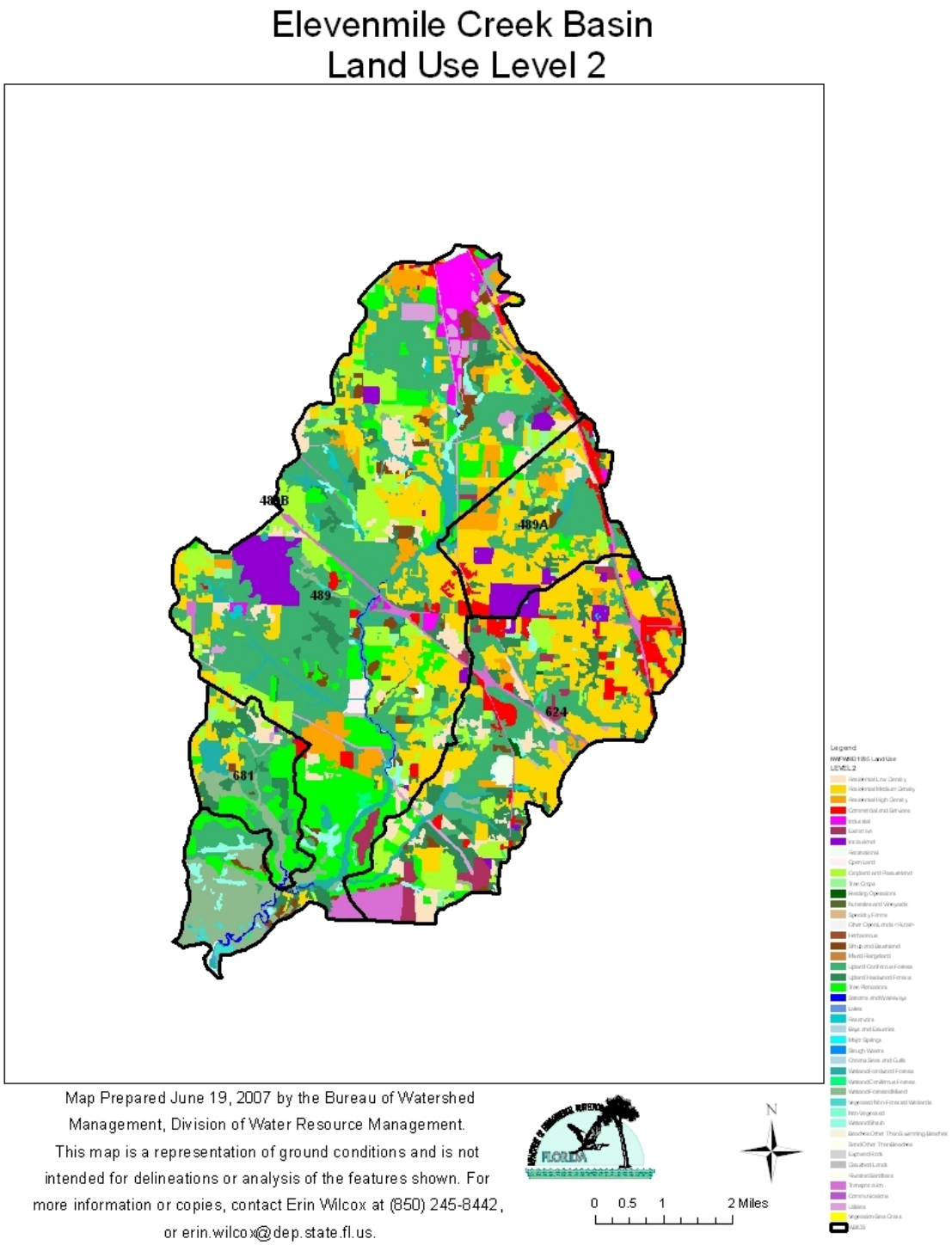


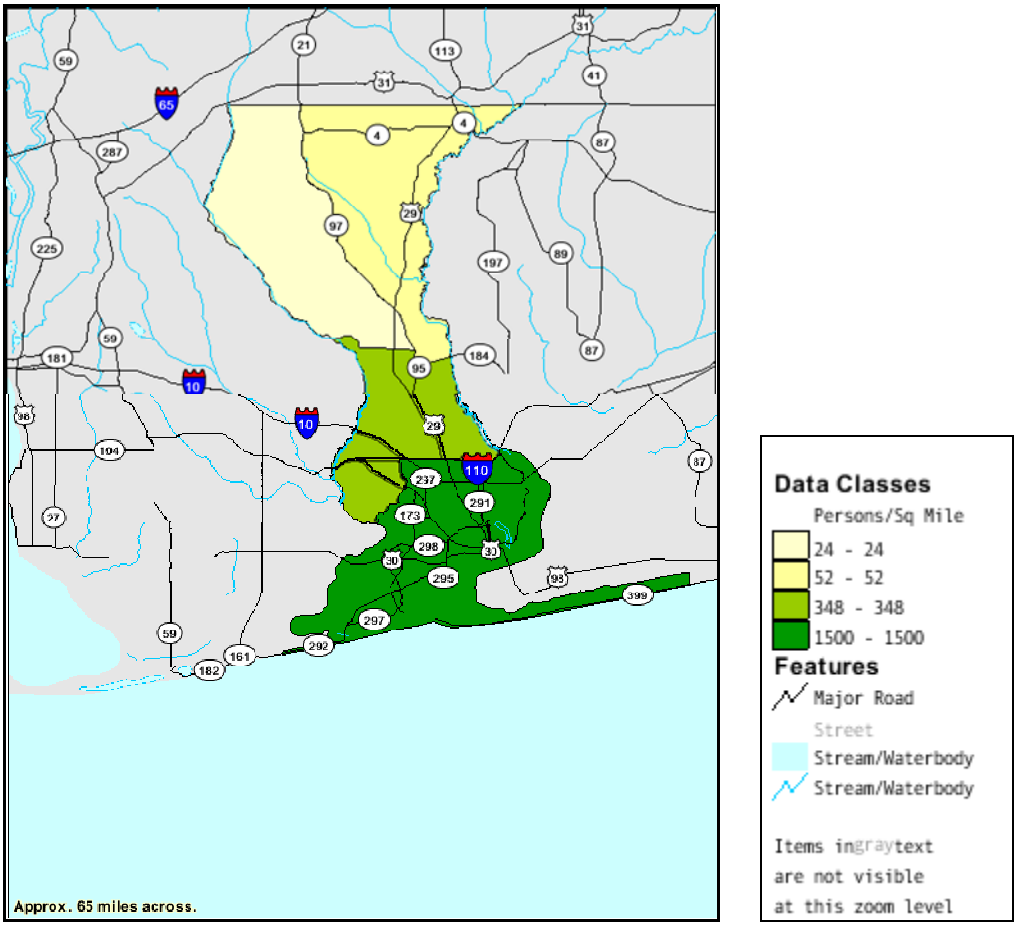
Figure 4.2b. Principal Land Uses in the Elevenmile Creek Watershed, WBIDs 489, 489A, 489B, 624, and 681



## Population

According to the U.S. Census Bureau Website (2007), the population density in and around the Elevenmile Creek watershed in the year 2000 was at or less than 1,579.2 people/mi$^2$ (10 persons/mi$^2$ is the minimum used by the Census Bureau) (**Figure 4.3**). The Bureau reports that in Escambia County, which includes WBIDs 489, 489A, 489B, 624, and 681, the total population for 2000 was 294,410, with 111,049 occupied housing units and 124,647 total housing units. For all of Escambia County, the Census Bureau reported a housing density of 180.09 housing units/mi$^2$. This places Escambia County among the highest in housing densities in Florida (U.S. Census Bureau Website, 2007). This is also supported by land use coverage showing that 36.19 percent of land use in the Elevenmile Creek watershed delineated as urban and built-up.

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



## 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 coliform, pathogens, and other pollutants to both ground water and surface water.

As of 2005, Escambia County had roughly 67,761 septic systems (Florida Department of Health [FDOH] Website, 2007). Data for septic tanks are based on 1970 to 2005 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 1993 to 2005, 9,572 permits for repairs were issued (FDOH Website, 2007). Based on the number of permitted septic tanks and housing units located in the county, approximately 45.71 percent of the housing units are connected to a wastewater treatment facility, with the remaining 54.29 percent using septic tank systems.

The Elevenmile Creek watershed comprises 47.97 $mi^2$, or approximately 6.93 percent of the total land area of Escambia County (692.13 $mi^2$). The number of septic tanks in the watershed is not known, but using the ratio of Level 1 urban and built-up land use in the watershed to that in Escambia County (0.06), the number of septic tanks is estimated to be 10,247. Using these numbers (FDOH Website, 2007) and 70 gallons/day/person (EPA, 2001), a loading of 3.394 X $10^{12}$ colonies/day is derived. These estimations of fecal coliform loading, as shown in **Table 4.3,** constitute 4.42 percent of the total load to the Elevenmile Creek watershed. **Appendix B** contains a map (FDOH Website, 2007) showing the distribution of septic tanks in the watershed.

### Table 4.3. Estimation of Fecal Coliform Loading from Failed Septic Tanks in the Elevenmile Creek Watershed

| Estimated Population Density and Area | Estimated Number of Septic Tanks in Area | Estimated Number of Tank Failures | Estimated Concentration from Failed Tanks (cfu/100mL) | Gallons/ Person/ Day | Estimated Number of People per Household | Estimated Load from Failing Tanks (cfu/day) |
|---|---|---|---|---|---|---|
| Standard Loading | 1.0 | 1.0 | 1.000E+06 | 70 | 2.5 | 6.624E+09 |
| Elevenmile Creek Watershed | 10,247.00 | 512.35 | 1.000E+06 | 70 | 2.5 | 3.394E+12 |
| Escambia County | 67,761.00 | 3,388.10 | 1.000E+06 | 70 | 2.5 | 2.244E+13 |

### Livestock

Another potential nonpoint source of coliform includes livestock and other agricultural animals. **Table 4.4a** summarizes cattle populations (Florida Department of Agriculture and Consumer Services [FDACS], 2003) in Escambia County from 1997 to 2006, and **Table 4.4b** summarizes populations of other agricultural animals in the county in 2002. Escambia County ranked 37$^{th}$ in the state in terms of the total number of cattle and calves and beef cows. Approximately 9.30 percent of the Elevenmile Creek watershed is specifically categorized as agriculture under the Level 1 land use system.

### Pets–Domestic Animals

Another possible source of fecal coliform bacteria in the Elevenmile Creek watershed could be pets or domestic animals. 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), the approximate loading to the watershed from dogs is 4.87E+13 counts per day. Similarly, the number of horses and ponies is estimated at a load of 3.53E+11 counts per day. The total domestic animal load (excluding cats) is 4.90E+13 counts per day, which is 31.40 percent of the total internal load.

### Boats

The Department believes that there is only a small amount of boat traffic on the Elevenmile Creek system. FDACS completed a shoreline inventory (as of July 2003) of the sub-basins in the Escambia Bay area (Brooks, 2007; Knight, 2003). An estimate can be made of the fecal coliform contribution from the boats, given the actual boat population of each marina. The 2000 U.S. Census shows that in Escambia County, 178 housing units were in the boat/recreational vehicle/van category. The marina inventory for Perdido Bay has not been updated since 1989 (FDACS, 1989); therefore, no estimate is being made for the boat contribution other than that carried into Elevenmile Creek from Perdido Bay (see **Table 4.6** and **Appendix D**).

## Table 4.4a. Summary of Cattle Population in Escambia County, 1997–2006

| Year | Number of Milk Cows | Number of Cattle and Calves | Number of Beef Cows |
|---|---|---|---|
| 1997 | 1,700 | 9,000 | 3,000 |
| 1998 | 1,600 | 8,500 | 3,500 |
| 1999 | 1,400 | 8,000 | 3,000 |
| 2000 | 1,600 | 8,000 | 3,000 |
| 2001 | 1,300 | 8,000 | 3,000 |
| 2002 | 1,200 | 8,000 | 3,500 |
| 2003 | 800 | 9,000 | 4,000 |
| 2004 | 1,000 | 9,000 | 3,500 |
| 2005 | 900 | 10,000 | 3,500 |
| 2006 | 400 | 9,000 | 3,500 |

Source: FDACS, 2006.

## Table 4.4b. Summary of Agricultural Animal Populations (Excluding Cattle) in Escambia County in 2002

| Livestock | Year 2002 | |
|---|---|---|
| | Inventory | Sold |
| Hogs and Pigs | 279 | 263 |
| Poultry | | |
| Layers and Pullets 20 Weeks and Older | 401 | 71 |
| Broilers | | 0 |
| Sheep and Lambs | | 0 |
| Horses | 1,297 | 178 |
| Milk Goats | | |
| Goats, except Angora and Milk | 592 | 308 |
| Ducks | 28 | |
| Geese | 53 | 19 |
| Pheasants | | |
| Other Poultry | | |
| Mules, Burros, and Donkeys | 18 | |
| Rabbits | 24 | 0 |

**Source:** FDACS, 2006.

### Wildlife

The most recent TMDL work (Benham, 2007) quantifying wildlife contributions to fecal coliform divides the load among eight categories of wildlife: deer, raccoons, muskrats, beavers, geese, ducks, wild turkeys, and other. Wildlife are assigned to a habitat they would normally frequent. For example, beaver, geese, and ducks are assigned to a buffer 91 meters wide along the perimeter of main streams and impoundments, while deer are assigned to the entire watershed. FDACS (Knight, 2003) notes that there are five major wildlife areas along several of the tributaries that are used for shellfish harvesting in Escambia County. The white-tailed deer population has been estimated (Department, 1998) at various densities (12.8/mi$^2$, as shown in **Appendix B**). Migratory waterfowl and other bird populations have been estimated annually from 1998–2006 (BirdSource Website, 2007). The value used for bird density (7.98/ mi$^2$) is a composite of the largest species by size for the county. The total load from wildlife is estimated as 1.4176E+13 counts per day, or 9.08 percent of the total.

### Spills

The Florida Department of Community Affairs (FDCA, 2007) maintains a Website (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. **Appendix C** lists the summaries (Ziegmont, 2005) for Escambia County. 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, the basin-specific data are not available to make this calculation.

## 4.3 Source Summary

**Table 4.5** summarizes the daily average fecal coliform loadings (from 1997 through 2006) from runoff, septic tank leakage, wildlife, and livestock in the Elevenmile Creek watershed; **Table 4.6** summarizes external loads to the Elevenmile Creek watershed (see **Appendix D** for additional details on external loads).

Table 4.5. Average Daily Quantity of Internal Fecal Coliform Loads to the Elevenmile Creek Watershed

| Nonpoint Source Category | Internal Load to Elevenmile Creek Watershed | % of Total Load |
|---|---|---|
| Total Livestock | 8.6068E+13 | 5.51E+01 |
| Total Wildlife | 1.4176E+13 | 9.08E+00 |
| Total Domestic Animals (Excluding Cats) | 4.9052E+13 | 3.14E+01 |
| Total Septic | 6.9038E+12 | 4.42E+00 |
| **TOTAL:** | **1.5620E+14** | **1.00E+02** |

## Table 4.6. Summary of External Fecal Coliform Loads to the Elevenmile Creek Watershed

| Surface Area of Tidal Portion of Elevenmile Creek Watershed ($mi^2$)* | Tidal Range (feet/ 12 hours)** | Tidal Flow into Elevenmile Creek Watershed (cfs) | Mean of Fecal Coliform Data from Perdido Bay, WBID 797 (cfu/100mL)† | External Load to Elevenmile Creek Watershed (cfu/day) |
|---|---|---|---|---|
| 0.5 | 0.5 | 80.671 | 199.69 | **3.94E+11** |

* From ESRI ArcGIS, ArcMap 9.1, based on areas of GIST_IDs 15143 and 15186 within TIGER 2005 Water (Areas) layer.
** Value for Station Number 4373, Pensacola Bay, 2 miles south of Warrington (U.S. Department of Commerce, 1994).
† Based on mean of yearly average fecal coliform data for all available years (1993 and 2005), from the Department's IWR Run 25.

# Chapter 5: DETERMINATION OF ASSIMILATIVE CAPACITY

## 5.1 Determination of Loading Capacity

The methodology used for this TMDL is the "load duration curve." Also known as the "Kansas Approach" because it was developed by the state of Kansas (Stiles, 2002), this method has been well documented in the literature, with improved modifications used by EPA Region 4. Basically, the method relates the pollutant concentration to the flow of the stream to establish the existing loading capacity and the allowable pollutant load (TMDL) under a spectrum of flow conditions. It then determines the maximum allowable pollutant load and load reduction requirement based on the analysis of the critical flow conditions. Using this method, it takes five steps to develop the TMDL and establish the required load reduction:

1. *Identify available flow and water quality data;*
2. *Develop the flow duration curve;*
3. *Develop the load duration curve for the existing loading;*
4. *Define the critical conditions; and*
5. *Establish the needed load reduction by comparing the existing loading with the allowable load under critical conditions.*

### *5.1.1 Data Used in the Determination of the TMDL*

Fifty-six sampling stations in the Elevenmile Creek watershed have historical coliform observations. The primary data collector of historical data was the Department. These sampling stations were sampled between December 5, 1966, and December 15, 2006. Additional sampling was conducted by the EPA and the Bream Fisherman's Association, and permitted facility sampling of the creek was carried out for International Paper, Cantonment WWTP, and Beulah Landfill. **Figures 5.1a, 5.1b,** and **5.1c** show the locations of these sites, while **Table 5.1** provides a brief statistical overview of the observed data at these sites. **Figures 5.2a, 5.2b,** and **5.2c** are charts showing the observed historical data over time, and **Appendix G** contains the historical observations from these sites.

In addition, **Figures 5.3a, 5.3b,** and **5.3c** show a graphical display of the recent data points collected between 1999 and 2007. Of the 218 recent samples collected, 196 samples exceeded the 400 cfu/100mL fecal coliform criterion. The Department conducted special sampling of Elevenmile Creek, tributaries, and wells (Wieckowicz, 1995) prior to and during a cold mill shutdown of the Champion Paper Company (now International Paper) in 1995.

Flow measurements for this analysis were obtained from USGS Gaging Station 02376115, located on Elevenmile Creek near Pensacola, FL, Latitude:30°29'53", Longitude:87°20'09" (**Figure 5.1b**).

Figure 5.1a. Historical Monitoring Sites in the Elevenmile Creek Watershed, WBIDs 489, 489A, 489B, 624, and 681

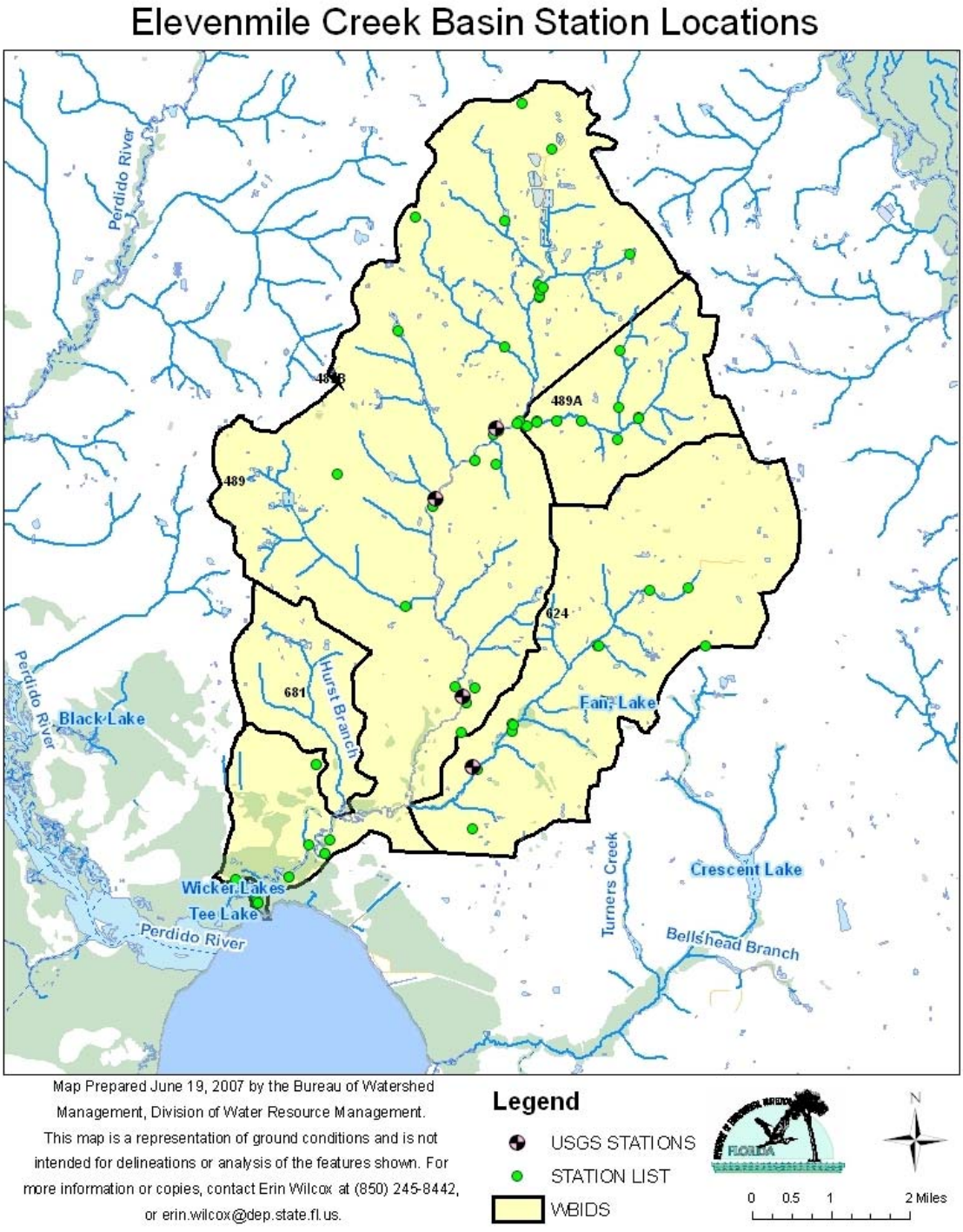
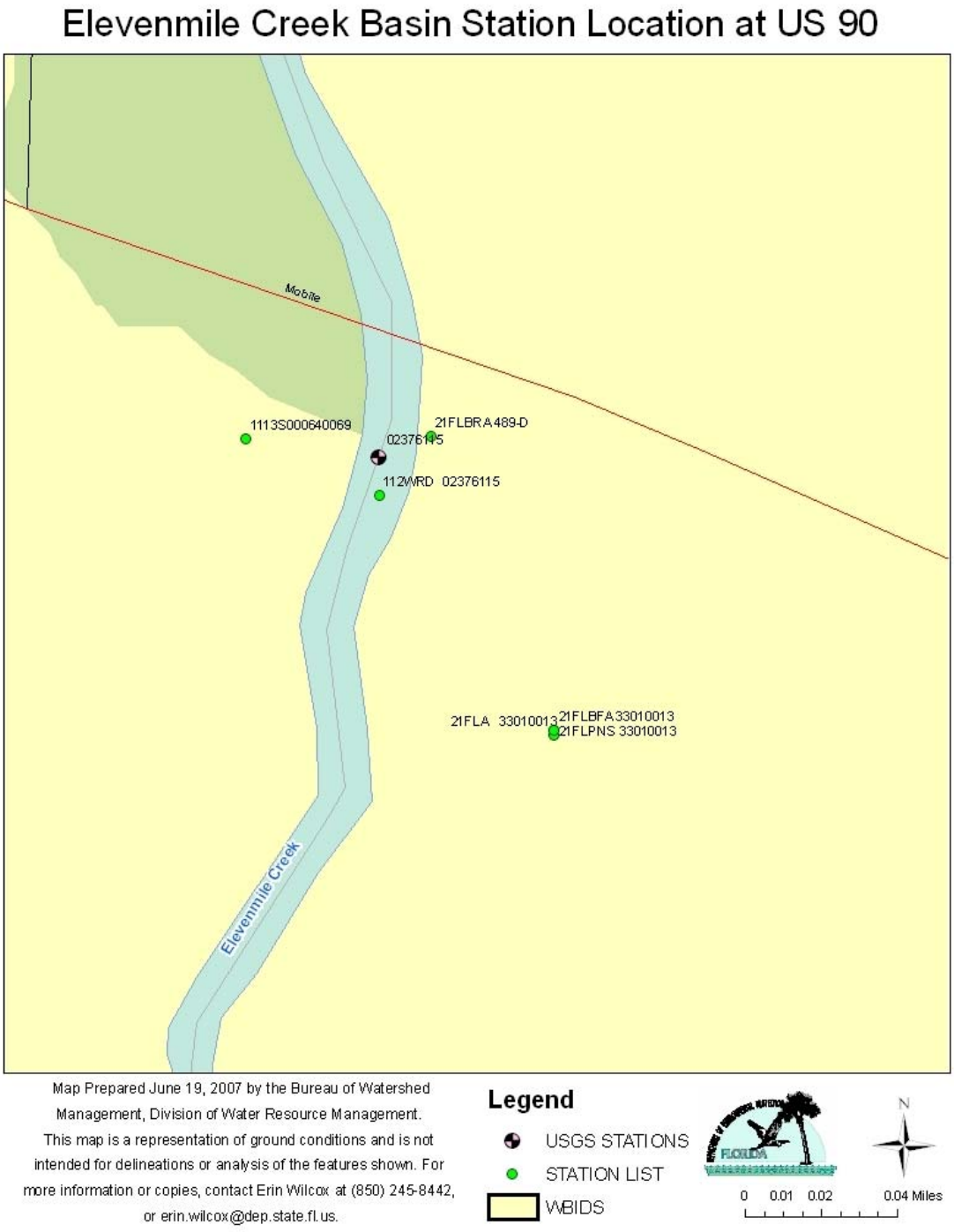
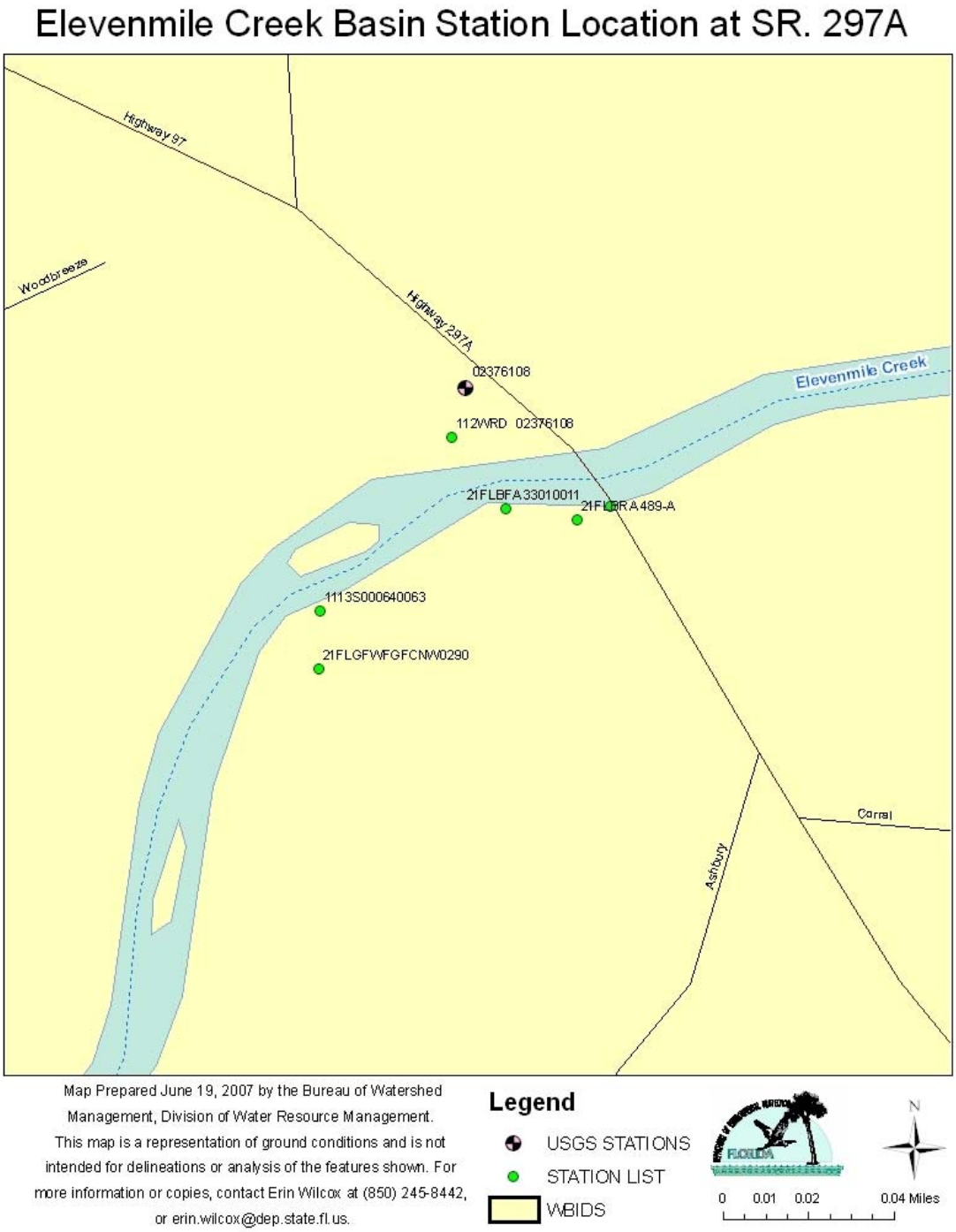


Figure 5.1b. Historical Monitoring Sites in the Elevenmile Creek Watershed, WBID 489, at U.S. 90



## Figure 5.1c. Historical Monitoring Sites in the Elevenmile Creek Watershed, WBID 489, at S.R. 297A



## Table 5.1. Statistical Table of Observed Historical Data for the Elevenmile Creek Watershed, WBIDs 489, 489A, 489B, 624, and 681

| WBID | Parameter | Total Number of Samples | Average of Samples (N/100mL) | Number of Samples above Standard Concentration (FC>400 [N/100mL]) | Minimum Concentration (N/100mL) | Maximum Concentration (N/100mL) |
|---|---|---|---|---|---|---|
| 489 | Fecal A-1 (MPN/1010mL) (31621) | 187 | 336 | 38 | 1 | 187 |
| 489 | Fecal Mem Br (cfu/100mL) (31616) | 255 | 974 | 96 | 3 | 50,000 |
| 489 | Fecal Tub (MPN/100mL) (31614) | 44 | 247 | 9 | 2 | 2,400 |
| 489 | Fecal Tube (MPN/100mL) (31615) | 68 | 3,122 | 23 | 2 | 160,000 |
| 489 | Other Fecal | 54 | 623 | 21 | 25 | 4,000 |
| 489A | Fecal A-1 (MPN/1010mL) (31621) | 45 | 540 | 9 | 9 | 4,700 |
| 489A | Fecal Mem Br (cfu/100mL) (31616) | 30 | 995 | 7 | 10 | 11,600 |
| 489A | Fecal Tub (MPN/100mL) (31614) | 0 | 0 | 0 | 0 | 0 |
| 489A | Fecal Tube (MPN/100mL) (31615) | 0 | 0 | 0 | 0 | 0 |
| 489B | Fecal A-1 (MPN/1010mL) (31621) | 0 | 0 | 0 | 0 | 0 |
| 489B | Fecal Mem Br (cfu/100mL) (31616) | 1 | 20 | 0 | 20 | 20 |
| 489B | Fecal Tub (MPN/100mL) (31614) | 0 | 0 | 0 | 0 | 0 |
| 489B | Fecal Tube (MPN/100mL) (31615) | 0 | 0 | 0 | 0 | 0 |
| 624 | Fecal A-1 (MPN/1010mL) (31621) | 34 | 722 | 6 | 10 | 14,091 |
| 624 | Fecal Mem Br (cfu/100mL) (31616) | 54 | 1,112 | 17 | 20 | 16,000 |
| 624 | Fecal Tub (MPN/100mL) (31614) | 0 | 0 | 0 | 0 | 0 |
| 624 | Fecal Tube (MPN/100mL) (31615) | 7 | 1,411 | 3 | 13 | 7,900 |
| 681 | Fecal A-1 (MPN/1010mL) (31621) | 0 | 0 | 0 | 0 | 0 |
| 681 | Fecal Mem Br (cfu/100mL) (31616) | 21 | 439 | 6 | 10 | 2,300 |
| 681 | Fecal Tub (MPN/100mL) (31614) | 0 | 0 | 0 | 0 | 0 |
| 681 | Fecal Tube (MPN/100mL) (31615) | 2 | 68 | 0 | 43 | 93 |

Figure 5.2a. Chart of Historical Fecal Coliform Observations in the Elevenmile Creek Watershed, WBIDs 489, 489A, 489B, 624, and 681, 1966—2006

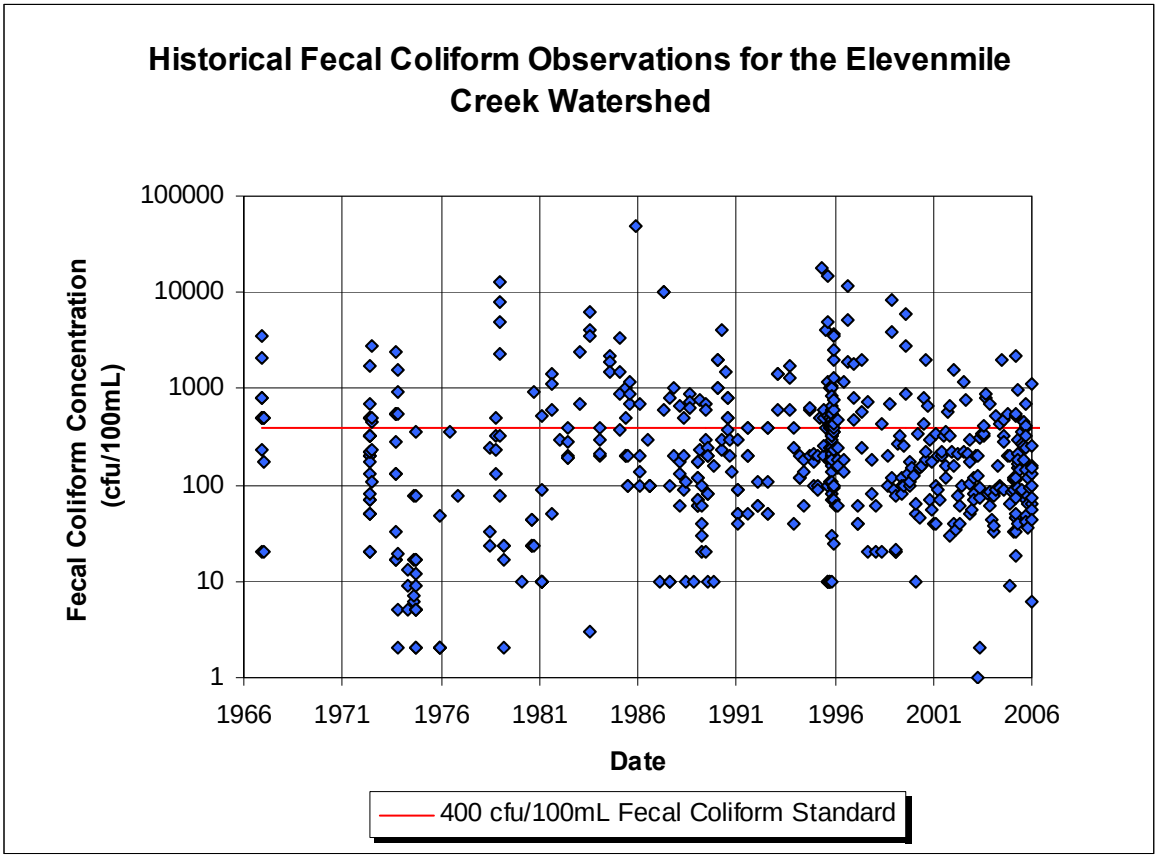


Figure 5.2b. Chart of Historical Fecal Coliform Observations in the Elevenmile Creek Watershed at U.S. 90, 1972—2006

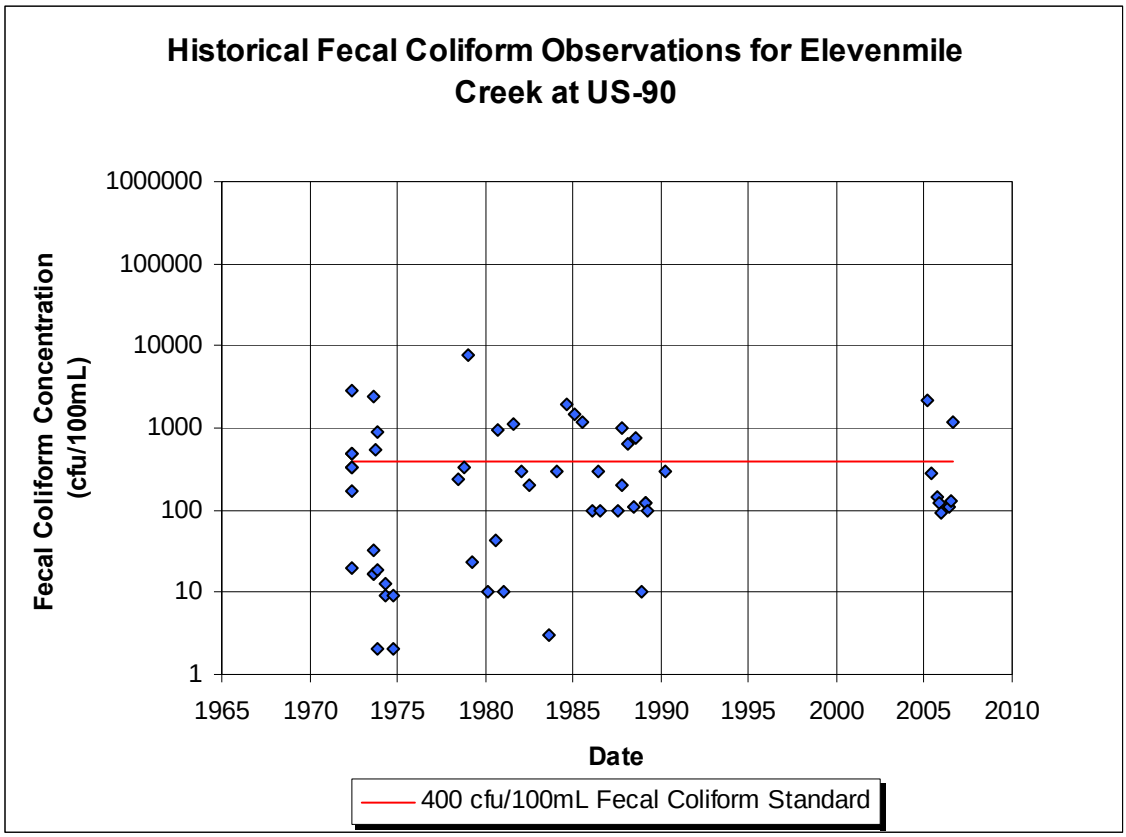


Figure 5.2c. Chart of Historical Fecal Coliform Observations in the Elevenmile Creek Watershed at S.R. 297A, 1972—2006

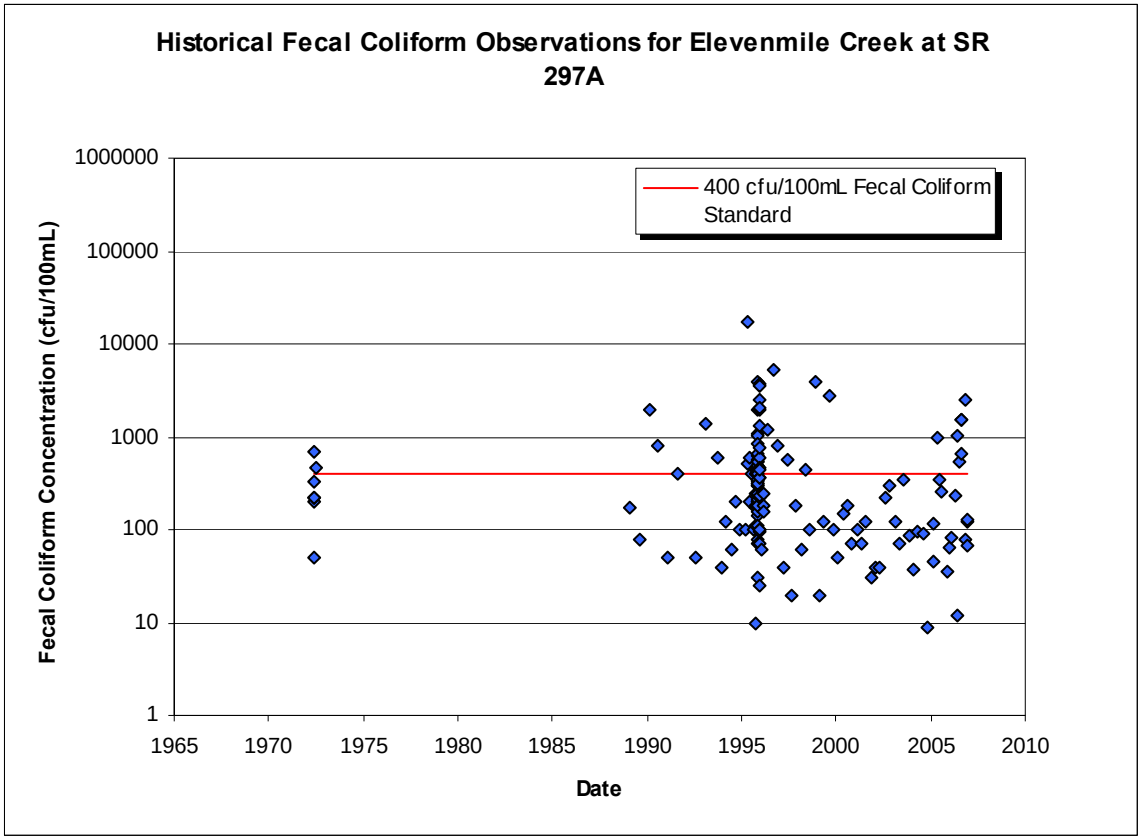


Figure 5.3a. Chart of Recent Fecal Coliform Observations in the Elevenmile Creek Watershed, WBIDs 489, 489A, 489B, 624, and 681, 1999–2007

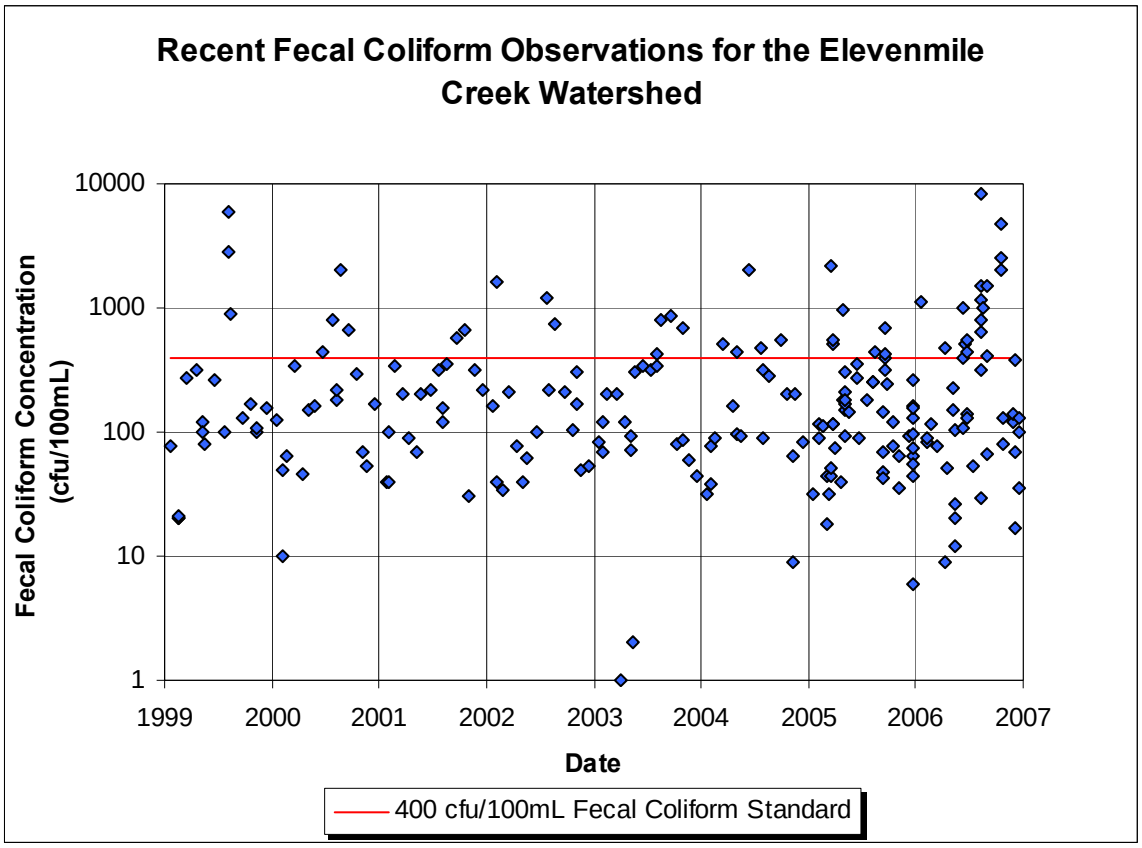


Figure 5.3b. Chart of Recent Fecal Coliform Observations in the Elevenmile Creek Watershed at U.S. 90, 1999–2007

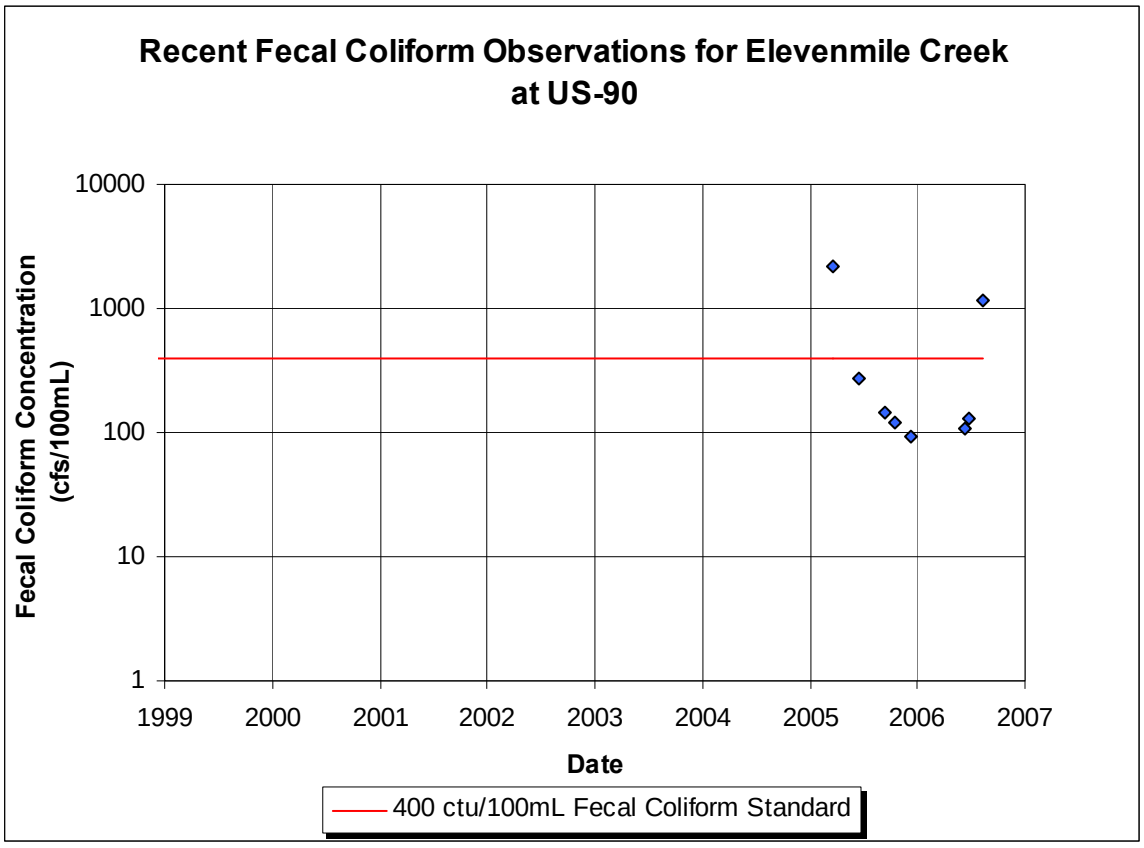
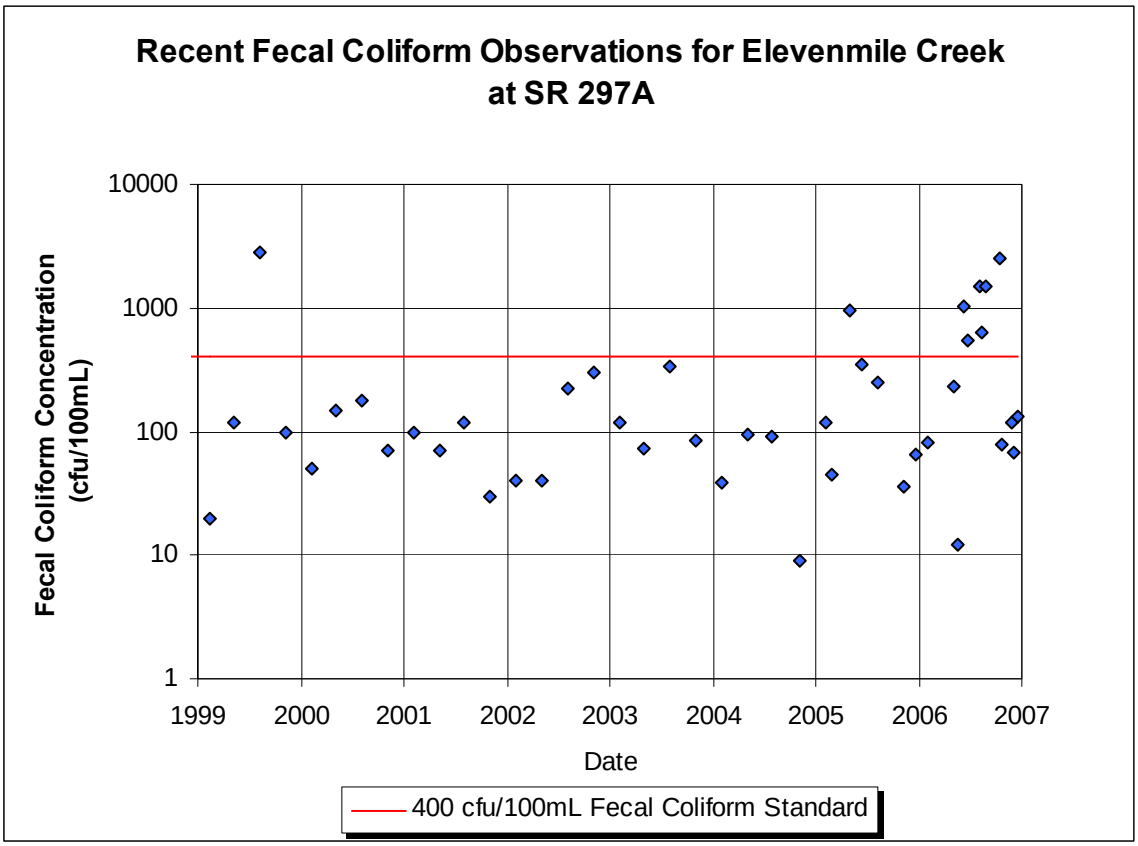


Figure 5.3c. Chart of Recent Fecal Coliform Observations in the Elevenmile Creek Watershed at S.R. 297A, 1999–2007




### *5.1.2 TMDL Development Process*

#### Development of the Flow Duration Curve

The first step in the development of a load duration curve is to create a *flow duration curve*. A flow duration curve displays the cumulative frequency distribution of daily flow data over the period of record. The duration curve relates flow values measured at a monitoring station to the percent of time the flow values were equalled or exceeded. Flows are ranked from low, which are exceeded nearly 100 percent of the time, to high, which are exceeded less than 1 percent of the time.

The flow duration curves for this analysis were developed based on flow records from USGS Gage 02376115, located at Elevenmile Creek at U.S. 90 near Pensacola (see **Appendix H** and **Figures 5.4a** and **5.4b**).

Figure 5.4a. Flow Duration Curve for USGS Gage 02376115 at U.S. 90

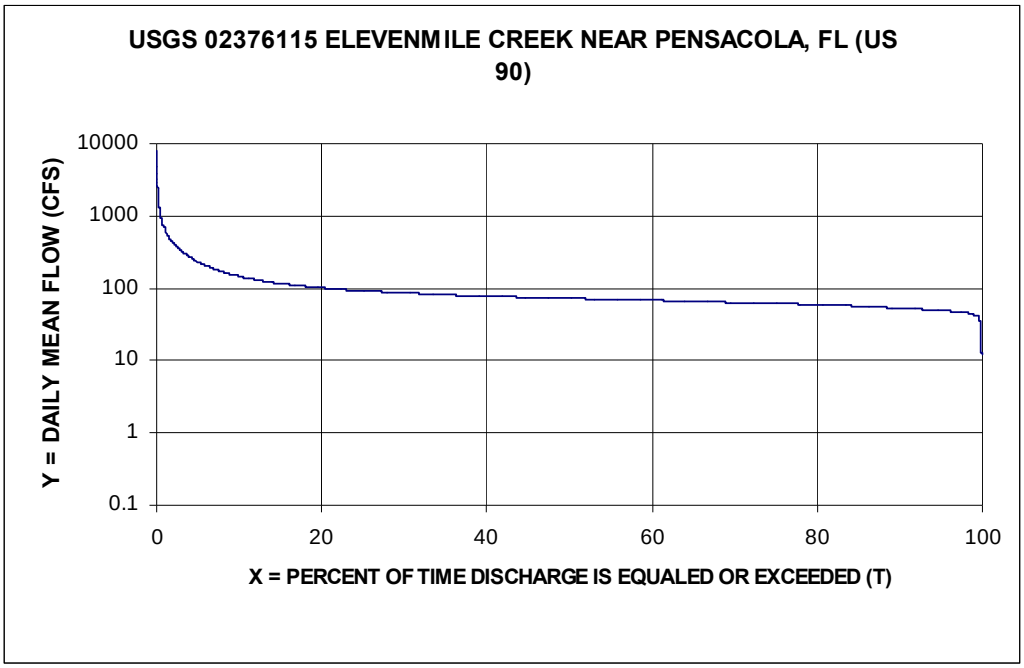
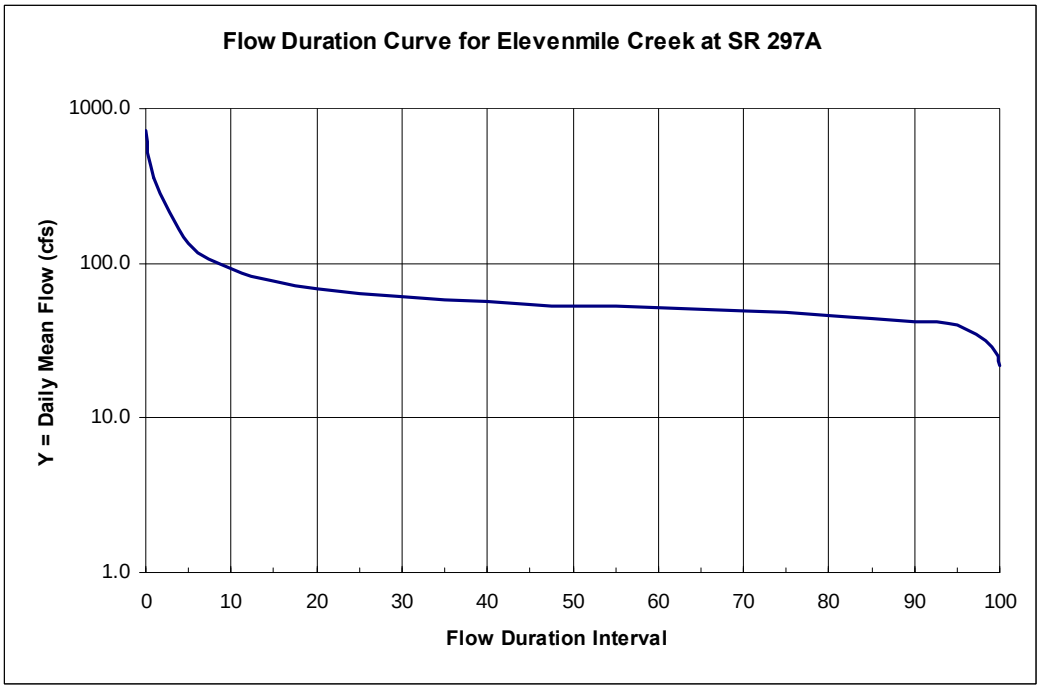



Figure 5.4b. Flow Duration Curve for USGS Gage 02376115, Scaled by Drainage Area, at S.R. 297A



## Develop the Load Duration Curve for the Existing Loading

Using the flows from the flow duration curve, a load duration curve for fecal coliform (**Figures 5.5a** and **5.5b**) was calculated using the following equation:

**(1) (observed flow) x (conversion factor) x (state criteria) = ([fecal coliform quantity]/day or daily load)**

Where:
(conversion factor) = 24468480 cfu/day and (state criteria) = 400 cfu/100mL

The above equation yields the load duration curve or allowable load curve (**Figures 5.5a** and **5.5b**). Using Equation 1 (above), a table was calculated (**Tables 5.2a** and **5.2b,** for the locations at U.S. 90 and S.R. 297A, respectively), substituting the observed data for the state criterion value. Fecal coliform observations were then plotted, noting where the samples are in relation to the allowable load curve (above or below the curve). Those above the curve (**Figures 5.5a** and **5.5b**) are noted as exceedances to the state criterion and are indicated by red triangles.

Figure 5.5a. Load Duration Curve for Fecal Coliform in the Elevenmile Creek Watershed at U.S. 90, with Line of Best-Fit (Power Curve)

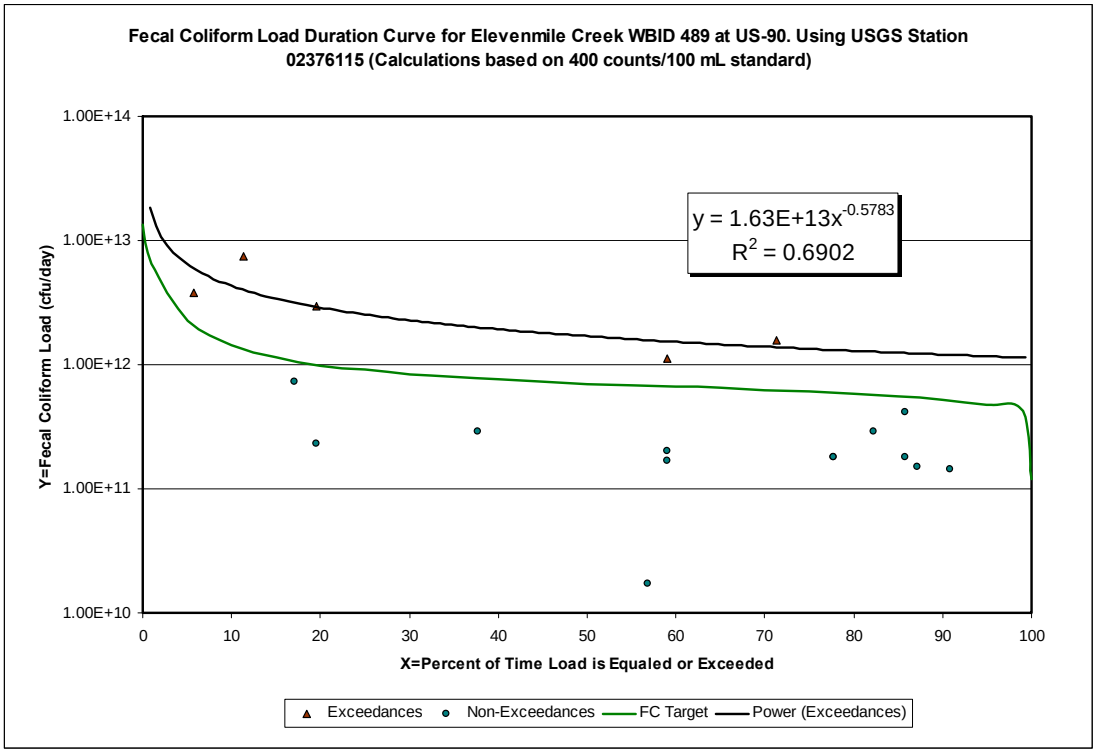
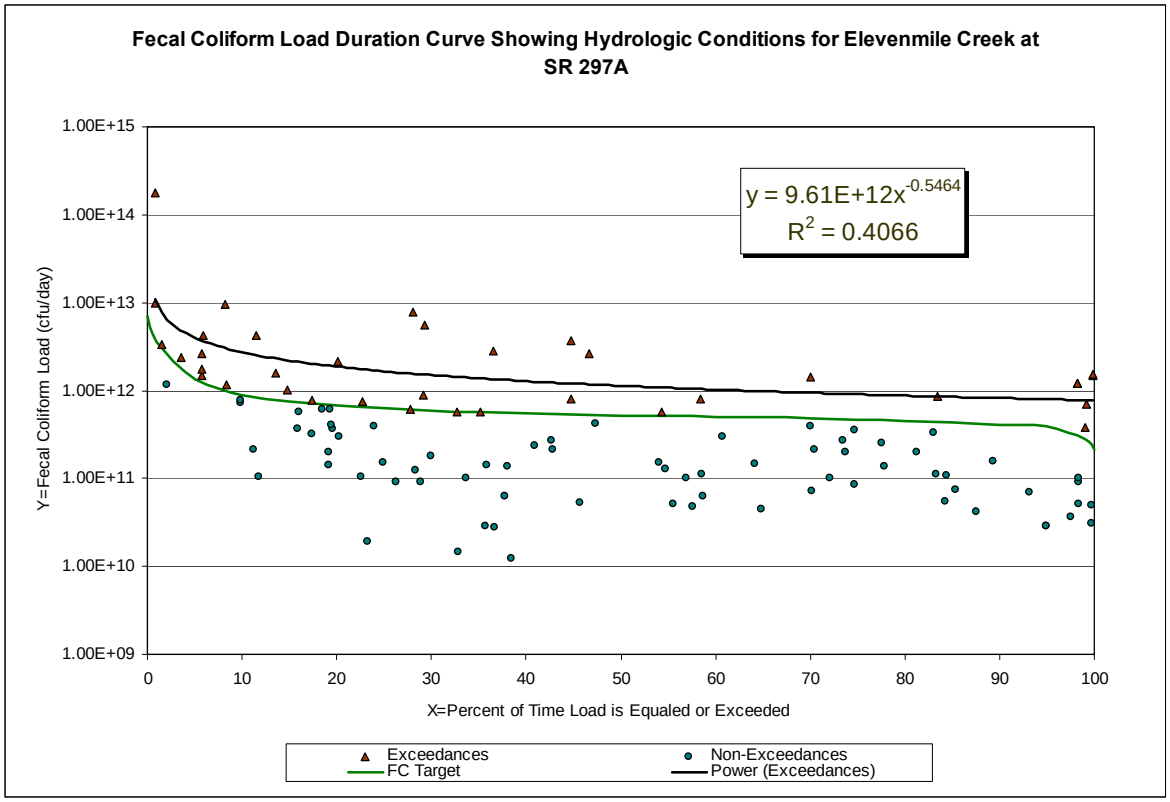


Figure 5.5b. Load Duration Curve for Fecal Coliform in the Elevenmile Creek Watershed at S.R. 297A, with Line of Best-Fit (Power Curve)



## Table 5.2a. Observed Data for Calculating Exceedances to the State Fecal Coliform Criterion for the Elevenmile Creek Watershed at U.S. 90, 1987–2006

| Sample Date | Sample time | Daily Mean Streamflow (cfs) of Elevenmile Creek Watershed (USGS 02376115) | Percent of Time Discharge is Equaled or Exceeded (T) | Fecal Coliform (cfu/100mL) | Fecal Coliform Load (cfu/day) |
|---|---|---|---|---|---|
| 10/20/1987 | 1400 | 59 | 73.684 | 200 | 2.89E+11 |
| 10/26/1987 | 1130 | 64 | 57.895 | 1000 | 1.57E+12 |
| 2/7/1988 | 905 | 69 | 42.105 | 660 | 1.11E+12 |
| 6/16/1988 | 1130 | 53 | 94.737 | 110 | 1.43E+11 |
| 8/7/1988 | 900 | 211 | 5.263 | 740 | 3.82E+12 |
| 11/7/1988 | 1310 | 70 | 36.842 | 10 | 1.71E+10 |
| 2/5/1989 | 855 | 61 | 63.158 | 120 | 1.79E+11 |
| 2/5/1989 | 855 | 61 | 68.421 | 120 | 1.79E+11 |
| 4/13/1989 | 1230 | 69 | 47.368 | 100 | 1.69E+11 |
| 4/5/1990 | 1035 | 57 | 78.947 | 300 | 4.18E+11 |
| 3/17/2005 | 1155 | 137 | 10.526 | 2200 | 7.37E+12 |
| 6/14/2005 | 915 | 110 | 15.789 | 273 | 7.35E+11 |
| 9/12/2005 | 1225 | 80 | 31.579 | 146 | 2.86E+11 |
| 10/17/2005 | 1045 | 69 | 52.632 | 120 | 2.03E+11 |
| 12/7/2005 | 1106 | 103 | 21.053 | 92 | 2.32E+11 |
| 6/12/2006 | 1330 | 56 | 89.474 | 109 | 1.49E+11 |
| 6/27/2006 | 1300 | 57 | 84.211 | 130 | 1.81E+11 |
| 8/9/2006 | 950 | 103 | 26.316 | 1173 | 2.96E+12 |

## Table 5.2b. Observed Data for Calculating Exceedances to the State Fecal Coliform Criterion for the Elevenmile Creek Watershed at S.R. 297A, 1989–2006

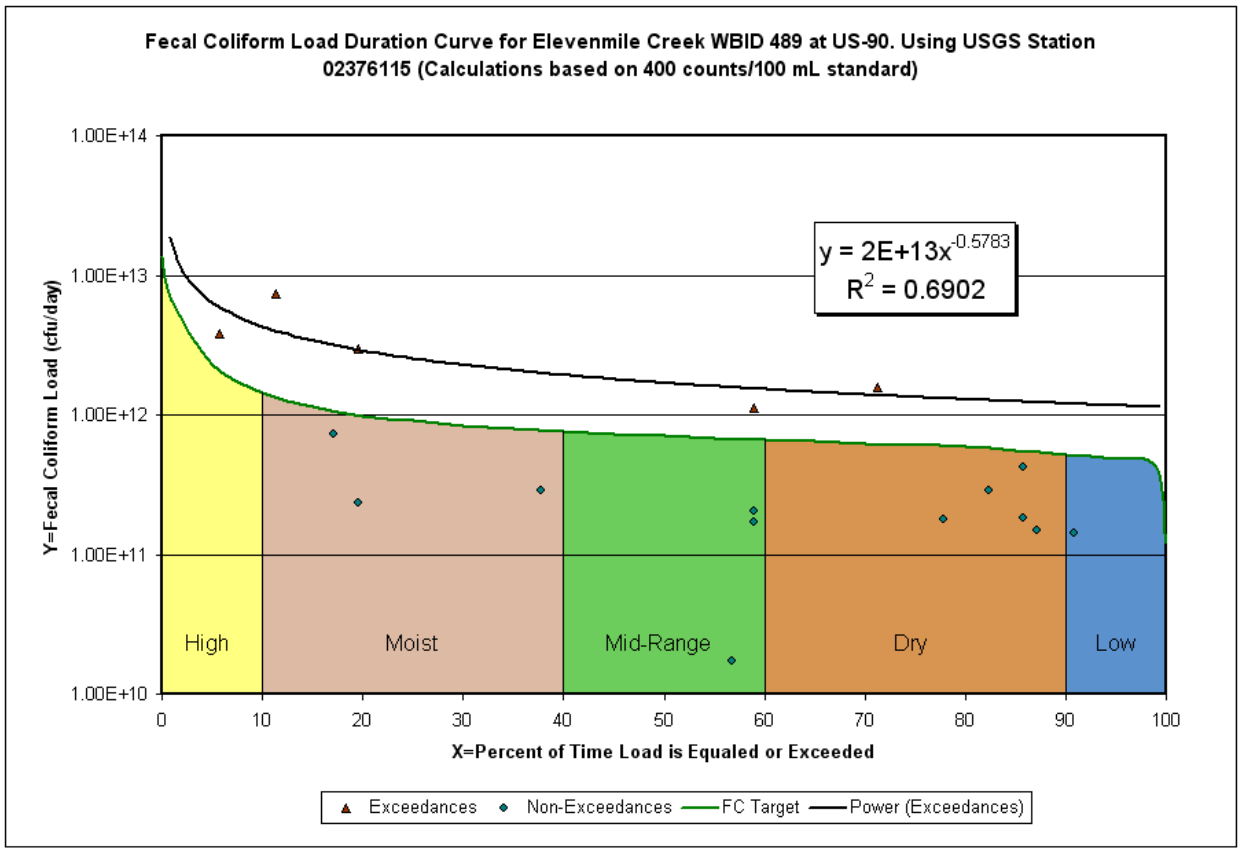
| Sample Date | Sample Time | Daily Mean Streamflow (cfs) of the Elevenmile Creek Watershed at 297A | Percent of Time Discharge is Equaled or Exceeded | Fecal Coliform (cfu/100mL) | Fecal Coliform Load (cfu/day) |
|---|---|---|---|---|---|
| 2/5/1989 | 1400 | 48 | 69.565 | 170 | 2.00E+11 |
| 8/6/1989 | 1130 | 51.9 | 55.435 | 80 | 1.01E+11 |
| 2/4/1990 | 925 | 54.2 | 50.000 | 2000 | 2.65E+12 |
| 8/5/1990 | 905 | 45 | 77.174 | 790 | 8.71E+11 |
| 2/3/1991 | 1115 | 85.1 | 11.957 | 50 | 1.04E+11 |
| 8/4/1991 | 1210 | 59.3 | 33.696 | 400 | 5.80E+11 |
| 8/2/1992 | 1120 | 51.5 | 57.609 | 50 | 6.30E+10 |
| 2/7/1993 | 955 | 124.6 | 6.522 | 1400 | 4.27E+12 |
| 9/12/1993 | 1000 | 61.1 | 30.435 | 600 | 8.97E+11 |
| 12/5/1993 | 1130 | 52.1 | 54.348 | 40 | 5.10E+10 |
| 3/6/1994 | 815 | 60.6 | 32.609 | 120 | 1.78E+11 |
| 6/5/1994 | 900 | 48.9 | 64.130 | 60 | 7.18E+10 |
| 9/11/1994 | 1025 | 55.3 | 44.565 | 200 | 2.71E+11 |
| 12/2/1994 | 1310 | 57.9 | 38.043 | 100 | 1.42E+11 |
| 3/5/1995 | 920 | 57 | 42.391 | 100 | 1.39E+11 |
| 4/12/1995 | 855 | 273.5 | 3.261 | 500 | 3.35E+12 |
| 5/10/1995 | 955 | 411.8 | 2.174 | 17500 | 1.76E+14 |
| 6/4/1995 | 1215 | 74.5 | 14.130 | 200 | 3.65E+11 |
| 6/14/1995 | 920 | 54.7 | 46.739 | 600 | 8.03E+11 |
| 7/12/1995 | 855 | 58.1 | 36.957 | 400 | 5.69E+11 |
| 8/9/1995 | 955 | 87.3 | 10.870 | 100 | 2.14E+11 |
| 9/17/1995 | 1215 | 59.2 | 34.783 | 10 | 1.45E+10 |
| 9/20/1995 | 1252 | 51 | 60.870 | 240 | 2.99E+11 |

| Sample Date | Sample Time | Daily Mean Streamflow (cfs) of the Elevenmile Creek Watershed at 297A | Percent of Time Discharge is Equaled or Exceeded | Fecal Coliform (cfu/100mL) | Fecal Coliform Load (cfu/day) |
|---|---|---|---|---|---|
| 10/11/1995 | 1407 | 72 | 15.217 | 440 | 7.75E+11 |
| 11/8/1995 | 910 | 126.7 | 5.435 | 560 | 1.74E+12 |
| 12/3/1995 | 1015 | 61 | 31.522 | 3700 | 5.52E+12 |
| 12/13/1995 | 1110 | 58.8 | 35.870 | 70 | 1.01E+11 |
| 1/10/1996 | 1230 | 62.9 | 26.087 | 60 | 9.23E+10 |
| 2/14/1996 | 910 | 69.3 | 19.565 | 240 | 4.07E+11 |
| 3/3/1996 | 930 | 68.2 | 20.652 | 180 | 3.01E+11 |
| 3/13/1996 | 1040 | 55.3 | 45.652 | 160 | 2.16E+11 |
| 6/1/1996 | 1020 | 48.9 | 65.217 | 1200 | 1.44E+12 |
| 9/8/1996 | 1015 | 61.8 | 27.174 | 5200 | 7.86E+12 |
| 12/1/1996 | 1040 | 79.7 | 13.043 | 800 | 1.56E+12 |
| 3/9/1997 | 840 | 54.4 | 48.913 | 40 | 5.33E+10 |
| 6/1/1997 | 1430 | 168.1 | 4.348 | 580 | 2.39E+12 |
| 8/17/1997 | 920 | 57.9 | 39.130 | 20 | 2.84E+10 |
| 11/16/1997 | 820 | 48.8 | 66.304 | 180 | 2.15E+11 |
| 2/15/1998 | 920 | 61.3 | 29.348 | 60 | 8.99E+10 |
| 5/17/1998 | 820 | 52.4 | 52.174 | 440 | 5.64E+11 |
| 8/24/1998 | 1400 | 52.3 | 53.261 | 100 | 1.28E+11 |
| 11/23/1998 | 838 | 101.8 | 7.609 | 3900 | 9.71E+12 |
| 2/15/1999 | 905 | 57.5 | 40.217 | 20 | 2.82E+10 |
| 5/10/1999 | 1015 | 46.8 | 72.826 | 120 | 1.37E+11 |
| 8/10/1999 | 905 | 54.7 | 47.826 | 2800 | 3.75E+12 |
| 11/7/1999 | 1015 | 45.1 | 76.087 | 100 | 1.10E+11 |
| 2/6/2000 | 1130 | 44.6 | 78.261 | 50 | 5.46E+10 |
| 5/7/2000 | 1115 | 42.5 | 82.609 | 150 | 1.56E+11 |
| 8/6/2000 | 1035 | 45.8 | 73.913 | 180 | 2.02E+11 |
| 11/5/2000 | 1603 | 44.1 | 80.435 | 70 | 7.56E+10 |
| 2/4/2001 | 1030 | 44.6 | 79.348 | 100 | 1.09E+11 |
| 5/6/2001 | 1315 | 40.9 | 83.696 | 70 | 7.00E+10 |

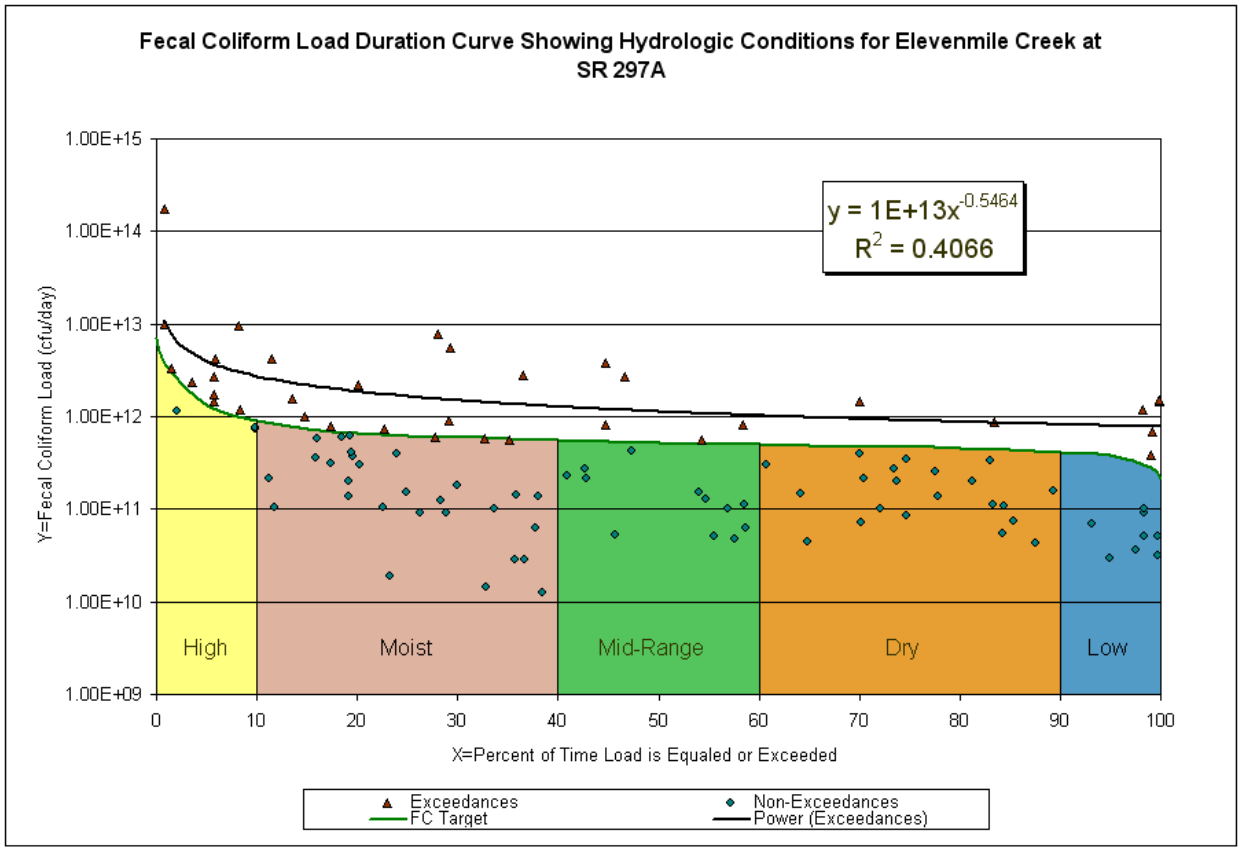
| Sample Date | Sample Time | Daily Mean Streamflow (cfs) of the Elevenmile Creek Watershed at 297A | Percent of Time Discharge is Equaled or Exceeded | Fecal Coliform (cfu/100mL) | Fecal Coliform Load (cfu/day) |
|---|---|---|---|---|---|
| 8/5/2001 | 1030 | 50.3 | 61.957 | 120 | 1.48E+11 |
| 11/4/2001 | 1315 | 39.9 | 84.783 | 30 | 2.93E+10 |
| 11/4/2001 | 1617 | 39.9 | 85.870 | 30 | 2.93E+10 |
| 2/3/2002 | 1400 | 43.3 | 81.522 | 40 | 4.24E+10 |
| 5/5/2002 | 1353 | 37 | 86.957 | 40 | 3.62E+10 |
| 8/4/2002 | 1203 | 46.9 | 71.739 | 220 | 2.52E+11 |
| 11/3/2002 | 1445 | 45.2 | 75.000 | 300 | 3.32E+11 |
| 2/2/2003 | 1630 | 52.5 | 51.087 | 120 | 1.54E+11 |
| 5/4/2003 | 1445 | 47.8 | 70.652 | 72 | 8.42E+10 |
| 8/4/2003 | 1630 | 92.9 | 8.696 | 320 | 7.27E+11 |
| 8/4/2003 | 1120 | 92.9 | 9.783 | 340 | 7.73E+11 |
| 11/2/2003 | 1630 | 48.4 | 67.391 | 86 | 1.02E+11 |
| 2/1/2004 | 1120 | 51.7 | 56.522 | 38 | 4.81E+10 |
| 5/2/2004 | 1630 | 63.9 | 25.000 | 96 | 1.50E+11 |
| 8/1/2004 | 1420 | 51.5 | 58.696 | 90 | 1.13E+11 |
| 11/7/2004 | 1420 | 56.8 | 43.478 | 9 | 1.25E+10 |
| 2/6/2005 | 1130 | 69.7 | 17.391 | 82 | 1.40E+11 |
| 2/6/2005 | 845 | 69.7 | 18.478 | 118 | 2.01E+11 |
| 3/2/2005 | 853 | 57.1 | 41.304 | 45 | 6.28E+10 |
| 5/1/2005 | 1130 | 416.5 | 1.087 | 964 | 9.82E+12 |
| 6/14/2005 | 1000 | 70.7 | 16.304 | 350 | 6.05E+11 |
| 8/7/2005 | 845 | 64.6 | 23.913 | 250 | 3.95E+11 |
| 11/6/2005 | 1000 | 50.2 | 63.043 | 36 | 4.42E+10 |
| 12/20/2005 | 1715 | 65.9 | 21.739 | 64 | 1.03E+11 |
| 2/5/2006 | 1330 | 61.7 | 28.261 | 82 | 1.24E+11 |
| 5/7/2006 | 1150 | 48.1 | 68.478 | 230 | 2.71E+11 |
| 5/16/2006 | 1310 | 65.1 | 22.826 | 12 | 1.91E+10 |
| 6/12/2006 | 1108 | 28 | 94.565 | 1018 | 6.97E+11 |
| 6/27/2006 | 1140 | 28.5 | 93.478 | 550 | 3.84E+11 |
| 8/8/2006 | 1040 | 32.5 | 88.043 | 1500 | 1.19E+12 |
| 8/9/2006 | 1400 | 51.5 | 59.783 | 645 | 8.13E+11 |
| 8/29/2006 | 1100 | 32.5 | 89.130 | 1500 | 1.19E+12 |
| 10/16/2006 | 1500 | 25 | 97.826 | 2500 | 1.53E+12 |
| 10/16/2006 | 1030 | 25 | 98.913 | 2400 | 1.47E+12 |
| 10/25/2006 | 1200 | 26 | 95.652 | 49 | 3.12E+10 |
| 10/25/2006 | 830 | 26 | 96.739 | 79 | 5.03E+10 |
| 11/27/2006 | 1200 | 31 | 91.304 | 120 | 9.10E+10 |
| 12/7/2006 | 1524 | 31 | 92.391 | 68 | 5.16E+10 |
| 12/15/2006 | 1054 | 32 | 90.217 | 130 | 1.02E+11 |

Values on the load duration curve can generally be grouped by hydrologic conditions to identify the most likely potential sources. Exceedances falling into the 10th through 40th percentile flows are typically associated with moist conditions when stormwater loads are the most likely source, and exceedances falling in the 60st through 90th percentiles are typically associated with dry conditions when point sources are likely the dominant source (**Figures 5.6a** and **5.6b**; **Tables 5.3a** and **5.3b**).

Figure 5.6a. Loading Curve Showing Hydrologic Conditions for Fecal Coliform in Elevenmile Creek at U.S. 90



## Figure 5.6b. Loading Curve Showing Hydrologic Conditions for Fecal Coliform in Elevenmile Creek at S.R. 297A




## Table 5.3a. Flow Conditions under Which Exceedances Occurred at U.S. 90

| Flow Condition | Flow Range % | Fecal N>400/100mL |
|---|---|---|
| High | 0–10 | 1 |
| Moist | 10–40 | 2 |
| Mid-range | 40–60 | 1 |
| Dry | 60–90 | 1 |
| Low | 90–100 | 0 |
| **TOTAL:** | **0–100** | **5** |

### Table 5.3b. Flow Conditions under Which Exceedances Occurred at S.R. 297A

| Flow Condition | Flow Range | Fecal N>400/100mL |
|---|---|---|
| High | 0–10 | 9 |
| Moist | 10–40 | 13 |
| Mid-Range | 40–60 | 5 |
| Dry | 60–90 | 2 |
| Low | 90–100 | 4 |
| **TOTAL:** | **0–100** | **25** |

## Develop the Loading Capacity

To determine the loading capacity, a trendline of best-fit was applied through the exceedances (**Figures 5.5a** and **5.5b**). The best-fitting trend line was determined by evaluating different functions until the highest $R^2$ value was found. In this case, a Power function was determined to be the best fit, and took the following form:

**(2a) (US90) $Y_{FC}$= (1.628 E+13)*(EXP(-5.783E-01*x))**
Where: $Y_{FC}$ = Fecal Coliform Load (cfu/day) and x =% duration interval

**(2b) (SR 297A) $Y_{FC}$= (9.612 E+12)*(EXP(-5.464E-01*x))**
Where: $Y_{FC}$ = Fecal Coliform Load (cfu/day) and x =% duration interval

This function (Equation 2) was used to determine the predicted loads by substituting different percentile numbers (from the 10th to 90th, in increments of 5 (see **Tables 5.4a** and **5.4b,** Column 1) for "x." The result yields a predicted load within each 5th percentile (**Tables 5.4a** and **5.4b,** Column 3).

Finally, the percent reduction in loading needed for compliance with the state criterion was calculated. This calculation involved both the allowable load and predicted loads previously computed (**Tables 5.4a** and **5.4b**). Using percentile increments of 5 (ranging from 10 to 90; see **Tables 5.4a** and **5.4b,** Column 1), the needed reduction of daily load was computed using the following formula:

**(3)** $\dfrac{\text{(predicted load) – (allowable load)}}{\text{(predicted load)}} \times 100$

**(4)** $\dfrac{\text{(observed value) – (state criterion)}}{\text{(observed value)}} \times 100$

The Elevenmile Creek TMDL is then calculated as the median of the percent reductions needed over the data range where exceedances occurred, which in this case was over the entire range of flow conditions. As shown in **Tables 5.4a** and **5.4b**, the source loadings for fecal coliform discussed in Chapter 4 would need to be reduced by 65.9 percent for Elevenmile Creek to meet the TMDL. The Department used the more stringent figure taken from **Table 5.4b** to ensure

that the cumulative percent reduction for this waterbody is met. The Tenmile Creek TMDL is then calculated using Equation 4, listed above. As shown in **Table 5.5**, the source loadings for fecal coliform discussed in Chapter 4 would need to be reduced by 42.9 percent for Tenmile Creek to meet the TMDL.

### Table 5.4a. Table for Calculating Needed Reduction of Fecal Coliform in Elevenmile Creek at U.S. 90

| Fecal Coliform at U.S. 90 (based on 400 cfu/100mL standard) | | | |
|---|---|---|---|
| **% of Days Load Exceeded** | **Allowable Load (#colonies/day)** | **Predicted Load (#colonies/day)** | **Load Reduction Needed for Compliance (%)** |
| 10 | 1.4484E+12 | 4.4899E+12 | 67.7 |
| 15 | 1.1352E+12 | 4.0301E+12 | 71.8 |
| 20 | 9.8842E+11 | 3.6173E+12 | 72.7 |
| 25 | 9.1013E+11 | 3.2468E+12 | 72 |
| 30 | 8.4163E+11 | 2.9143E+12 | 71.1 |
| 35 | 8.0248E+11 | 2.6158E+12 | 69.3 |
| 40 | 7.6334E+11 | 2.3479E+12 | 67.5 |
| 45 | 7.3398E+11 | 2.1075E+12 | 65.2 |
| 50 | 7.0462E+11 | 1.8916E+12 | 62.8 |
| 55 | 6.8504E+11 | 1.6979E+12 | 59.7 |
| 60 | 6.6547E+11 | 1.5240E+12 | 56.3 |
| 65 | 6.4590E+11 | 1.3679E+12 | 52.8 |
| 70 | 6.2633E+11 | 1.2278E+12 | 49 |
| 75 | 6.0675E+11 | 1.1021E+12 | 44.9 |
| 80 | 5.8718E+11 | 9.8919E+11 | 40.6 |
| 85 | 5.5782E+11 | 8.8788E+11 | 37.2 |
| 90 | 5.1868E+11 | 7.9695E+11 | 34.9 |
| **MEDIAN:** | **7.0462E+11** | **1.8916E+12** | **62.8** |

## Table 5.4b. Table for Calculating Needed Reduction of Fecal Coliform in Elevenmile Creek at S.R. 297A

| Fecal Coliform at S.R. 297A (based on 400 cfu/100mL standard) | | | |
|---|---|---|---|
| **% of Days Load Exceeded** | **Allowable Load (#colonies/day)** | **Predicted Load (#colonies/day)** | **Load Reduction Needed for Compliance (%)** |
| 10 | 9.0014E+11 | 2.7887E+12 | 67.7 |
| 15 | 7.4326E+11 | 2.5873E+12 | 71.3 |
| 20 | 6.6946E+11 | 2.4005E+12 | 72.1 |
| 25 | 6.2390E+11 | 2.2272E+12 | 72.0 |
| 30 | 5.9315E+11 | 2.0664E+12 | 71.3 |
| 35 | 5.6903E+11 | 1.9172E+12 | 70.3 |
| 40 | 5.5126E+11 | 1.7788E+12 | 69.0 |
| 45 | 5.3439E+11 | 1.6504E+12 | 67.6 |
| 50 | 5.2257E+11 | 1.5312E+12 | 65.9 |
| 55 | 5.1135E+11 | 1.4206E+12 | 64.0 |
| 60 | 5.0080E+11 | 1.3181E+12 | 62.0 |
| 65 | 4.9025E+11 | 1.2229E+12 | 59.9 |
| 70 | 4.7906E+11 | 1.1346E+12 | 57.8 |
| 75 | 4.6650E+11 | 1.0527E+12 | 55.7 |
| 80 | 4.5106E+11 | 9.7669E+11 | 53.8 |
| 85 | 4.3362E+11 | 9.0617E+11 | 52.1 |
| 90 | 4.1293E+11 | 8.4074E+11 | 50.9 |
| **MEDIAN:** | **5.2257E+11** | **1.5312E+12** | **65.9** |

## Table 5.5. Table for Calculating Needed Reduction of Fecal Coliform in Elevenmile Creek, WBID 489A

| WBID | Station | Date | Result (cfu/100mL) | % Reduction |
|---|---|---|---|---|
| 489A | 21FLBFA 33010080 | 9/17/1995 | 10 | |
| 489A | 21FLBFA 33010080 | 2/6/2000 | 10 | |
| 489A | 21FLPNS 33010125 | 3/2/2005 | 18 | |
| 489A | 21FLBFA 33010080 | 2/15/1998 | 20 | |
| 489A | 21FLBFA 33010080 | 5/17/1998 | 20 | |
| 489A | 21FLBFA 33010080 | 2/15/1999 | 20 | |
| 489A | 21FLBFA 33010080 | 3/9/1997 | 40 | |
| 489A | 21FLBFA 33010080 | 2/4/2001 | 40 | |
| 489A | 21FLPNS 33010125 | 12/21/2005 | 44 | |
| 489A | 21FLBFA 33010125 | 11/7/2004 | 64 | |
| 489A | 21FLBFA 33010080 | 2/2/2003 | 70 | |
| 489A | 21FLBFA 33010080 | 2/1/2004 | 76 | |
| 489A | 21FLBFA 33010080 | 11/16/1997 | 80 | |
| 489A | 21FLBFA 33010125 | 2/6/2005 | 91 | |
| 489A | 21FLPNS 33010125 | 5/2/2005 | 92 | |
| 489A | 21FLBFA 33010080 | 5/4/2003 | 94 | |
| 489A | 21FLPNS 3301489A5 | 12/21/2005 | 96 | |
| 489A | 21FLBFA 33010080 | 5/10/1999 | 100 | |
| 489A | 21FLBFA 33010080 | 3/6/1994 | 120 | |
| 489A | 21FLPNS 33010103 | 12/21/2005 | 129 | |
| 489A | 21FLBFA 33010080 | 6/5/1994 | 140 | |
| 489A | 21FLBFA 33010080 | 6/1/1996 | 140 | |
| 489A | 21FLBFA 33010080 | 5/10/1999 | 140 | |
| 489A | 21FLPNS 33010104 | 12/21/2005 | 148 | |
| 489A | 21FLBFA 33010080 | 3/3/1996 | 150 | |
| 489A | 21FLPNS 33010080 | 5/2/2005 | 151 | |
| 489A | 21FLPNS 3301489A4 | 12/21/2005 | 154 | |
| 489A | 21FLBFA 33010080 | 8/5/2001 | 155 | |
| 489A | 21FLPNS 33010104 | 12/21/2005 | 160 | |
| 489A | 21FLPNS 33010104 | 5/2/2005 | 168 | |
| 489A | 21FLBFA 33010080 | 11/3/2002 | 170 | |
| 489A | 21FLBFA 33010125 | 5/1/2005 | 182 | |
| 489A | 21FLPNS 3301489A4 | 5/2/2005 | 184 | |
| 489A | 21FLBFA 33010080 | 3/5/1995 | 200 | |
| 489A | 21FLBFA 33010080 | 8/24/1998 | 200 | |
| 489A | 21FLPNS 33010103 | 5/2/2005 | 207 | |

| WBID | Station | Date | Result (cfu/100mL) | % Reduction |
|---|---|---|---|---|
| 489A | 21FLBFA 33010080 | 12/2/1994 | 210 | |
| 489A | 21FLBFA 33010080 | 8/6/2000 | 220 | |
| 489A | 21FLBFA 33010080 | 12/3/1995 | 230 | |
| 489A | 21FLBFA 33010080 | 6/1/1997 | 240 | |
| 489A | 21FLBFA 33010080 | 6/4/1995 | 260 | |
| 489A | 21FLPNS 33010080 | 12/21/2005 | 260 | |
| 489A | 21FLPNS 3301489A5 | 5/2/2005 | 300 | |
| 489A | 21FLBFA 33010125 | 8/1/2004 | 320 | |
| 489A | 21FLPNS 33010104 | 9/15/2005 | 320 | |
| 489A | 21FLPNS 33010080 | 9/15/2005 | 400 | |
| 489A | 21FLBFA 33010080 | 8/4/2003 | 420 | 4.76 |
| 489A | 21FLPNS 33010103 | 9/15/2005 | 420 | 4.76 |
| 489A | 21FLBFA 33010080 | 5/2/2004 | 440 | 9.09 |
| 489A | 21FLBFA 33010080 | 9/11/1994 | 640 | 37.50 |
| 489A | 21FLPNS 3301489A4 | 9/15/2005 | 691 | 42.11 |
| 489A | 21FLBFA 33010080 | 11/2/2003 | 700 | 42.86 |
| 489A | 21FLBFA 33010080 | 8/17/1997 | 740 | 45.95 |
| 489A | 21FLBFA 33010080 | 2/3/2002 | 1,600 | 75.00 |
| 489A | 21FLBFA 33010080 | 12/1/1996 | 1,820 | 78.02 |
| 489A | 21FLBFA 33010080 | 8/10/1999 | 6,000 | 93.33 |
| 489A | 21FLBFA 33010080 | 11/23/1998 | 8,520 | 95.31 |
| 489A | 21FLBFA 33010080 | 9/8/1996 | 11,600 | 96.55 |
| | | **MEDIAN % REDUCTION:** | | **42.86** |

### *5.1.3 Critical Conditions/Seasonality*

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

Exceedances occurred over the entire range of flow conditions in the Elevenmile Creek watershed, as shown in **Figure 5.6**. Based on the dominant type of land use (36.19 percent urban and built-up) and sources of fecal coliform in the watershed, it is likely that many of the

exceedances in each of the flow intervals are from nonpoint sources entering the waters through baseflow. However, the fecal coliform loads increase slightly with flow increase, possibly indicating that there are additional exceedances during higher flow conditions, caused by fecal coliform built up on the land during dry periods being washed into local waters by rain. Critical conditions are accounted for in the load curve analysis by using the flow records and water quality data available in the $10^{th}$ to $90^{th}$ percentile flow duration interval.

# Chapter 6: DETERMINATION OF THE TMDL

## 6.1 Expression and Allocation of the TMDL

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

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

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

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

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

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

This approach is consistent with federal regulations (40 CFR § 130.2[I]), which state that TMDLs can be expressed in terms of mass per time (e.g., pounds per day), toxicity, or **other appropriate measure**. The TMDL for the Elevenmile Creek watershed is expressed in terms of percent reduction, and represents the maximum annual fecal coliform load the watershed can assimilate and maintain the fecal coliform criterion (**Tables 6.1a, 6.1b,** and **6.1c**).

### Table 6.1a. TMDL Components for the Elevenmile Creek Watershed at U.S. 90

| WBID | Parameter | TMDL (% Reduction)* | WLA | | LA (% Reduction)* | MOS |
|---|---|---|---|---|---|---|
| | | | Wastewater (cfu/100mL) | NPDES Stormwater | | |
| Elevenmile Creek at U.S. 90 | Fecal Coliform | 62.8% | Point sources must meet permit limits | 62.8% | 62.8% | Implicit |

* The percent reduction is based on the 10th to 90th percentile of recurrence intervals minus the WLA; see **Table 5.4a**.

### Table 6.1b. TMDL Components for the Elevenmile Creek Watershed at S.R. 297A

| WBID | Parameter | TMDL (% Reduction)* | WLA | | LA (% Reduction)* | MOS |
|---|---|---|---|---|---|---|
| | | | Wastewater (cfu/100mL) | NPDES Stormwater | | |
| Elevenmile Creek at S.R. 297A | Fecal Coliform | 65.9% | Point sources must meet permit limits | 65.9% | 65.9% | Implicit |

* The percent reduction is based on the 10th to 90th percentile of recurrence intervals minus the WLA; see **Table 5.4b**.

### Table 6.1c. TMDL Components for the Tenmile Creek Watershed, WBID 489A

| WBID | Parameter | TMDL (% Reduction) | WLA | | LA (% Reduction) | MOS |
|---|---|---|---|---|---|---|
| | | | Wastewater (cfu/100mL) | NPDES Stormwater | | |
| Tenmile Creek | Fecal Coliform | 42.90% | Point sources must meet permit limits | 42.90% | 42.9% | Implicit |

## 6.2 Load Allocation

Based on a load duration curve approach similar to that developed by Kansas (Stiles, 2002), a fecal coliform reduction of 65.9 percent is needed from nonpoint sources in the Elevenmile Creek watershed. A fecal coliform reduction of 42.9 percent is needed from nonpoint sources in the Tenmile Creek watershed. It should be noted that the LA includes loading from stormwater

discharges regulated by the Department and the water management districts that are not part of the NPDES Stormwater Program (see **Appendix A**).

## 6.3 Wasteload Allocation

Currently, there is only one point source permitted NPDES wastewater discharger in the watershed. Any new potential discharger is expected to comply with the Class III criterion for coliform bacteria.

### *6.3.1 NPDES Wastewater Discharges*

As mentioned previously, there is only one permitted wastewater facility with a discharge permit in the Elevenmile Creek watershed. Any new potential discharger is expected to comply with the Class III criterion for coliform bacteria.

### *6.3.2 NPDES Stormwater Discharges*

The Elevenmile Creek watershed, located in Escambia County, falls under the Escambia County and Coapplicant MS4 permit (FLS000019). The wasteload allocation for this permit is a 65.9 percent reduction in current anthropogenic fecal coliform loading from the MS4. 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 coliform, an implicit MOS was inherently incorporated by using 400 MPN/100mL of fecal coliform as the water quality target for each and every sampling event, instead of setting the criterion as no more than 10 percent of the samples exceeding 400 MPN/100mL. For fecal coliform TMDLs, using the correlation lines fitting through only the existing loadings that exceeded the allowable loadings could overestimate the actual existing loading, which makes the estimation more conservative and therefore adds to the MOS. An additional MOS was included in the TMDL by not allowing any exceedances of the state criterion, even though intermittent natural exceedances of the criterion would be expected and would be taken into account when determining impairment.

# Chapter 7: NEXT STEPS: IMPLEMENTATION PLAN DEVELOPMENT AND BEYOND

## 7.1 Basin Management Action Plan

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

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

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# Appendices

## Appendix A: Background Information on Federal and State Stormwater Programs

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

Rule 62-40, F.A.C., also requires the water management districts to establish stormwater pollutant load reduction goals (PLRGs) and adopt them as part of a Surface Water Improvement and Management (SWIM) plan, other watershed plan, or rule. Stormwater PLRGs are a major component of the load allocation part of a TMDL. To date, stormwater PLRGs have been established for Tampa Bay, Lake Thonotosassa, the Winter Haven Chain of Lakes, the Everglades, Lake Okeechobee, and Lake Apopka. No PLRG had been developed for Newnans Lake when this report was published.

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

**Table 3**
**Escambia County NPDES MS4 Permit FLS000019**
**Summary of WMM Land Uses for Co-permittees**

| Basin | Unincorporated County | City of Pensacola | Town of Century | FDOT District Three | Total County | % of County |
|---|---|---|---|---|---|---|
| Alligator Creek | 9,047.0 | 0.0 | 0.0 | 18.5 | 9,065.5 | 2.1% |
| Bayou Garcon | 3,459.0 | 0.0 | 0.0 | 38.1 | 3,497.0 | 0.8% |
| Bayou Grande | 12,128.8 | 0.0 | 0.0 | 145.0 | 12,273.8 | 2.9% |
| Bayou Marcus | 12,682.6 | 0.0 | 0.0 | 137.7 | 12,820.3 | 3.0% |
| Bellshead Branch | 2,214.7 | 0.3 | 0.0 | 30.7 | 2,245.7 | 0.5% |
| Big Lagoon | 2,384.7 | 0.0 | 0.0 | 48.5 | 2,433.2 | 0.6% |
| Bowman Creek | 5,073.7 | 0.0 | 0.0 | 0.0 | 5,073.7 | 1.2% |
| Bridge Creek | 4,724.2 | 0.0 | 0.0 | 72.9 | 4,797.1 | 1.1% |
| Bronson Field/Paradise | 1,180.7 | 0.0 | 0.0 | 14.7 | 1,195.4 | 0.3% |
| Carpenter Creek | 5,252.0 | 6,174.5 | 0.0 | 243.0 | 11,669.4 | 2.8% |
| Churchhouse Branch | 1,078.2 | 0.0 | 0.0 | 0.0 | 1,078.2 | 0.3% |
| Claypit Branch | 21,265.2 | 0.0 | 0.0 | 81.4 | 21,346.5 | 5.0% |
| Clear Creek | 11,293.0 | 0.0 | 0.0 | 58.1 | 11,351.1 | 2.7% |
| Cotton Creek | 8,763.2 | 0.0 | 0.0 | 20.7 | 8,783.9 | 2.1% |
| Cowdevil Creek | 4,044.2 | 0.0 | 0.0 | 9.0 | 4,053.1 | 1.0% |
| Direct Runoff To Bay | 1,290.4 | 0.0 | 0.0 | 19.6 | 1,310.0 | 0.3% |
| Dry Creek | 15,200.4 | 0.0 | 0.0 | 96.4 | 15,296.9 | 3.6% |
| Eightmile Creek | 7,527.4 | 0.0 | 0.0 | 81.4 | 7,608.7 | 1.8% |
| Elevenmile Creek | 21,152.5 | 0.0 | 0.0 | 136.7 | 21,289.2 | 5.0% |
| Escambia Bay | 3,023.2 | 2,906.8 | 0.0 | 146.9 | 6,076.8 | 1.4% |
| Escambia River | 5,280.2 | 0.0 | 0.0 | 0.7 | 5,280.8 | 1.2% |
| Fletcher Creek | 3,721.5 | 0.0 | 0.0 | 26.9 | 3,748.4 | 0.9% |
| Hobbs Branch | 18,696.2 | 0.0 | 0.0 | 73.4 | 18,769.6 | 4.4% |
| Hurst Branch | 1,864.0 | 0.0 | 0.0 | 8.2 | 1,872.2 | 0.4% |
| Millview | 4,961.7 | 0.0 | 0.0 | 4.4 | 4,966.1 | 1.2% |
| Mitchell Creek | 8,046.8 | 0.0 | 0.0 | 13.5 | 8,060.3 | 1.9% |
| Penasula Creek | 4,822.4 | 0.0 | 0.0 | 1.3 | 4,823.6 | 1.1% |
| Pensacola Bay | 3,726.5 | 3,486.4 | 0.0 | 271.5 | 7,484.3 | 1.8% |
| Pensacola Beach | 4,180.4 | 0.0 | 0.0 | 131.4 | 4,311.8 | 1.0% |
| Pine Barren Creek | 64,422.5 | 0.0 | 0.0 | 198.4 | 64,620.9 | 15.2% |
| Pond Branch | 18,686.1 | 0.0 | 0.0 | 39.6 | 18,725.7 | 4.4% |
| Pritchett Mill Branch | 4,505.8 | 0.0 | 0.0 | 21.9 | 4,527.7 | 1.1% |
| Reedy Branch | 17,833.4 | 0.0 | 0.0 | 0.0 | 17,833.4 | 4.2% |
| Rocky Creek | 34,503.1 | 0.0 | 0.0 | 0.0 | 34,503.1 | 8.1% |
| Southwest Side | 3,173.8 | 0.0 | 0.0 | 41.9 | 3,215.7 | 0.8% |
| Spanish Mill Creek | 6,126.3 | 0.0 | 0.0 | 0.0 | 6,126.3 | 1.4% |
| Tarkiln Bayou | 1,382.3 | 0.0 | 0.0 | 2.2 | 1,384.5 | 0.3% |
| Warrington | 5,682.1 | 735.7 | 0.0 | 174.4 | 6,592.2 | 1.6% |
| Weekly Bayou | 1,970.0 | 0.0 | 0.0 | 15.3 | 1,985.3 | 0.5% |
| West Fork | 20,798.7 | 0.0 | 0.0 | 0.0 | 20,798.7 | 4.9% |
| Wiggins Branch | 15,316.4 | 0.0 | 314.9 | 83.7 | 15,714.9 | 3.7% |
| Williams Creek | 5,512.2 | 0.0 | 0.0 | 0.0 | 5,512.2 | 1.3% |
| Total for Land Use | 407,997.0 | 13,303.6 | 314.9 | 2,507.9 | 424,123.4 | 100.0% |
| Percent of County | 96.2% | 3.1% | 0.1% | 0.6% | | |

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Table 3 - WMM Data: Summary

**Table 11A**
**Escambia County NPDES MS4 Permit FLS000019**
**Summary of BMP Coverage for Unincorporated County - Dry Ponds**

| | MDSF Residential | | | Institutional | | | Commercial | | |
|---|---|---|---|---|---|---|---|---|---|
| Basin | Total | BMP | Percent | Total | BMP | Percent | Total | BMP | Percent |
| Alligator Creek | 263.0 | | 0.0% | 2.6 | | 0.0% | 2.6 | | 0.0% |
| Bayou Garcon | 165.3 | 64.2 | 38.8% | 1.0 | | 0.0% | 38.6 | | 0.0% |
| Bayou Grande | 2,052.4 | | 0.0% | 219.1 | | 0.0% | 1,719.8 | | 0.0% |
| Bayou Marcus | 3,607.1 | 527.1 | 14.6% | 398.7 | | 0.0% | 445.9 | 1.8 | 0.4% |
| Bellshead Branch | 472.2 | | 0.0% | 105.9 | | 0.0% | 164.6 | | 0.0% |
| Big Lagoon | 132.0 | | 0.0% | 16.5 | | 0.0% | 12.1 | | 0.0% |
| Bowman Creek | 0.0 | | 0.0% | 0.0 | | 0.0% | 0.0 | | 0.0% |
| Bridge Creek | 354.2 | 63.3 | 17.9% | 1.5 | | 0.0% | 157.2 | | 0.0% |
| Bronson Field/Paradis | 122.7 | | 0.0% | 0.0 | | 0.0% | 170.1 | | 0.0% |
| Carpenter Creek | 2,012.2 | 659.1 | 32.8% | 178.3 | | 0.0% | 912.2 | | 0.0% |
| Churchhouse Branch | 91.7 | | 0.0% | 3.9 | | 0.0% | 0.0 | | 0.0% |
| Claypit Branch | 1,480.0 | | 0.0% | 19.5 | | 0.0% | 77.4 | | 0.0% |
| Clear Creek | 3,011.0 | 488.0 | 16.2% | 412.9 | 284.3 | 68.9% | 348.3 | | 0.0% |
| Cotton Creek | 39.0 | | 0.0% | 5.0 | | 0.0% | 0.0 | | 0.0% |
| Cowdevil Creek | 249.6 | | 0.0% | 28.4 | | 0.0% | 0.0 | | 0.0% |
| Direct Runoff To Bay | 232.2 | 232.2 | 100.0% | 22.7 | | 0.0% | 3.1 | | 0.0% |
| Dry Creek | 1,011.2 | | 0.0% | 37.9 | | 0.0% | 68.6 | | 0.0% |
| Eightmile Creek | 2,239.0 | 788.4 | 35.2% | 144.6 | | 0.0% | 729.5 | 310.8 | 42.6% |
| Elevenmile Creek | 3,239.6 | 363.6 | 11.2% | 798.2 | 9.8 | 1.2% | 555.9 | | 0.0% |
| Escambia Bay | 714.5 | | 0.0% | 44.2 | | 0.0% | 84.2 | | 0.0% |
| Escambia River | 447.2 | | 0.0% | 0.0 | | 0.0% | 21.9 | | 0.0% |
| Fletcher Creek | 6.9 | | 0.0% | 0.0 | | 0.0% | 0.0 | | 0.0% |
| Hobbs Branch | 131.5 | | 0.0% | 47.2 | | 0.0% | 13.2 | | 0.0% |
| Hurst Branch | 175.5 | 30.0 | 17.1% | 8.1 | | 0.0% | 22.6 | | 0.0% |
| Millview | 502.0 | | 0.0% | 4.2 | | 0.0% | 338.9 | | 0.0% |
| Mitchell Creek | 127.8 | | 0.0% | 0.0 | | 0.0% | 0.0 | | 0.0% |
| Penasula Creek | 91.0 | | 0.0% | 9.7 | | 0.0% | 0.0 | | 0.0% |
| Pensacola Bay | 1,207.6 | | 0.0% | 180.8 | | 0.0% | 991.6 | | 0.0% |
| Pensacola Beach | 73.5 | | 0.0% | 123.0 | | 0.0% | 302.7 | | 0.0% |
| Pine Barren Creek | 756.8 | 4.9 | 0.6% | 80.8 | | 0.0% | 59.6 | | 0.0% |
| Pond Branch | 198.9 | | 0.0% | 0.1 | | 0.0% | 0.1 | | 0.0% |
| Pritchett Mill Branch | 136.7 | | 0.0% | 13.1 | | 0.0% | 0.0 | | 0.0% |
| Reedy Branch | 60.9 | | 0.0% | 3.0 | | 0.0% | 0.0 | | 0.0% |
| Rocky Creek | 189.0 | | 0.0% | 7.4 | | 0.0% | 0.0 | | 0.0% |
| Southwest Side | 357.9 | | 0.0% | 0.0 | | 0.0% | 76.1 | | 0.0% |
| Spanish Mill Creek | 660.1 | | 0.0% | 0.0 | | 0.0% | 37.1 | | 0.0% |
| Tarkiln Bayou | 29.7 | 19.2 | 64.5% | 0.0 | | 0.0% | 0.0 | | 0.0% |
| Warrington | 2,010.4 | 30.5 | 1.5% | 196.9 | | 0.0% | 876.1 | | 0.0% |
| Weekly Bayou | 116.1 | | 0.0% | 0.0 | | 0.0% | 0.0 | | 0.0% |
| West Fork | 111.0 | | 0.0% | 11.1 | | 0.0% | 11.6 | | 0.0% |
| Wiggins Branch | 507.5 | | 0.0% | 185.0 | | 0.0% | 264.7 | | 0.0% |
| Williams Creek | 145.5 | | 0.0% | 0.0 | | 0.0% | 0.1 | | 0.0% |
| Total for Land Use | 29,532.3 | 3,270.4 | 11.1% | 3,311.5 | 294.1 | 8.9% | 8,506.1 | 312.6 | 3.7% |

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Table 11 - BMP Coverage

**Table 11B**
**Escambia County NPDES MS4 Permit FLS000019**
**Summary of BMP Coverage for Unincorporated County - Wet Ponds**

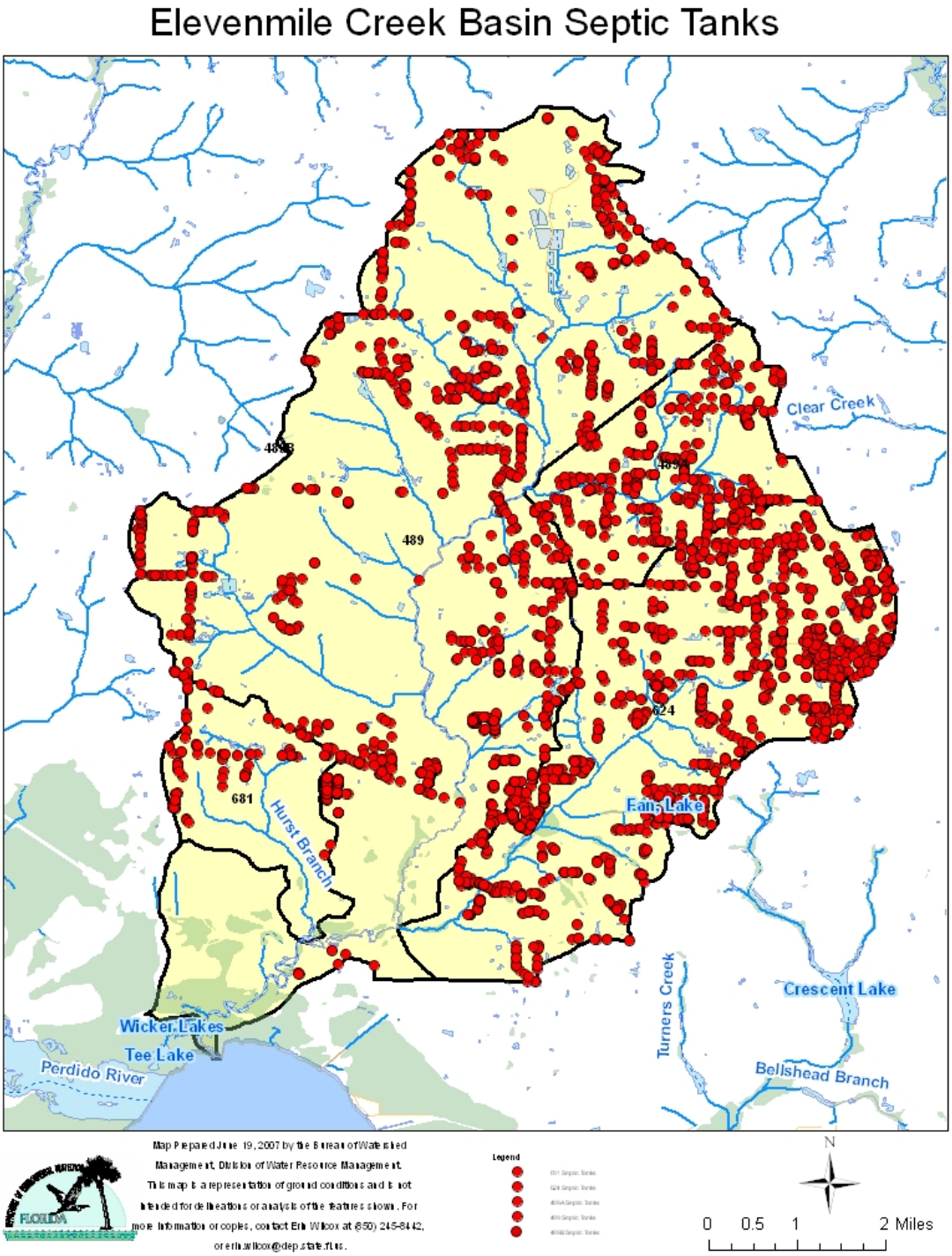
| | MDSF Residential | | | Institutional | | | Commercial | | |
|---|---|---|---|---|---|---|---|---|---|
| Basin | Total | BMP | Percent | Total | BMP | Percent | Total | BMP | Percent |
| Alligator Creek | 263.0 | | 0.0% | 2.6 | | 0.0% | 2.6 | | 0.0% |
| Bayou Garcon | 165.3 | | 0.0% | 1.0 | | 0.0% | 38.6 | | 0.0% |
| Bayou Grande | 2,052.4 | | 0.0% | 219.1 | | 0.0% | 1,719.8 | | 0.0% |
| Bayou Marcus | 3,607.1 | | 0.0% | 398.7 | | 0.0% | 445.9 | | 0.0% |
| Bellshead Branch | 472.2 | | 0.0% | 105.9 | | 0.0% | 164.6 | | 0.0% |
| Big Lagoon | 132.0 | | 0.0% | 16.5 | | 0.0% | 12.1 | | 0.0% |
| Bowman Creek | 0.0 | | 0.0% | 0.0 | | 0.0% | 0.0 | | 0.0% |
| Bridge Creek | 354.2 | 17.0 | 4.8% | 1.5 | | 0.0% | 157.2 | | 0.0% |
| Bronson Field/Paradis | 122.7 | | 0.0% | 0.0 | | 0.0% | 170.1 | | 0.0% |
| Carpenter Creek | 2,012.2 | 4.8 | 0.2% | 178.3 | | 0.0% | 912.2 | | 0.0% |
| Churchhouse Branch | 91.7 | | 0.0% | 3.9 | | 0.0% | 0.0 | | 0.0% |
| Claypit Branch | 1,480.0 | | 0.0% | 19.5 | | 0.0% | 77.4 | | 0.0% |
| Clear Creek | 3,011.0 | | 0.0% | 412.9 | | 0.0% | 348.3 | | 0.0% |
| Cotton Creek | 39.0 | | 0.0% | 5.0 | | 0.0% | 0.0 | | 0.0% |
| Cowdevil Creek | 249.6 | | 0.0% | 28.4 | | 0.0% | 0.0 | | 0.0% |
| Direct Runoff To Bay | 232.2 | 61.3 | 26.4% | 22.7 | | 0.0% | 3.1 | | 0.0% |
| Dry Creek | 1,011.2 | | 0.0% | 37.9 | | 0.0% | 68.6 | | 0.0% |
| Eightmile Creek | 2,239.0 | | 0.0% | 144.6 | | 0.0% | 729.5 | | 0.0% |
| Elevenmile Creek | 3,239.6 | 22.9 | 0.7% | 798.2 | | 0.0% | 555.9 | | 0.0% |
| Escambia Bay | 714.5 | | 0.0% | 44.2 | | 0.0% | 84.2 | | 0.0% |
| Escambia River | 447.2 | | 0.0% | 0.0 | | 0.0% | 21.9 | | 0.0% |
| Fletcher Creek | 6.9 | | 0.0% | 0.0 | | 0.0% | 0.0 | | 0.0% |
| Hobbs Branch | 131.5 | | 0.0% | 47.2 | | 0.0% | 13.2 | | 0.0% |
| Hurst Branch | 175.5 | | 0.0% | 8.1 | | 0.0% | 22.6 | | 0.0% |
| Millview | 502.0 | | 0.0% | 4.2 | | 0.0% | 338.9 | | 0.0% |
| Mitchell Creek | 127.8 | | 0.0% | 0.0 | | 0.0% | 0.0 | | 0.0% |
| Penasula Creek | 91.0 | | 0.0% | 9.7 | | 0.0% | 0.0 | | 0.0% |
| Pensacola Bay | 1,207.6 | | 0.0% | 180.8 | | 0.0% | 991.6 | | 0.0% |
| Pensacola Beach | 73.5 | | 0.0% | 123.0 | | 0.0% | 302.7 | | 0.0% |
| Pine Barren Creek | 756.8 | | 0.0% | 80.8 | | 0.0% | 59.6 | | 0.0% |
| Pond Branch | 198.9 | | 0.0% | 0.1 | | 0.0% | 0.1 | | 0.0% |
| Pritchett Mill Branch | 136.7 | | 0.0% | 13.1 | | 0.0% | 0.0 | | 0.0% |
| Reedy Branch | 60.9 | | 0.0% | 3.0 | | 0.0% | 0.0 | | 0.0% |
| Rocky Creek | 189.0 | | 0.0% | 7.4 | | 0.0% | 0.0 | | 0.0% |
| Southwest Side | 357.9 | | 0.0% | 0.0 | | 0.0% | 76.1 | | 0.0% |
| Spanish Mill Creek | 660.1 | | 0.0% | 0.0 | | 0.0% | 37.1 | | 0.0% |
| Tarkiln Bayou | 29.7 | | 0.0% | 0.0 | | 0.0% | 0.0 | | 0.0% |
| Warrington | 2,010.4 | | 0.0% | 196.9 | | 0.0% | 876.1 | | 0.0% |
| Weekly Bayou | 116.1 | 10.2 | 8.8% | 0.0 | | 0.0% | 0.0 | | 0.0% |
| West Fork | 111.0 | | 0.0% | 11.1 | | 0.0% | 11.6 | | 0.0% |
| Wiggins Branch | 507.5 | | 0.0% | 185.0 | | 0.0% | 264.7 | | 0.0% |
| Williams Creek | 145.5 | | 0.0% | 0.0 | | 0.0% | 0.1 | | 0.0% |
| Total for Land Use | 29,532.3 | 116.2 | 0.4% | 3,311.5 | 0.0 | 0.0% | 8,506.1 | 0.0 | 0.0% |

CDM

Table 11 - BMP Coverage

## Appendix B: Summary of Land Use Loads by Category

### Septic Tanks in the Elevenmile Creek Watershed



## Land Use Information for the Elevenmile Creek Watershed

| Land Use Level 1 | | Escambia County, FL | | Elevenmile Creek Watershed | |
|---|---|---|---|---|---|
| | | Total $Mi^2$ | % | Total $Mi^2$ | % |
| 1000 | Urban and Built-up | 1.1481E+02 | 1.6588E+01 | 1.7361E+01 | 3.6192E+01 |
| 2000 | Agriculture | 9.3660E+01 | 1.3532E+01 | 4.4626E+00 | 9.3029E+00 |
| 3000 | Rangeland | 1.1610E+01 | 1.6775E+00 | 7.6270E-01 | 1.5900E+00 |
| 4000 | Upland Forests | 3.1183E+02 | 4.5054E+01 | 1.8492E+01 | 3.8550E+01 |
| 5000 | Water | 1.2250E+01 | 1.7699E+00 | 5.5760E-01 | 1.1624E+00 |
| 6000 | Wetlands | 1.2111E+02 | 1.7498E+01 | 4.5177E+00 | 9.4178E+00 |
| 7000 | Barren Land | 9.4800E+00 | 1.3697E+00 | 4.7600E-02 | 9.9229E-02 |
| 8000 | Transportation and Utilities | 1.7370E+01 | 2.5097E+00 | 1.7682E+00 | 3.6861E+00 |
| | Total Land | 6.7987E+02 | 9.8230E+01 | 4.7412E+01 | 9.8838E+01 |
| | Total Land+Water | 6.9212E+02 | 1.0000E+02 | 4.7970E+01 | 1.0000E+02 |
| | Total Census 2003 | 2.7183E+05 | | 4.1106E+04 | |
| | Urban Ratio WBID/County | 1 | | 1.5122E-01 | |
| | Agriculture Ratio WBID/County | 1 | | 4.7647E-02 | |
| | Natural Ratio WBID/County | 1 | | 5.2461E-02 | |
| | Total Septic Tanks thru 2005 | 67761 | | 1.0247E+04 | |
| | Total Repairs 1991 thru 2005 | 10510 | | 1.5893E+03 | |
| | Total Failures | 3.3881E+03 | | 5.1234E+02 | |
| | Total 2000 Households | 111049 | | 1.6793E+04 | |
| | Total Houseboats | | | | |
| | Total 1990 Public Sewer | 65461 | | 9.8989E+03 | |
| | Total 1990 Septic | 46376 | | 7.0129E+03 | |
| | Total 1990 Other | 393 | | 5.9429E+01 | |
| | Total 2000 Population | 2.9441E+05 | | 4.4520E+04 | |

## Fecal Coliform Loading From Animals in the Elevenmile Creek Watershed

| Livestock, Wildlife, and Domestic Animals | | | | | | Elevenmile Creek Watershed | | |
|---|---|---|---|---|---|---|---|---|
| Animal Type | Fecal Coliform Produced LFC (cts/animal/day) | Animals per County | County Area ($mi^2$) | Animal Density ($N/mi^2$) | References | DA1 ($mi^2$) | NDA1 (N) | LFC1 (cts/day) |
| | | | 6.9212E+02 | | | 4.7970E+01 | | |
| **LIVESTOCK** | | | | | | | | |
| Cattle and Calves Inventory | 1.04E+11 | 8643 | 6.9212E+02 | | | 4.7970E+01 | 4.1181E+02 | 4.2828E+13 |
| Cattle and Calves Sold | 1.04E+11 | 3382 | 6.9212E+02 | | | 4.7970E+01 | 1.6114E+02 | 1.6759E+13 |
| Dairy Cattle Inventory | 1.01E+11 | 1169 | 6.9212E+02 | | C | 4.7970E+01 | 5.5699E+01 | 5.6145E+12 |
| Beef Cattle Inventory | 1.04E+11 | 4009 | 6.9212E+02 | | C | 4.7970E+01 | 1.9102E+02 | 1.9866E+13 |
| Sheep and Lambs Inventory | 1.20E+10 | | 6.9212E+02 | | C | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Sheep and Lambs Sold | 1.20E+10 | 0 | 6.9212E+02 | | | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Horses and Ponies Inventory | 4.20E+08 | 1297 | 6.9212E+02 | | C | 4.7970E+01 | 6.1798E+01 | 2.5955E+10 |
| Horses and Ponies Sold | 4.20E+08 | 178 | 6.9212E+02 | | | 4.7970E+01 | 8.4811E+00 | 3.5621E+09 |
| Mules, Burros, and Donkeys Inventory | 4.20E+08 | 18 | 6.9212E+02 | | C,E | 4.7970E+01 | 8.5764E-01 | 3.6021E+08 |
| Mules, Burros, and Donkeys Sold | 4.20E+08 | | 6.9212E+02 | | | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Llamas (~Sheep) | 1.20E+10 | | 6.9212E+02 | | C,E | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Bison (~Beef Cattle) | 1.04E+11 | | 6.9212E+02 | | C,E | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Deer | 5.00E+08 | | 6.9212E+02 | | C,E | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Elk | 5.00E+08 | | 6.9212E+02 | | C,E | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Goats, All (~Sheep) Inventory | 1.20E+10 | 592 | 6.9212E+02 | | C,E | 4.7970E+01 | 2.8207E+01 | 3.3848E+11 |
| Goats, All (~Sheep) Sold | 1.20E+10 | 308 | 6.9212E+02 | | | 4.7970E+01 | 1.4675E+01 | 1.7610E+11 |
| Hogs and Pigs Inventory | 1.08E+10 | 279 | 6.9212E+02 | | C | 4.7970E+01 | 1.3293E+01 | 1.4357E+11 |
| Hogs and Pigs Sold | 1.08E+10 | 263 | 6.9212E+02 | | | 4.7970E+01 | 1.2531E+01 | 1.3534E+11 |
| Layer Chickens Inventory | 1.40E+08 | 401 | 6.9212E+02 | | C | 4.7970E+01 | 1.9106E+01 | 2.6749E+09 |
| Layer Chickens Sold | 1.40E+08 | 71 | 6.9212E+02 | | | 4.7970E+01 | 3.3829E+00 | 4.7361E+08 |
| Broilers Inventory | 1.40E+08 | | 6.9212E+02 | | C | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |

| Livestock, Wildlife, and Domestic Animals | | | | | | Elevenmile Creek Watershed | | |
|---|---|---|---|---|---|---|---|---|
| Animal Type | Fecal Coliform Produced LFC (cts/animal/day) | Animals per County | County Area ($mi^2$) | Animal Density ($N/mi^2$) | References | DA1 ($mi^2$) | NDA1 (N) | LFC1 (cts/day) |
| | | | **6.9212E+02** | | | **4.7970E+01** | | |
| Broilers Sold | 1.40E+08 | 0 | 6.9212E+02 | | | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Turkeys Inventory | 9.50E+07 | 0 | 6.9212E+02 | | C | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Turkeys Sold | 9.50E+07 | 0 | 6.9212E+02 | | | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Ducks Inventory | 2.50E+09 | 28 | 6.9212E+02 | | C | 4.7970E+01 | 1.3341E+00 | 3.3353E+09 |
| Ducks Sold | 2.50E+09 | | 6.9212E+02 | | | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Geese Inventory | 4.90E+10 | 53 | 6.9212E+02 | | C | 4.7970E+01 | 2.5253E+00 | 1.2374E+11 |
| Geese Sold | 4.90E+10 | 19 | 6.9212E+02 | | | 4.7970E+01 | 9.0529E-01 | 4.4359E+10 |
| Emus (~Geese) | 4.90E+10 | | 6.9212E+02 | | C,E | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Ostriches (~Geese) | 4.90E+10 | | 6.9212E+02 | | C,E | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Pheasants (~Geese) Inventory | 4.90E+10 | | 6.9212E+02 | | C,E | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Pheasants (~Geese) Sold | 4.90E+10 | | 6.9212E+02 | | | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Pigeons or Squab Inventory | 1.60E+08 | | 6.9212E+02 | | C | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Pigeons or Squab Sold | 1.60E+08 | | 6.9212E+02 | | | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Quail (~Pigeon) | 1.60E+08 | | 6.9212E+02 | | C | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Other | | | 6.9212E+02 | | C | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Rabbits Inventory | 2.53E+09 | 24 | 6.9212E+02 | | J,K | 4.7970E+01 | 1.1435E+00 | 2.8943E+09 |
| Rabbits Sold | 2.53E+09 | 0 | 6.9212E+02 | | J,K | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| **TOTAL LIVESTOCK** | | | **6.9212E+02** | | **C** | **4.7970E+01** | **0.0000E+00** | **8.6068E+13** |
| | | | | | | | | |
| **WILDLIFE** | | | **6.9212E+02** | | **C** | **4.7970E+01** | | |
| Alligators | | | 6.9212E+02 | | C | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Black Bears | | | 6.9212E+02 | | C | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Raccoons | 1.25E+08 | | 6.9212E+02 | | C | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Beavers | 2.50E+08 | | 6.9212E+02 | | C | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Deer | 5.00E+08 | 8.7020E+03 | 6.9212E+02 | | C,I | 4.7970E+01 | 4.5652E+02 | 2.2826E+11 |
| Dolphin, Porpose, Manatee | | | 6.9212E+02 | | C | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| Waterfowl | 4.90E+10 | 5.4260E+03 | 6.9212E+02 | | C,I | 4.7970E+01 | 2.8466E+02 | 1.3948E+13 |
| Wild Pigs | 1.08E+10 | | 6.9212E+02 | | C,I | 4.7970E+01 | 0.0000E+00 | 0.0000E+00 |
| | | | | | | | | |
| **TOTAL WILDLIFE** | | | **6.9212E+02** | | **C** | **4.7970E+01** | | **1.4176E+13** |
| | | | | | | | | |
| **DOMESTIC ANIMALS** | | | **6.9212E+02** | | **C** | **4.7970E+01** | | |
| Dogs | 5.00E+09 | 4.6388E+03 | 6.9212E+02 | 0.58*HH | F | 4.7970E+01 | 9.7397E+03 | 4.8699E+13 |
| Cats | 5.00E+09 | 5.2787E+03 | 6.9212E+02 | 0.66*HH | F | 4.7970E+01 | 1.1083E+04 | 5.5416E+13 |

| Livestock, Wildlife, and Domestic Animals | | | | | | Elevenmile Creek Watershed | | |
|---|---|---|---|---|---|---|---|---|
| Animal Type | Fecal Coliform Produced LFC (cts/animal/day) | Animals per County | County Area ($mi^2$) | Animal Density ($N/mi^2$) | References | DA1 ($mi^2$) | NDA1 (N) | LFC1 (cts/day) |
| | | | **6.9212E+02** | | | **4.7970E+01** | | |
| Horses and Ponies–Pets | 4.20E+08 | 3.9990E+02 | 6.9212E+02 | 0.05*HH | F | 4.7970E+01 | 8.3963E+02 | 3.5265E+11 |
| **TOTAL DOMESTIC** | | | **6.9212E+02** | | | **4.7970E+01** | | **1.0447E+14** |
| | | | | | | | | |
| **SEPTIC–HUMAN IMPACTS** | | | **6.9212E+02** | | | **4.7970E+01** | | |
| Human | 2.00E+09 | | 6.9212E+02 | | | 4.7970E+01 | | |
| Sewer Line Leaks | 6.89E+09 | | 6.9212E+02 | | | 4.7970E+01 | | 3.3743E+12 |
| Houseboats–Nonmarina | 2.00E+09 | | 6.9212E+02 | | C | 4.7970E+01 | | |
| Boats–Marina Slips | 2.00E+09 | | 6.9212E+02 | | | 4.7970E+01 | | 0.0000E+00 |
| Septic Tanks Failed | 6.89E+09 | | 6.9212E+02 | | | 4.7970E+01 | 5.1234E+02 | 3.5295E+12 |
| Septic Tanks Normal | | | 6.9212E+02 | | | 4.7970E+01 | | |
| Septic Tanks – ATU | 2.76E+08 | | 6.9212E+02 | | H | 4.7970E+01 | | |
| **TOTAL SEPTIC** | | | **6.9212E+02** | | | **4.7970E+01** | | **6.9038E+12** |
| | | | | | | | | |
| **AQUACULTURE** | | | | | | | | |
| Fish Farms | | | 6.9212E+02 | | | 4.7970E+01 | 0.0000E+00 | |
| Fish Farms Sold | | | 6.9212E+02 | | | 4.7970E+01 | 0.0000E+00 | |
| Oyster Houses | | | 6.9212E+02 | | | 4.7970E+01 | 0.0000E+00 | |
| **TOTAL AQUACULTURE** | | | **6.9212E+02** | | | **4.7970E+01** | **0.0000E+00** | |
| | | | | | | | | |
| **TOTAL** | | | **6.9212E+02** | | | **4.7970E+01** | **0.0000E+00** | **2.1162E+14** |

## Fecal Coliform Loading From Animals in Escambia County

| Livestock, Wildlife, and Domestic Animals | | | | | - | Escambia County | | |
|---|---|---|---|---|---|---|---|---|
| Animal Type | Fecal Coliform Produced LFC (cts/Animal/Day) | Animals per County | County Area ($mi^2$) | Animal Density ($N/mi^2$) | References* | DA1 ($mi^2$) | NDA1 (N) | LFC1 (cts/day) |
| | | | 6.9212E+02 | | | 6.9212E+02 | | |
| **LIVESTOCK** | | | | | | | | |
| Cattle and Calves Inventory | 1.04E+11 | 8643 | 6.9212E+02 | | | 6.9212E+02 | 8.6430E+03 | 8.9887E+14 |
| Cattle and Calves Sold | 1.04E+11 | 3382 | 6.9212E+02 | | | 6.9212E+02 | 3.3820E+03 | 3.5173E+14 |
| Dairy Cattle Inventory | 1.01E+11 | 1169 | 6.9212E+02 | | C | 6.9212E+02 | 1.1690E+03 | 1.1784E+14 |
| Beef Cattle Inventory | 1.04E+11 | 4009 | 6.9212E+02 | | C | 6.9212E+02 | 4.0090E+03 | 4.1694E+14 |
| Sheep and Lambs Inventory | 1.20E+10 | | 6.9212E+02 | | C | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Sheep and Lambs Sold | 1.20E+10 | 0 | 6.9212E+02 | | | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Horses and Ponies Inventory | 4.20E+08 | 1297 | 6.9212E+02 | | C | 6.9212E+02 | 1.2970E+03 | 5.4474E+11 |
| Horses and Ponies Sold | 4.20E+08 | 178 | 6.9212E+02 | | | 6.9212E+02 | 1.7800E+02 | 7.4760E+10 |
| Mules, Burros, and Donkeys Inventory | 4.20E+08 | 18 | 6.9212E+02 | | C,E | 6.9212E+02 | 1.8000E+01 | 7.5600E+09 |
| Mules, Burros, and Donkeys Sold | 4.20E+08 | | 6.9212E+02 | | | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Llamas (~Sheep) | 1.20E+10 | | 6.9212E+02 | | C,E | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Bison (~Beef Cattle) | 1.04E+11 | | 6.9212E+02 | | C,E | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Deer | 5.00E+08 | | 6.9212E+02 | | C,E | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Elk | 5.00E+08 | | 6.9212E+02 | | C,E | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Goats, All (~Sheep) Inventory | 1.20E+10 | 592 | 6.9212E+02 | | C,E | 6.9212E+02 | 5.9200E+02 | 7.1040E+12 |
| Goats, All (~Sheep) Sold | 1.20E+10 | 308 | 6.9212E+02 | | | 6.9212E+02 | 3.0800E+02 | 3.6960E+12 |
| Hogs and Pigs Inventory | 1.08E+10 | 279 | 6.9212E+02 | | C | 6.9212E+02 | 2.7900E+02 | 3.0132E+12 |
| Hogs and Pigs Sold | 1.08E+10 | 263 | 6.9212E+02 | | | 6.9212E+02 | 2.6300E+02 | 2.8404E+12 |
| Layer Chickens Inventory | 1.40E+08 | 401 | 6.9212E+02 | | C | 6.9212E+02 | 4.0100E+02 | 5.6140E+10 |
| Layer Chickens Sold | 1.40E+08 | 71 | 6.9212E+02 | | | 6.9212E+02 | 7.1000E+01 | 9.9400E+09 |
| Broilers Inventory | 1.40E+08 | | 6.9212E+02 | | C | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |

| Livestock, Wildlife, and Domestic Animals | | | | | - | Escambia County | | |
|---|---|---|---|---|---|---|---|---|
| Animal Type | Fecal Coliform Produced LFC (cts/Animal/Day) | Animals per County | County Area ($mi^2$) | Animal Density ($N/mi^2$) | References* | DA1 ($mi^2$) | NDA1 (N) | LFC1 (cts/day) |
| | | | **6.9212E+02** | | | **6.9212E+02** | | |
| Broilers Sold | 1.40E+08 | 0 | 6.9212E+02 | | | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Turkeys Inventory | 9.50E+07 | 0 | 6.9212E+02 | | C | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Turkeys Sold | 9.50E+07 | 0 | 6.9212E+02 | | | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Ducks Inventory | 2.50E+09 | 28 | 6.9212E+02 | | C | 6.9212E+02 | 2.8000E+01 | 7.0000E+10 |
| Ducks Sold | 2.50E+09 | | 6.9212E+02 | | | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Geese Inventory | 4.90E+10 | 53 | 6.9212E+02 | | C | 6.9212E+02 | 5.3000E+01 | 2.5970E+12 |
| Geese Sold | 4.90E+10 | 19 | 6.9212E+02 | | | 6.9212E+02 | 1.9000E+01 | 9.3100E+11 |
| Emus (~Geese) | 4.90E+10 | | 6.9212E+02 | | C,E | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Ostriches (~Geese) | 4.90E+10 | | 6.9212E+02 | | C,E | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Pheasants (~Geese) Inventory | 4.90E+10 | | 6.9212E+02 | | C,E | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Pheasants (~Geese) Sold | 4.90E+10 | | 6.9212E+02 | | | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Pigeons or Squab Inventory | 1.60E+08 | | 6.9212E+02 | | C | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Pigeons or Squab Sold | 1.60E+08 | | 6.9212E+02 | | | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Quail (~Pigeon) | 1.60E+08 | | 6.9212E+02 | | C | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Other | | | 6.9212E+02 | | C | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Rabbits Inventory | 2.53E+09 | 24 | 6.9212E+02 | | J,K | 6.9212E+02 | 2.4000E+01 | 6.0744E+10 |
| Rabbits Sold | 2.53E+09 | 0 | 6.9212E+02 | | J,K | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| **TOTAL LIVESTOCK** | | | **6.9212E+02** | | **C** | **6.9212E+02** | **0.0000E+00** | **1.8064E+15** |
| | | | | | | | | |
| **WILDLIFE** | | | **6.9212E+02** | | **C** | **6.9212E+02** | | |
| Alligators | | | 6.9212E+02 | | C | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Black Bears | | | 6.9212E+02 | | C | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Raccoons | 1.25E+08 | | 6.9212E+02 | | C | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Beavers | 2.50E+08 | | 6.9212E+02 | | C | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Deer | 5.00E+08 | 8.7020E+03 | 6.9212E+02 | | C,I | 6.9212E+02 | 8.7020E+03 | 4.3510E+12 |
| Dolphin, Porpose, Manatee | | | 6.9212E+02 | | C | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| Waterfowl | 4.90E+10 | 5.4260E+03 | 6.9212E+02 | | C,I | 6.9212E+02 | 5.4260E+03 | 2.6587E+14 |
| Wild Pigs | 1.08E+10 | | 6.9212E+02 | | C,I | 6.9212E+02 | 0.0000E+00 | 0.0000E+00 |
| **TOTAL WILDLIFE** | | | **6.9212E+02** | | **C** | **6.9212E+02** | | **2.7023E+14** |
| | | | | | | | | |
| **DOMESTIC ANIMALS** | | | **6.9212E+02** | | **C** | **6.9212E+02** | | |
| Dogs | 5.00E+09 | 4.6388E+03 | 6.9212E+02 | 0.58*HH | F | 6.9212E+02 | 6.4408E+04 | 3.2204E+14 |
| Cats | 5.00E+09 | 5.2787E+03 | 6.9212E+02 | 0.66*HH | F | 6.9212E+02 | 7.3292E+04 | 3.6646E+14 |

| Livestock, Wildlife, and Domestic Animals | | | | | - | Escambia County | | |
|---|---|---|---|---|---|---|---|---|
| Animal Type | Fecal Coliform Produced LFC (cts/Animal/Day) | Animals per County | County Area ($mi^2$) | Animal Density ($N/mi^2$) | References* | DA1 ($mi^2$) | NDA1 (N) | LFC1 (cts/day) |
| | | | **6.9212E+02** | | | **6.9212E+02** | | |
| Horses and Ponies–Pets | 4.20E+08 | 3.9990E+02 | 6.9212E+02 | 0.05*HH | F | 6.9212E+02 | 5.5525E+03 | 2.3320E+12 |
| **TOTAL DOMESTIC** | | | **6.9212E+02** | | | **6.9212E+02** | | **6.9084E+14** |
| | | | | | | | | |
| **SEPTIC-HUMAN IMPACTS** | | | **6.9212E+02** | | | **6.9212E+02** | | |
| Human | 2.00E+09 | | 6.9212E+02 | | | 6.9212E+02 | | |
| Sewer Line Leaks | 6.89E+09 | | 6.9212E+02 | | | 6.9212E+02 | | 2.2314E+13 |
| Houseboats–Nonmarina | 2.00E+09 | | 6.9212E+02 | | C | 6.9212E+02 | | |
| Boats–Marina Slipa | 2.00E+09 | | 6.9212E+02 | | | 6.9212E+02 | | 0.0000E+00 |
| Septic Tanks Failed | 6.89E+09 | | 6.9212E+02 | | | 6.9212E+02 | 3.3881E+03 | 2.3340E+13 |
| Septic Tanks Normal | | | 6.9212E+02 | | | 6.9212E+02 | | |
| Septic Tanks–ATU | 2.76E+08 | | 6.9212E+02 | | H | 6.9212E+02 | | |
| **TOTAL SEPTIC** | | | **6.9212E+02** | | | **6.9212E+02** | | **4.5654E+13** |
| | | | | | | | | |
| **AQUACULTURE** | | | | | | | | |
| Fish Farms | | | 6.9212E+02 | | | 6.9212E+02 | 0.0000E+00 | |
| Fish Farms Sold | | | 6.9212E+02 | | | 6.9212E+02 | 0.0000E+00 | |
| Oyster Houses | | | 6.9212E+02 | | | 6.9212E+02 | 0.0000E+00 | |
| **TOTAL AQUACULTURE** | | | **6.9212E+02** | | | **6.9212E+02** | **0.0000E+00** | |
| | | | | | | | | |
| **TOTAL** | | | **6.9212E+02** | | | **6.9212E+02** | | **2.8131E+15** |

**References:**


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

# Appendix C: Summary of Permitted Point Source Loads, International Paper and Cantonment Wastewater Treatment Plant

## International Paper

| Facility ID | Facility Name* | Test Site ID | Report Type | Report Month | Report Year | Fecal Load (cfu/day) |
|---|---|---|---|---|---|---|
| 2217 | IP | 5277 | INITL | 5 | 1981 | 1.9377E+10 |
| 2217 | IP | 5277 | INITL | 1 | 1983 | 3.6405E+10 |
| 2217 | IP | 5277 | INITL | 2 | 1983 | 6.6630E+10 |
| 2217 | IP | 5277 | INITL | 3 | 1983 | 9.5593E+10 |
| 2217 | IP | 5277 | INITL | 4 | 1983 | 6.4986E+10 |
| 2217 | IP | 5277 | INITL | 5 | 1983 | 6.1302E+10 |
| 2217 | IP | 5277 | INITL | 6 | 1983 | 1.0844E+11 |
| 2217 | IP | 5277 | INITL | 7 | 1983 | 1.2084E+11 |
| 2217 | IP | 5277 | INITL | 8 | 1983 | 1.3106E+11 |
| 2217 | IP | 5277 | INITL | 9 | 1983 | 1.5889E+11 |
| 2217 | IP | 5277 | INITL | 10 | 1983 | 2.7866E+11 |
| 2217 | IP | 5277 | INITL | 11 | 1983 | 1.0451E+11 |
| 2217 | IP | 5277 | INITL | 12 | 1983 | 1.2519E+11 |
| 2217 | IP | 5277 | INITL | 1 | 1984 | 1.2062E+11 |
| 2217 | IP | 5277 | INITL | 2 | 1984 | 1.4077E+11 |
| 2217 | IP | 5277 | INITL | 3 | 1984 | 1.9260E+11 |
| 2217 | IP | 5277 | INITL | 4 | 1984 | 1.9895E+11 |
| 2217 | IP | 5277 | INITL | 5 | 1984 | 1.0177E+11 |
| 2217 | IP | 5277 | INITL | 6 | 1984 | 6.6893E+10 |
| 2217 | IP | 5277 | INITL | 7 | 1984 | 1.1389E+11 |
| 2217 | IP | 5277 | INITL | 8 | 1984 | 1.1279E+11 |
| 2217 | IP | 5277 | INITL | 9 | 1984 | 7.2233E+10 |
| 2217 | IP | 5277 | INITL | 10 | 1984 | 7.4601E+10 |
| 2217 | IP | 5277 | INITL | 11 | 1984 | 1.0740E+11 |
| 2217 | IP | 5277 | INITL | 12 | 1984 | 8.6242E+10 |
| 2217 | IP | 5277 | INITL | 1 | 1985 | 7.4601E+10 |
| 2217 | IP | 5277 | INITL | 2 | 1985 | 1.0404E+11 |
| 2217 | IP | 5277 | INITL | 3 | 1985 | 4.2349E+10 |
| 2217 | IP | 5277 | INITL | 4 | 1985 | 6.9045E+10 |
| 2217 | IP | 5277 | INITL | 5 | 1985 | 5.5708E+10 |
| 2217 | IP | 5277 | INITL | 6 | 1985 | 6.9460E+10 |
| 2217 | IP | 5277 | INITL | 7 | 1985 | 7.2649E+10 |
| 2217 | IP | 5277 | INITL | 9 | 1985 | 8.5068E+10 |

| Facility ID | Facility Name* | Test Site ID | Report Type | Report Month | Report Year | Fecal Load (cfu/day) |
|---|---|---|---|---|---|---|
| 2217 | IP | 5277 | INITL | 10 | 1985 | 6.3803E+10 |
| 2217 | IP | 5277 | INITL | 11 | 1985 | 2.2898E+10 |
| 2217 | IP | 5277 | INITL | 12 | 1985 | 2.2472E+10 |
| 2217 | IP | 5277 | INITL | 1 | 1986 | 4.4948E+10 |
| 2217 | IP | 5277 | INITL | 2 | 1986 | 9.7568E+10 |
| 2217 | IP | 5277 | INITL | 3 | 1986 | 3.7347E+10 |
| 2217 | IP | 5277 | INITL | 4 | 1986 | 4.5306E+10 |
| 2217 | IP | 5277 | INITL | 5 | 1986 | 3.1647E+10 |
| 2217 | IP | 5277 | INITL | 6 | 1986 | 3.4896E+10 |
| 2217 | IP | 5277 | INITL | 7 | 1986 | 8.6012E+10 |
| 2217 | IP | 5277 | INITL | 8 | 1986 | 1.7276E+11 |
| 2217 | IP | 5277 | INITL | 9 | 1986 | 8.1655E+10 |
| 2217 | IP | 5277 | INITL | 10 | 1986 | 7.2545E+10 |
| 2217 | IP | 5277 | INITL | 11 | 1986 | 2.5163E+10 |
| 2217 | IP | 5277 | INITL | 12 | 1986 | 1.5290E+10 |
| 2217 | IP | 5277 | INITL | 1 | 1987 | 2.0343E+10 |
| 2217 | IP | 5277 | INITL | 4 | 1987 | 1.4078E+10 |
| 2217 | IP | 5277 | INITL | 5 | 1987 | 1.9905E+10 |
| 2217 | IP | 5277 | INITL | 6 | 1987 | 1.5633E+10 |
| 2217 | IP | 5277 | INITL | 7 | 1987 | 1.4886E+10 |
| 2217 | IP | 5277 | INITL | 8 | 1987 | 3.8783E+10 |
| 2217 | IP | 5277 | INITL | 9 | 1987 | 2.2329E+10 |
| 2217 | IP | 5277 | INITL | 10 | 1987 | 2.1125E+10 |
| 2217 | IP | 5277 | INITL | 11 | 1987 | 1.3715E+10 |
| 2217 | IP | 5277 | INITL | 12 | 1987 | 2.9430E+10 |
| 2217 | IP | 5277 | INITL | 1 | 1988 | 3.3352E+10 |
| 2217 | IP | 5277 | INITL | 2 | 1988 | 1.7528E+10 |
| 2217 | IP | 5277 | INITL | 3 | 1988 | 2.4264E+10 |
| 2217 | IP | 5277 | INITL | 4 | 1988 | 1.9689E+10 |
| 2217 | IP | 5277 | INITL | 5 | 1988 | 1.8849E+10 |
| 2217 | IP | 5277 | INITL | 6 | 1988 | 2.4714E+10 |
| 2217 | IP | 5277 | INITL | 7 | 1988 | 2.7179E+10 |
| 2217 | IP | 5277 | INITL | 8 | 1988 | 2.2551E+10 |
| 2217 | IP | 5277 | INITL | 9 | 1988 | 2.0962E+10 |
| 2217 | IP | 5277 | INITL | 10 | 1988 | 5.1193E+10 |
| 2217 | IP | 5277 | INITL | 11 | 1988 | 1.9858E+10 |
| 2217 | IP | 5277 | INITL | 12 | 1988 | 2.2328E+10 |
| 2217 | IP | 5277 | INITL | 1 | 1989 | 3.5924E+10 |
| 2217 | IP | 5277 | INITL | 2 | 1989 | 1.1073E+10 |

| Facility ID | Facility Name* | Test Site ID | Report Type | Report Month | Report Year | Fecal Load (cfu/day) |
|---|---|---|---|---|---|---|
| 2217 | IP | 5277 | INITL | 3 | 1989 | 6.8566E+10 |
| 2217 | IP | 5277 | INITL | 4 | 1989 | 2.4469E+10 |
| 2217 | IP | 5277 | INITL | 5 | 1989 | 2.2530E+10 |
| 2217 | IP | 5277 | INITL | 6 | 1989 | 2.5062E+10 |
| 2217 | IP | 5277 | INITL | 7 | 1989 | 7.9314E+10 |
| 2217 | IP | 5277 | INITL | 8 | 1989 | 1.6026E+10 |
| 2217 | IP | 5277 | INITL | 9 | 1989 | 3.8278E+10 |
| 2217 | IP | 5277 | INITL | 10 | 1989 | 2.8498E+10 |
| 2217 | IP | 5277 | INITL | 12 | 1989 | 2.3419E+09 |
| 2217 | IP | 5277 | INITL | 1 | 1990 | 1.2864E+10 |
| 2217 | IP | 5277 | INITL | 2 | 1990 | 1.4123E+10 |
| 2217 | IP | 5277 | INITL | 3 | 1990 | 1.0775E+10 |
| 2217 | IP | 5277 | INITL | 4 | 1990 | 1.2233E+10 |
| 2217 | IP | 5277 | INITL | 5 | 1990 | 7.4466E+10 |
| 2217 | IP | 5277 | INITL | 6 | 1990 | 4.1064E+10 |
| 2217 | IP | 5277 | INITL | 7 | 1990 | 1.6469E+11 |
| 2217 | IP | 5277 | INITL | 8 | 1990 | 1.0874E+11 |
| 2217 | IP | 5277 | INITL | 10 | 1990 | 2.5897E+10 |
| 2217 | IP | 5277 | INITL | 11 | 1990 | 2.5594E+10 |
| 2217 | IP | 5277 | INITL | 12 | 1990 | 2.2383E+10 |
| 2217 | IP | 5277 | INITL | 1 | 1991 | 3.5280E+10 |
| 2217 | IP | 5277 | INITL | 2 | 1991 | 3.8164E+10 |
| 2217 | IP | 5277 | INITL | 3 | 1991 | 5.0618E+10 |
| 2217 | IP | 5277 | INITL | 4 | 1991 | 2.0337E+10 |
| 2217 | IP | 5277 | INITL | 5 | 1991 | 5.1091E+10 |
| 2217 | IP | 5277 | INITL | 6 | 1991 | 9.1477E+10 |
| 2217 | IP | 5277 | INITL | 7 | 1991 | 6.3944E+10 |
| 2217 | IP | 5277 | INITL | 8 | 1991 | 2.7598E+10 |
| 2217 | IP | 5277 | INITL | 9 | 1991 | 3.0622E+10 |
| 2217 | IP | 5277 | INITL | 10 | 1991 | 4.7599E+10 |
| 2217 | IP | 5277 | INITL | 11 | 1991 | 4.2728E+10 |
| 2217 | IP | 5277 | INITL | 12 | 1991 | 3.4652E+10 |
| 2217 | IP | 5277 | INITL | 1 | 1992 | 3.3455E+10 |
| 2217 | IP | 5277 | INITL | 2 | 1992 | 3.7165E+10 |
| 2217 | IP | 5277 | INITL | 3 | 1992 | 1.0230E+10 |
| 2217 | IP | 5277 | INITL | 4 | 1992 | 1.2724E+10 |
| 2217 | IP | 5277 | INITL | 5 | 1992 | 1.4024E+10 |
| 2217 | IP | 5277 | INITL | 6 | 1992 | 1.6475E+10 |
| 2217 | IP | 5277 | INITL | 7 | 1992 | 4.9842E+10 |

| Facility ID | Facility Name* | Test Site ID | Report Type | Report Month | Report Year | Fecal Load (cfu/day) |
|---|---|---|---|---|---|---|
| 2217 | IP | 5277 | INITL | 8 | 1992 | 6.0186E+10 |
| 2217 | IP | 5277 | INITL | 9 | 1992 | 4.4827E+10 |
| 2217 | IP | 5277 | INITL | 10 | 1992 | 1.9825E+10 |
| 2217 | IP | 5277 | INITL | 11 | 1992 | 1.2918E+10 |
| 2217 | IP | 5277 | INITL | 12 | 1992 | 6.6743E+09 |
| 2217 | IP | 5277 | INITL | 1 | 1993 | 4.3500E+09 |
| 2217 | IP | 5277 | INITL | 2 | 1993 | 2.9971E+09 |
| 2217 | IP | 5277 | INITL | 3 | 1993 | 1.7542E+09 |
| 2217 | IP | 5277 | INITL | 4 | 1993 | 3.6307E+09 |
| 2217 | IP | 5277 | INITL | 5 | 1993 | 6.1654E+09 |
| 2217 | IP | 5277 | INITL | 6 | 1993 | 6.2168E+09 |
| 2217 | IP | 5277 | INITL | 7 | 1993 | 7.7288E+09 |
| 2217 | IP | 5277 | INITL | 8 | 1993 | 6.7428E+09 |
| 2217 | IP | 5277 | INITL | 9 | 1993 | 5.2846E+09 |
| 2217 | IP | 5277 | INITL | 10 | 1993 | 6.1630E+09 |
| 2217 | IP | 5277 | INITL | 11 | 1993 | 4.4430E+09 |
| 2217 | IP | 5277 | INITL | 12 | 1993 | 8.1863E+09 |
| 2217 | IP | 5277 | INITL | 1 | 1994 | 5.3580E+09 |
| 2217 | IP | 5277 | INITL | 2 | 1994 | 4.7782E+09 |
| 2217 | IP | 5277 | INITL | 3 | 1994 | 2.3487E+09 |
| 2217 | IP | 5277 | INITL | 4 | 1994 | 4.1690E+09 |
| 2217 | IP | 5277 | INITL | 5 | 1994 | 4.1298E+09 |
| 2217 | IP | 5277 | INITL | 6 | 1994 | 3.0949E+09 |
| 2217 | IP | 5277 | INITL | 8 | 1994 | 3.3352E+10 |
| 2217 | IP | 5277 | INITL | 9 | 1994 | 1.6833E+10 |
| 2217 | IP | 5277 | INITL | 10 | 1994 | 6.1067E+09 |
| 2217 | IP | 5277 | INITL | 11 | 1994 | 2.5567E+09 |
| 2217 | IP | 5277 | INITL | 12 | 1994 | 2.6790E+09 |
| 2217 | IP | 5277 | INITL | 1 | 1995 | 6.9336E+09 |
| 2217 | IP | 5277 | INITL | 2 | 1995 | 1.0180E+10 |
| 2217 | IP | 5277 | INITL | 3 | 1995 | 5.6272E+09 |
| 2217 | IP | 5277 | INITL | 4 | 1995 | 6.0553E+09 |
| 2217 | IP | 5277 | INITL | 5 | 1995 | 1.7322E+10 |
| 2217 | IP | 5277 | INITL | 6 | 1995 | 1.5551E+10 |
| 2217 | IP | 5277 | INITL | 7 | 1995 | 1.1352E+10 |
| 2217 | IP | 5277 | INITL | 8 | 1995 | 1.6304E+10 |
| 2217 | IP | 5277 | INITL | 9 | 1995 | 1.3089E+10 |
| 2217 | IP | 5277 | INITL | 10 | 1995 | 7.7410E+09 |
| 2217 | IP | 5277 | INITL | 11 | 1995 | 4.1616E+09 |

| Facility ID | Facility Name* | Test Site ID | Report Type | Report Month | Report Year | Fecal Load (cfu/day) |
|---|---|---|---|---|---|---|
| 2217 | IP | 5277 | INITL | 12 | 1995 | 6.8700E+09 |
| 2217 | IP | 5277 | INITL | 1 | 1996 | 7.7753E+09 |
| 2217 | IP | 5277 | INITL | 2 | 1996 | 1.0024E+10 |
| 2217 | IP | 5277 | INITL | 3 | 1996 | 6.5471E+09 |
| 2217 | IP | 5277 | INITL | 4 | 1996 | 1.0107E+10 |
| 2217 | IP | 5277 | INITL | 5 | 1996 | 2.6827E+10 |
| 2217 | IP | 5277 | INITL | 6 | 1996 | 1.8555E+10 |
| 2217 | IP | 5277 | INITL | 7 | 1996 | 1.5458E+10 |
| 2217 | IP | 5277 | INITL | 8 | 1996 | 2.5484E+10 |
| 2217 | IP | 5277 | INITL | 9 | 1996 | 2.7333E+10 |
| 2217 | IP | 5277 | INITL | 10 | 1996 | 1.6319E+10 |
| 2217 | IP | 5277 | INITL | 11 | 1996 | 2.2509E+10 |
| 2217 | IP | 5277 | INITL | 12 | 1996 | 1.2830E+10 |
| 2217 | IP | 5277 | INITL | 1 | 1997 | 3.4372E+10 |
| 2217 | IP | 5277 | INITL | 2 | 1997 | 2.7950E+10 |
| 2217 | IP | 5277 | INITL | 3 | 1997 | 3.2684E+10 |
| 2217 | IP | 5277 | INITL | 4 | 1997 | 2.7693E+10 |
| 2217 | IP | 5277 | INITL | 5 | 1997 | 2.3881E+10 |
| 2217 | IP | 5277 | INITL | 6 | 1997 | 3.3205E+10 |
| 2217 | IP | 5277 | INITL | 7 | 1997 | 1.8430E+10 |
| 2217 | IP | 5277 | INITL | 8 | 1997 | 1.0785E+10 |
| 2217 | IP | 5277 | INITL | 9 | 1997 | 1.9181E+10 |
| 2217 | IP | 5277 | INITL | 10 | 1997 | 3.4587E+10 |
| 2217 | IP | 5277 | INITL | 11 | 1997 | 4.1241E+10 |
| 2217 | IP | 5277 | INITL | 12 | 1997 | 3.5873E+10 |
| 2217 | IP | 5277 | INITL | 1 | 1998 | 3.6445E+10 |
| 2217 | IP | 5277 | INITL | 2 | 1998 | 1.1796E+10 |
| 2217 | IP | 5277 | INITL | 6 | 1998 | 1.0393E+11 |
| 2217 | IP | 5277 | INITL | 7 | 1998 | 1.0785E+11 |

* IP– Champion International Paper

## Cantonment Wastewater Treatment Plant

| Facility ID | Facility Name | Test Site ID | Report Type | Report Month | Report Year | Fecal Load (cfu/day) |
|---|---|---|---|---|---|---|
| 1907 | Cantonment | 5325 | INITL | 1 | 1986 | 7.8242E+07 |
| 1907 | Cantonment | 5325 | INITL | 1 | 1987 | 5.4804E+06 |
| 1907 | Cantonment | 5325 | INITL | 1 | 1988 | 2.7157E+06 |
| 1907 | Cantonment | 5325 | INITL | 1 | 1989 | 1.2551E+07 |
| 1907 | Cantonment | 5325 | INITL | 1 | 1990 | 5.8260E+09 |
| 1907 | Cantonment | 5325 | INITL | 1 | 1991 | 1.6818E+09 |
| 1907 | Cantonment | 5325 | INITL | 1 | 1992 | 4.5360E+07 |
| 1907 | Cantonment | 5325 | INITL | 1 | 1993 | 9.6371E+07 |
| 1907 | Cantonment | 5325 | INITL | 1 | 1994 | 8.7833E+06 |
| 1907 | Cantonment | 5325 | INITL | 1 | 1995 | 8.9300E+06 |
| 1907 | Cantonment | 5325 | INITL | 1 | 1996 | 1.2062E+07 |
| 1907 | Cantonment | 5325 | INITL | 1 | 1997 | 3.7433E+07 |
| 1907 | Cantonment | 5325 | INITL | 1 | 1998 | 4.7341E+07 |
| 1907 | Cantonment | 5325 | INITL | 2 | 1986 | 2.6912E+06 |
| 1907 | Cantonment | 5325 | INITL | 2 | 1987 | 5.4167E+07 |
| 1907 | Cantonment | 5325 | INITL | 2 | 1988 | 3.4742E+06 |
| 1907 | Cantonment | 5325 | INITL | 2 | 1989 | 3.2491E+07 |
| 1907 | Cantonment | 5325 | INITL | 2 | 1990 | 1.9697E+09 |
| 1907 | Cantonment | 5325 | INITL | 2 | 1991 | 6.4057E+08 |
| 1907 | Cantonment | 5325 | INITL | 2 | 1992 | 9.1747E+06 |
| 1907 | Cantonment | 5325 | INITL | 2 | 1993 | 7.6334E+06 |
| 1907 | Cantonment | 5325 | INITL | 2 | 1994 | 9.0279E+06 |
| 1907 | Cantonment | 5325 | INITL | 2 | 1995 | 1.8545E+07 |
| 1907 | Cantonment | 5325 | INITL | 2 | 1996 | 2.4662E+07 |
| 1907 | Cantonment | 5325 | INITL | 2 | 1997 | 4.1176E+07 |
| 1907 | Cantonment | 5325 | INITL | 3 | 1986 | 3.4252E+06 |
| 1907 | Cantonment | 5325 | INITL | 3 | 1987 | 1.6732E+10 |
| 1907 | Cantonment | 5325 | INITL | 3 | 1988 | 7.1930E+06 |
| 1907 | Cantonment | 5325 | INITL | 3 | 1989 | 4.5507E+06 |
| 1907 | Cantonment | 5325 | INITL | 3 | 1990 | 3.9488E+10 |
| 1907 | Cantonment | 5325 | INITL | 3 | 1991 | 1.5555E+08 |
| 1907 | Cantonment | 5325 | INITL | 3 | 1992 | 6.9728E+06 |
| 1907 | Cantonment | 5325 | INITL | 3 | 1993 | 1.7028E+07 |
| 1907 | Cantonment | 5325 | INITL | 3 | 1994 | 9.9821E+06 |
| 1907 | Cantonment | 5325 | INITL | 3 | 1995 | 1.9132E+07 |

| Facility ID | Facility Name | Test Site ID | Report Type | Report Month | Report Year | Fecal Load (cfu/day) |
|---|---|---|---|---|---|---|
| 1907 | Cantonment | 5325 | INITL | 3 | 1996 | 1.2967E+07 |
| 1907 | Cantonment | 5325 | INITL | 3 | 1997 | 4.0002E+07 |
| 1907 | Cantonment | 5325 | INITL | 4 | 1986 | 8.3257E+08 |
| 1907 | Cantonment | 5325 | INITL | 4 | 1987 | 2.7646E+06 |
| 1907 | Cantonment | 5325 | INITL | 4 | 1988 | 5.2112E+07 |
| 1907 | Cantonment | 5325 | INITL | 4 | 1989 | 1.2947E+08 |
| 1907 | Cantonment | 5325 | INITL | 4 | 1990 | 1.7661E+10 |
| 1907 | Cantonment | 5325 | INITL | 4 | 1991 | 3.3518E+07 |
| 1907 | Cantonment | 5325 | INITL | 4 | 1992 | 6.8015E+06 |
| 1907 | Cantonment | 5325 | INITL | 4 | 1993 | 2.4441E+07 |
| 1907 | Cantonment | 5325 | INITL | 4 | 1994 | 2.7084E+07 |
| 1907 | Cantonment | 5325 | INITL | 4 | 1995 | 6.0626E+07 |
| 1907 | Cantonment | 5325 | INITL | 4 | 1996 | 2.3147E+09 |
| 1907 | Cantonment | 5325 | INITL | 4 | 1997 | 2.2949E+07 |
| 1907 | Cantonment | 5325 | INITL | 5 | 1986 | 2.7713E+09 |
| 1907 | Cantonment | 5325 | INITL | 5 | 1987 | 4.0633E+08 |
| 1907 | Cantonment | 5325 | INITL | 5 | 1988 | 5.9501E+07 |
| 1907 | Cantonment | 5325 | INITL | 5 | 1989 | 5.9599E+07 |
| 1907 | Cantonment | 5325 | INITL | 5 | 1990 | 9.9694E+07 |
| 1907 | Cantonment | 5325 | INITL | 5 | 1991 | 1.5546E+08 |
| 1907 | Cantonment | 5325 | INITL | 5 | 1992 | 1.1895E+08 |
| 1907 | Cantonment | 5325 | INITL | 5 | 1993 | 8.4163E+06 |
| 1907 | Cantonment | 5325 | INITL | 5 | 1994 | 2.4662E+07 |
| 1907 | Cantonment | 5325 | INITL | 5 | 1995 | 3.0020E+07 |
| 1907 | Cantonment | 5325 | INITL | 5 | 1996 | 4.8736E+07 |
| 1907 | Cantonment | 5325 | INITL | 5 | 1997 | 3.3396E+07 |
| 1907 | Cantonment | 5325 | INITL | 6 | 1986 | 5.6761E+06 |
| 1907 | Cantonment | 5325 | INITL | 6 | 1987 | 7.4376E+07 |
| 1907 | Cantonment | 5325 | INITL | 6 | 1988 | 3.7433E+06 |
| 1907 | Cantonment | 5325 | INITL | 6 | 1989 | 1.0002E+08 |
| 1907 | Cantonment | 5325 | INITL | 6 | 1990 | 5.1235E+09 |
| 1907 | Cantonment | 5325 | INITL | 6 | 1991 | 1.8976E+08 |
| 1907 | Cantonment | 5325 | INITL | 6 | 1992 | 8.9056E+07 |
| 1907 | Cantonment | 5325 | INITL | 6 | 1993 | 7.8780E+06 |
| 1907 | Cantonment | 5325 | INITL | 6 | 1994 | 1.1115E+08 |
| 1907 | Cantonment | 5325 | INITL | 6 | 1995 | 8.5631E+07 |
| 1907 | Cantonment | 5325 | INITL | 6 | 1996 | 2.2362E+07 |
| 1907 | Cantonment | 5325 | INITL | 6 | 1997 | 3.4350E+07 |

| Facility ID | Facility Name | Test Site ID | Report Type | Report Month | Report Year | Fecal Load (cfu/day) |
|---|---|---|---|---|---|---|
| 1907 | Cantonment | 5325 | INITL | 7 | 1986 | 3.8020E+08 |
| 1907 | Cantonment | 5325 | INITL | 7 | 1987 | 3.4497E+06 |
| 1907 | Cantonment | 5325 | INITL | 7 | 1988 | 1.2416E+09 |
| 1907 | Cantonment | 5325 | INITL | 7 | 1989 | 1.8643E+07 |
| 1907 | Cantonment | 5325 | INITL | 7 | 1990 | 1.0533E+09 |
| 1907 | Cantonment | 5325 | INITL | 7 | 1991 | 1.7860E+08 |
| 1907 | Cantonment | 5325 | INITL | 7 | 1992 | 2.4348E+08 |
| 1907 | Cantonment | 5325 | INITL | 7 | 1993 | 8.6854E+06 |
| 1907 | Cantonment | 5325 | INITL | 7 | 1994 | 3.3690E+07 |
| 1907 | Cantonment | 5325 | INITL | 7 | 1995 | 2.6717E+07 |
| 1907 | Cantonment | 5325 | INITL | 7 | 1996 | 8.6903E+07 |
| 1907 | Cantonment | 5325 | INITL | 7 | 1997 | 2.9261E+07 |
| 1907 | Cantonment | 5325 | INITL | 8 | 1986 | 4.0858E+06 |
| 1907 | Cantonment | 5325 | INITL | 8 | 1987 | 2.2088E+08 |
| 1907 | Cantonment | 5325 | INITL | 8 | 1988 | 5.5538E+08 |
| 1907 | Cantonment | 5325 | INITL | 8 | 1989 | 6.9654E+07 |
| 1907 | Cantonment | 5325 | INITL | 8 | 1990 | 5.3825E+08 |
| 1907 | Cantonment | 5325 | INITL | 8 | 1991 | 4.9013E+08 |
| 1907 | Cantonment | 5325 | INITL | 8 | 1992 | 2.5601E+08 |
| 1907 | Cantonment | 5325 | INITL | 8 | 1993 | 9.2970E+06 |
| 1907 | Cantonment | 5325 | INITL | 8 | 1994 | 9.9586E+07 |
| 1907 | Cantonment | 5325 | INITL | 8 | 1995 | 2.2313E+07 |
| 1907 | Cantonment | 5325 | INITL | 8 | 1996 | 4.8912E+08 |
| 1907 | Cantonment | 5325 | INITL | 8 | 1997 | 1.3779E+08 |
| 1907 | Cantonment | 5325 | INITL | 9 | 1986 | 5.8229E+06 |
| 1907 | Cantonment | 5325 | INITL | 9 | 1987 | 1.8349E+08 |
| 1907 | Cantonment | 5325 | INITL | 9 | 1988 | 1.1907E+10 |
| 1907 | Cantonment | 5325 | INITL | 9 | 1989 | 2.5432E+08 |
| 1907 | Cantonment | 5325 | INITL | 9 | 1990 | 1.7479E+09 |
| 1907 | Cantonment | 5325 | INITL | 9 | 1991 | 7.2419E+08 |
| 1907 | Cantonment | 5325 | INITL | 9 | 1992 | 3.0788E+08 |
| 1907 | Cantonment | 5325 | INITL | 9 | 1993 | 7.6334E+07 |
| 1907 | Cantonment | 5325 | INITL | 9 | 1994 | 2.9276E+07 |
| 1907 | Cantonment | 5325 | INITL | 9 | 1995 | 2.8625E+07 |
| 1907 | Cantonment | 5325 | INITL | 9 | 1996 | 2.5249E+07 |
| 1907 | Cantonment | 5325 | INITL | 9 | 1997 | 3.8460E+07 |
| 1907 | Cantonment | 5325 | INITL | 10 | 1986 | 2.3295E+08 |
| 1907 | Cantonment | 5325 | INITL | 10 | 1987 | 3.5231E+08 |

| Facility ID | Facility Name | Test Site ID | Report Type | Report Month | Report Year | Fecal Load (cfu/day) |
|---|---|---|---|---|---|---|
| 1907 | Cantonment | 5325 | INITL | 10 | 1988 | 1.9866E+07 |
| 1907 | Cantonment | 5325 | INITL | 10 | 1989 | 3.3063E+08 |
| 1907 | Cantonment | 5325 | INITL | 10 | 1990 | 1.4655E+09 |
| 1907 | Cantonment | 5325 | INITL | 10 | 1991 | 5.1506E+08 |
| 1907 | Cantonment | 5325 | INITL | 10 | 1992 | 6.8749E+06 |
| 1907 | Cantonment | 5325 | INITL | 10 | 1993 | 1.7664E+07 |
| 1907 | Cantonment | 5325 | INITL | 10 | 1994 | 2.6820E+07 |
| 1907 | Cantonment | 5325 | INITL | 10 | 1996 | 7.1049E+07 |
| 1907 | Cantonment | 5325 | INITL | 10 | 1997 | 1.6857E+08 |
| 1907 | Cantonment | 5325 | INITL | 11 | 1986 | 6.1654E+06 |
| 1907 | Cantonment | 5325 | INITL | 11 | 1987 | 4.5590E+08 |
| 1907 | Cantonment | 5325 | INITL | 11 | 1988 | 2.8038E+07 |
| 1907 | Cantonment | 5325 | INITL | 11 | 1989 | 1.1401E+07 |
| 1907 | Cantonment | 5325 | INITL | 11 | 1990 | 7.2517E+07 |
| 1907 | Cantonment | 5325 | INITL | 11 | 1992 | 3.0827E+07 |
| 1907 | Cantonment | 5325 | INITL | 11 | 1993 | 8.1961E+06 |
| 1907 | Cantonment | 5325 | INITL | 11 | 1994 | 3.4742E+07 |
| 1907 | Cantonment | 5325 | INITL | 11 | 1995 | 6.5936E+07 |
| 1907 | Cantonment | 5325 | INITL | 11 | 1996 | 3.4057E+07 |
| 1907 | Cantonment | 5325 | INITL | 11 | 1997 | 4.2791E+07 |
| 1907 | Cantonment | 5325 | INITL | 12 | 1985 | 6.3611E+05 |
| 1907 | Cantonment | 5325 | INITL | 12 | 1986 | 5.3825E+06 |
| 1907 | Cantonment | 5325 | INITL | 12 | 1987 | 2.7891E+06 |
| 1907 | Cantonment | 5325 | INITL | 12 | 1988 | 4.3329E+07 |
| 1907 | Cantonment | 5325 | INITL | 12 | 1989 | 1.9219E+09 |
| 1907 | Cantonment | 5325 | INITL | 12 | 1990 | 1.8305E+08 |
| 1907 | Cantonment | 5325 | INITL | 12 | 1992 | 2.1359E+07 |
| 1907 | Cantonment | 5325 | INITL | 12 | 1993 | 1.0941E+08 |
| 1907 | Cantonment | 5325 | INITL | 12 | 1994 | 3.5133E+07 |
| 1907 | Cantonment | 5325 | INITL | 12 | 1995 | 2.4270E+07 |
| 1907 | Cantonment | 5325 | INITL | 12 | 1996 | 2.3340E+07 |
| 1907 | Cantonment | 5325 | INITL | 12 | 1997 | 5.9403E+07 |

## Appendix D: Summary of Measured External Loads

### Calculation of External Loads to the Elevenmile Creek Watershed (based on fecal coliform brought into the watershed with the tide)

| Tidal Input/Output | | Rate | Elevenmile Creek | | WBID 489 | Input from Perdido Bay, WBID 797 | |
|---|---|---|---|---|---|---|---|
| Date | Date Year | Area ($mi^2$) | Area ($meter^2$) | Qston (cfs) | Fecal (N/100mL) | Fecal (cfu/day) | Fecal (cfu/yr) |
| 1/1/1983 | 1983.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 1.2640E+03 | 2.4950E+12 | 9.1068E+14 |
| 1/1/1984 | 1984.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 1.7750E+02 | 3.5037E+11 | 1.2788E+14 |
| 1/1/1985 | 1985.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 2.0500E+02 | 4.0465E+11 | 1.4770E+14 |
| 1/1/1986 | 1986.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 2.0000E+01 | 3.9478E+10 | 1.4409E+13 |
| 1/1/1987 | 1987.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 1.3733E+03 | 2.7108E+12 | 9.8943E+14 |
| 1/1/1988 | 1988.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | | | |
| 1/1/1989 | 1989.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 6.2000E+01 | 1.2238E+11 | 4.4669E+13 |
| 1/1/1990 | 1990.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 4.3333E+01 | 8.5535E+10 | 3.1220E+13 |
| 1/1/1991 | 1991.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 7.8000E+01 | 1.5396E+11 | 5.6197E+13 |
| 1/1/1992 | 1992.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 4.0667E+01 | 8.0272E+10 | 2.9299E+13 |
| 1/1/1993 | 1993.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 1.0000E+01 | 1.9739E+10 | 7.2047E+12 |
| 1/1/1994 | 1994.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 3.2500E+01 | 6.4152E+10 | 2.3415E+13 |
| 1/1/1995 | 1995.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 2.0000E+01 | 3.9478E+10 | 1.4409E+13 |
| 1/1/1996 | 1996.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | | | |
| 1/1/1997 | 1997.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 7.1000E+01 | 1.4015E+11 | 5.1154E+13 |
| 1/1/1998 | 1998.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 2.2959E+02 | 4.5320E+11 | 1.6542E+14 |
| 1/1/1999 | 1999.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 1.6999E+02 | 3.3555E+11 | 1.2247E+14 |
| 1/1/2000 | 2000.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 6.0400E+01 | 1.1922E+11 | 4.3517E+13 |
| 1/1/2001 | 2001.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 1.0057E+02 | 1.9852E+11 | 7.2460E+13 |
| 1/1/2002 | 2002.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 6.5481E+01 | 1.2925E+11 | 4.7177E+13 |
| 1/1/2003 | 2003.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 1.2700E+02 | 2.5069E+11 | 9.1500E+13 |
| 1/1/2004 | 2004.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 1.0980E+02 | 2.1673E+11 | 7.9108E+13 |
| 1/1/2005 | 2005.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 8.6902E+01 | 1.7154E+11 | 6.2610E+13 |
| 1/1/2006 | 2006.00 | 0.5 | 1.2950E+06 | 8.0671E+01 | 4.6229E+01 | 9.1251E+10 | 3.3307E+13 |
| AVE | | | | 8.0671E+01 | 1.9969E+02 | 3.9418E+11 | 1.4387E+14 |
| COUNT | | | | 2.4000E+01 | 2.2000E+01 | 2.2000E+01 | 2.2000E+01 |

TIDAL FLOW ASSUME
ELEVENMILE CREEK AREA= 0.5 SQMI DEP GIS WBID 489
TIDAL RANGE = 0.5 FT STATION 4539 MOBILE- TIDE TABLES 1996 OF EAST COAST OF NORTH AND SOUTH AMERICA
Q TIDAL PRISM = (0.5 FT)*0.5 * (0.5 SQMI)* (2.788E7 SQFT/SQMI)* (1.0 HR/3600 SEC)*(1/12.0 HR)=
Q= 0.5 0.5 0.5 2.7880E+07 2.7778E-04 8.3333E-02 8.0671E+01
QSTON= 8.0671E+01 CFS
INPUT DATA FROM RUN 28 ANNUAL MEANS OF SEASONAL MEDIANS
CHECK ON TIDAL FLOWS

# Appendix E: Summary of Effluent Data, International Paper and Cantonment Wastewater Treatment Facility

## International Paper

| Facility ID | Facility Name* | Test Site ID | Report Type | Report Year | Parameter | Parameter Name | Annual Average Test Value** |
|---|---|---|---|---|---|---|---|
| 2217 | IP | 5277 | INITL | 1981 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 36.0000 |
| 2217 | IP | 5277 | INITL | 1983 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 186.5000 |
| 2217 | IP | 5277 | INITL | 1984 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 196.8333 |
| 2217 | IP | 5277 | INITL | 1985 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 121.5455 |
| 2217 | IP | 5277 | INITL | 1986 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 130.1667 |
| 2217 | IP | 5277 | INITL | 1987 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 39.3000 |
| 2217 | IP | 5277 | INITL | 1988 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 44.8333 |
| 2217 | IP | 5277 | INITL | 1989 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 56.2500 |
| 2217 | IP | 5277 | INITL | 1990 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 91.4545 |
| 2217 | IP | 5277 | INITL | 1991 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 78.7500 |
| 2217 | IP | 5277 | INITL | 1992 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 47.5000 |
| 2217 | IP | 5277 | INITL | 1993 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 9.4167 |
| 2217 | IP | 5277 | INITL | 1994 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 14.7273 |
| 2217 | IP | 5277 | INITL | 1995 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 18.0833 |
| 2217 | IP | 5277 | INITL | 1996 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 29.3333 |

| Facility ID | Facility Name* | Test Site ID | Report Type | Report Year | Parameter | Parameter Name | Annual Average Test Value** |
|---|---|---|---|---|---|---|---|
| 2217 | IP | 5277 | INITL | 1997 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 50.8333 |
| 2217 | IP | 5277 | INITL | 1998 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 114.2500 |
| 2217 | IP | 5277 | INITL | 1981 | 50053 | Flow,Month Avg | 22.0000 |
| 2217 | IP | 5277 | INITL | 1983 | 50053 | Flow,Month Avg | 24.7250 |
| 2217 | IP | 5277 | INITL | 1984 | 50053 | Flow,Month Avg | 24.0975 |
| 2217 | IP | 5277 | INITL | 1985 | 50053 | Flow,Month Avg | 20.7127 |
| 2217 | IP | 5277 | INITL | 1986 | 50053 | Flow,Month Avg | 19.6650 |
| 2217 | IP | 5277 | INITL | 1987 | 50053 | Flow,Month Avg | 21.6150 |
| 2217 | IP | 5277 | INITL | 1988 | 50053 | Flow,Month Avg | 23.1158 |
| 2217 | IP | 5277 | INITL | 1989 | 50053 | Flow,Month Avg | 22.6482 |
| 2217 | IP | 5277 | INITL | 1990 | 50053 | Flow,Month Avg | 21.4791 |
| 2217 | IP | 5277 | INITL | 1991 | 50053 | Flow,Month Avg | 23.1408 |
| 2217 | IP | 5277 | INITL | 1992 | 50053 | Flow,Month Avg | 23.1125 |
| 2217 | IP | 5277 | INITL | 1993 | 50053 | Flow,Month Avg | 23.1750 |
| 2217 | IP | 5277 | INITL | 1994 | 50053 | Flow,Month Avg | 22.1417 |
| 2217 | IP | 5277 | INITL | 1995 | 50053 | Flow,Month Avg | 22.8500 |
| 2217 | IP | 5277 | INITL | 1996 | 50053 | Flow,Month Avg | 23.2750 |
| 2217 | IP | 5277 | INITL | 1997 | 50053 | Flow,Month Avg | 22.8450 |
| 2217 | IP | 5277 | INITL | 1998 | 50053 | Flow,Month Avg | 23.0825 |

* IP – International Paper
** Values are annual averages of samples.

## Cantonment Wastewater Treatment Facility

| Cantonment | | | | | | | |
|---|---|---|---|---|---|---|---|
| Facility ID | Facility Name | Test Site ID | Report Type | Report Year | Parameter | Parameter Name | Annual Average Test Value* |
| 1907 | Cantonment | 5325 | INITL | 1985 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 2.0000 |
| 1907 | Cantonment | 5325 | INITL | 1986 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 172.1429 |
| 1907 | Cantonment | 5325 | INITL | 1987 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 893.8462 |
| 1907 | Cantonment | 5325 | INITL | 1988 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 193.8333 |
| 1907 | Cantonment | 5325 | INITL | 1989 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 45.6667 |
| 1907 | Cantonment | 5325 | INITL | 1990 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 1018.3425 |
| 1907 | Cantonment | 5325 | INITL | 1991 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 68.2700 |
| 1907 | Cantonment | 5325 | INITL | 1992 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 12.9167 |
| 1907 | Cantonment | 5325 | INITL | 1993 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 3.9167 |
| 1907 | Cantonment | 5325 | INITL | 1994 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 3.9500 |
| 1907 | Cantonment | 5325 | INITL | 1995 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 3.5455 |
| 1907 | Cantonment | 5325 | INITL | 1996 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 19.5833 |
| 1907 | Cantonment | 5325 | INITL | 1997 | 31616 | Fecal Coliform, Membran- | 4.4167 |

| Cantonment | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Facility ID** | **Facility Name** | **Test Site ID** | **Report Type** | **Report Year** | **Parameter** | **Parameter Name** | **Annual Average Test Value*** |
| | | | | | | Filter, 44.5 C | |
| 1907 | Cantonment | 5325 | INITL | 1998 | 31616 | Fecal Coliform, Membran-Filter, 44.5 C | 3.0000 |
| 1907 | Cantonment | 5325 | INITL | 1985 | 50053 | Flow,Month Avg | 0.0130 |
| 1907 | Cantonment | 5325 | INITL | 1986 | 50053 | Flow,Month Avg | 0.1002 |
| 1907 | Cantonment | 5325 | INITL | 1987 | 50053 | Flow,Month Avg | 0.1350 |
| 1907 | Cantonment | 5325 | INITL | 1988 | 50053 | Flow,Month Avg | 0.1719 |
| 1907 | Cantonment | 5325 | INITL | 1989 | 50053 | Flow,Month Avg | 0.2168 |
| 1907 | Cantonment | 5325 | INITL | 1990 | 50053 | Flow,Month Avg | 0.2253 |
| 1907 | Cantonment | 5325 | INITL | 1991 | 50053 | Flow,Month Avg | 0.2851 |
| 1907 | Cantonment | 5325 | INITL | 1992 | 50053 | Flow,Month Avg | 0.3020 |
| 1907 | Cantonment | 5325 | INITL | 1993 | 50053 | Flow,Month Avg | 0.3439 |
| 1907 | Cantonment | 5325 | INITL | 1994 | 50053 | Flow,Month Avg | 0.3836 |
| 1907 | Cantonment | 5325 | INITL | 1995 | 50053 | Flow,Month Avg | 0.4138 |
| 1907 | Cantonment | 5325 | INITL | 1996 | 50053 | Flow,Month Avg | 0.4939 |
| 1907 | Cantonment | 5325 | INITL | 1997 | 50053 | Flow,Month Avg | 0.5302 |
| 1907 | Cantonment | 5325 | INITL | 1998 | 50053 | Flow,Month Avg | 0.6450 |

* Values are annual averages of samples.

# Appendix F: Summary of Photos and News Articles

# Appendix G: Elevenmile Creek Watershed Data, 1966–2006

## WBIDs 489, 489A, 489B, 624, and 681

| WBID | Station | Date | Time | Fecal A-1 (MPN/ 1010mL) (31621) | Fecal Membr (cfu/ 100mL) (31616) | Fecal Tub (MPN/ 100mL) (31614) | Fecal Tube (MPN/ 100mL) (31615) | Other Fecal |
|---|---|---|---|---|---|---|---|---|
| 489 | 1113S050640410 | 12/5/1966 | 1420 | | | | 490 | |
| 489 | 1113S050640410 | 12/6/1966 | 1330 | | | | 490 | |
| 489 | 1113S050640410 | 12/7/1966 | 1350 | | | | 230 | |
| 489 | 1113S050640410 | 12/9/1966 | 1306 | | | | 2,100 | |
| 489 | 1113S050640410 | 12/12/1966 | 945 | | | | 3,500 | |
| 489 | 1113S050640410 | 12/13/1966 | 1120 | | | | 790 | |
| 489 | 1113S050640410 | 12/14/1966 | 1343 | | | | 790 | |
| 489 | 1113S050640410 | 12/19/1966 | 1015 | | | | 20 | |
| 489 | 1113S050640410 | 12/20/1966 | 844 | | | | 170 | |
| 489 | 1113S050640410 | 12/21/1966 | 1005 | | | | 490 | |
| 489 | 1113S050640410 | 12/23/1966 | 830 | | | | 20 | |
| 489 | 1113S050640410 | 12/29/1966 | 1125 | | | | 160,000 | |
| 489 | 1113S050640410 | 1/3/1967 | 1235 | | | | 500 | |
| 489 | 1113S000640063 | 6/6/1972 | 1500 | | | | 200 | |
| 489 | 1113S000640066 | 6/6/1972 | 1435 | | | | 200 | |
| 489 | 1113S000640069 | 6/6/1972 | 1135 | | | | 20 | |
| 489 | 1113S000640072 | 6/6/1972 | 1230 | | | | 50 | |
| 489 | 1113S000640063 | 6/7/1972 | 1600 | | | | 50 | |
| 489 | 1113S000640066 | 6/7/1972 | 1540 | | | | 70 | |
| 489 | 1113S000640069 | 6/7/1972 | 1415 | | | | 170 | |
| 489 | 1113S000640072 | 6/7/1972 | 1450 | | | | 50 | |
| 489 | 1113S000640063 | 6/8/1972 | 940 | | | | 700 | |
| 489 | 1113S000640066 | 6/8/1972 | 920 | | | | 1,700 | |
| 489 | 1113S000640069 | 6/8/1972 | 855 | | | | 330 | |
| 489 | 1113S000640072 | 6/8/1972 | 1400 | | | | 70 | |
| 489 | 1113S000640063 | 6/9/1972 | 1415 | | | | 220 | |
| 489 | 1113S000640066 | 6/9/1972 | 1350 | | | | 490 | |
| 489 | 1113S000640069 | 6/9/1972 | 1140 | | | | 330 | |
| 489 | 1113S000640072 | 6/9/1972 | 740 | | | | 80 | |
| 489 | 1113S000640063 | 6/10/1972 | 1105 | | | | 220 | |
| 489 | 1113S000640066 | 6/10/1972 | 1050 | | | | 20 | |
| 489 | 1113S000640069 | 6/10/1972 | 945 | | | | 490 | |
| 489 | 1113S000640072 | 6/10/1972 | 1435 | | | | 130 | |

| WBID | Station | Date | Time | Fecal A-1 (MPN/ 1010mL) (31621) | Fecal Membr (cfu/ 100mL) (31616) | Fecal Tub (MPN/ 100mL) (31614) | Fecal Tube (MPN/ 100mL) (31615) | Other Fecal |
|---|---|---|---|---|---|---|---|---|
| 489 | 1113S000640063 | 6/11/1972 | 1235 | | | | 330 | |
| 489 | 1113S000640066 | 6/11/1972 | 1220 | | | | 330 | |
| 489 | 1113S000640069 | 6/11/1972 | 1110 | | | | 490 | |
| 489 | 1113S000640072 | 6/11/1972 | 1010 | | | | 330 | |
| 489 | 1113S000640063 | 6/12/1972 | 1500 | | | | 460 | |
| 489 | 1113S000640066 | 6/12/1972 | 1445 | | | | 490 | |
| 489 | 1113S000640069 | 6/12/1972 | 950 | | | | 2,800 | |
| 489 | 1113S000640072 | 6/12/1972 | 1055 | | | | 230 | |
| 489 | 1113S000640072 | 6/13/1972 | 1110 | | | | 110 | |
| 489 | 21FLA 33010011 | 9/5/1973 | 820 | | | 540 | | |
| 489 | 21FLA 33010013 | 9/5/1973 | 905 | | | 2,400 | | |
| 489 | 21FLA 33010011 | 9/7/1973 | 1130 | | | 540 | | |
| 489 | 21FLA 33010011 | 9/7/1973 | 1130 | | | 540 | | |
| 489 | 21FLA 33010013 | 9/7/1973 | 1155 | | | 33 | | |
| 489 | 21FLA 33010013 | 9/7/1973 | 1155 | | | 33 | | |
| 489 | 21FLA 33010011 | 9/10/1973 | 945 | | | 130 | | |
| 489 | 21FLA 33010013 | 9/10/1973 | 945 | | | 17 | | |
| 489 | 21FLA 33010011 | 9/12/1973 | 830 | | | 130 | | |
| 489 | 21FLA 33010013 | 9/12/1973 | 845 | | | 17 | | |
| 489 | 21FLA 33010011 | 9/14/1973 | 830 | | | 280 | | |
| 489 | 21FLA 33010011 | 9/14/1973 | 830 | | | 280 | | |
| 489 | 21FLA 33010013 | 9/14/1973 | 850 | | | 540 | | |
| 489 | 21FLA 33010011 | 10/30/1973 | 815 | | | 540 | | |
| 489 | 21FLA 33010013 | 10/30/1973 | 850 | | | 19 | | |
| 489 | 21FLA 33010011 | 11/1/1973 | 815 | | | 1,600 | | |
| 489 | 21FLA 33010011 | 11/1/1973 | 815 | | | 1,600 | | |
| 489 | 21FLA 33010013 | 11/1/1973 | 845 | | | 920 | | |
| 489 | 21FLA 33010011 | 11/6/1973 | 1330 | | | 5 | | |
| 489 | 21FLA 33010013 | 11/6/1973 | 1230 | | | 2 | | |
| 489 | 21FLA 33010011 | 5/9/1974 | 745 | | | 5 | | |
| 489 | 21FLA 33010013 | 5/9/1974 | 850 | | | 13 | | |
| 489 | 21FLA 33010013 | 5/15/1974 | 1005 | | | 9 | | |
| 489 | 21FLA 33010040 | 8/27/1974 | 1045 | | | 6 | | |
| 489 | 21FLA 33010041 | 8/27/1974 | 1110 | | | 79 | | |
| 489 | 21FLA 33010042 | 8/27/1974 | 1125 | | | 17 | | |
| 489 | 21FLA 33010010 | 8/29/1974 | 915 | | | 7 | | |
| 489 | 21FLA 33010040 | 9/18/1974 | 1013 | | | 12 | | |
| 489 | 21FLA 33010041 | 9/18/1974 | 1035 | | | 17 | | |
| 489 | 21FLA 33010042 | 9/18/1974 | 1047 | | | 17 | | |

| WBID | Station | Date | Time | Fecal A-1 (MPN/ 1010mL) (31621) | Fecal Membr (cfu/ 100mL) (31616) | Fecal Tub (MPN/ 100mL) (31614) | Fecal Tube (MPN/ 100mL) (31615) | Other Fecal |
|---|---|---|---|---|---|---|---|---|
| 489 | 21FLA 33010010 | 9/19/1974 | 918 | | | 5 | | |
| 489 | 21FLA 33010011 | 9/19/1974 | 945 | | | 5 | | |
| 489 | 21FLA 33010011 | 9/19/1974 | 945 | | | 5 | | |
| 489 | 21FLA 33010013 | 9/19/1974 | 1005 | | | 9 | | |
| 489 | 21FLA 33010010 | 10/3/1974 | 1335 | | | 2 | | |
| 489 | 21FLA 33010011 | 10/3/1974 | 1400 | | | 5 | | |
| 489 | 21FLA 33010011 | 10/3/1974 | 1400 | | | 5 | | |
| 489 | 21FLA 33010013 | 10/3/1974 | 1430 | | | 2 | | |
| 489 | 21FLA 33010040 | 10/9/1974 | 1200 | | | 79 | | |
| 489 | 21FLA 33010041 | 10/9/1974 | 1225 | | | 350 | | |
| 489 | 21FLA 33010041 | 10/9/1974 | 1205 | | | 49 | | |
| 489 | 21FLA 33010010 | 12/11/1975 | 1300 | | | 2 | | |
| 489 | 21FLA 33010011 | 12/11/1975 | 1335 | | | 2 | | |
| 489 | 21FLA 33010012 | 12/11/1975 | 1400 | | | 2 | | |
| 489 | 21FLA 33010011 | 6/3/1976 | 1120 | | | | 350 | |
| 489 | 21FLA 33010041 | 10/27/1976 | 1125 | | | | 79 | |
| 489 | 21FLA 33010011 | 7/2/1978 | 955 | | | | 23 | |
| 489 | 21FLA 33010013 | 7/2/1978 | 1025 | | | | 240 | |
| 489 | 21FLA 33010040 | 7/2/1978 | 1145 | | | | 33 | |
| 489 | 21FLA 33010011 | 10/1/1978 | 940 | | | | 130 | |
| 489 | 21FLA 33010013 | 10/1/1978 | 1005 | | | | 330 | |
| 489 | 21FLA 33010014 | 10/1/1978 | 1250 | | | | 230 | |
| 489 | 21FLA 33010040 | 10/1/1978 | 1110 | | | | 490 | |
| 489 | 21FLA 33010010 | 1/7/1979 | 830 | | | | 330 | |
| 489 | 21FLA 33010011 | 1/7/1979 | 900 | | | | 13,000 | |
| 489 | 21FLA 33010012 | 1/7/1979 | 915 | | | | 2,300 | |
| 489 | 21FLA 33010013 | 1/7/1979 | 935 | | | | 7,900 | |
| 489 | 21FLA 33010014 | 1/7/1979 | 1000 | | | | 4,900 | |
| 489 | 21FLA 33010040 | 1/7/1979 | 1115 | | | | 79 | |
| 489 | 21FLA 33010011 | 4/1/1979 | 910 | | | | 2 | |
| 489 | 21FLA 33010013 | 4/1/1979 | 940 | | | | 23 | |
| 489 | 21FLA 33010014 | 4/1/1979 | 1225 | | | | 23 | |
| 489 | 21FLA 33010040 | 4/1/1979 | 1040 | | | | 17 | |
| 489 | 21FLA 33010013 | 2/25/1980 | 1415 | | 10 | | | |
| 489 | 21FLA 33010011 | 8/3/1980 | 815 | | | | 23 | |
| 489 | 21FLA 33010013 | 8/3/1980 | 840 | | | | 43 | |
| 489 | 21FLA 33010014 | 8/3/1980 | 1130 | | | | 43 | |
| 489 | 21FLA 33010040 | 8/3/1980 | 945 | | | | 23 | |
| 489 | 21FLA 33010013 | 8/3/1980 | 930 | | | | 930 | |

| WBID | Station | Date | Time | Fecal A-1 (MPN/ 1010mL) (31621) | Fecal Membr (cfu/ 100mL) (31616) | Fecal Tub (MPN/ 100mL) (31614) | Fecal Tube (MPN/ 100mL) (31615) | Other Fecal |
|---|---|---|---|---|---|---|---|---|
| 489 | 21FLA 33010043 | 10/7/1980 | 1050 | | | | 23 | |
| 489 | 21FLA 33010011 | 2/1/1981 | 930 | | 10 | | | |
| 489 | 21FLA 33010013 | 2/1/1981 | 955 | | 10 | | | |
| 489 | 21FLA 33010014 | 2/1/1981 | 1030 | | 10 | | | |
| 489 | 21FLA 33010040 | 2/1/1981 | 1215 | | 10 | | | |
| 489 | 21FLA 33010011 | 2/23/1981 | 1330 | | 90 | | | |
| 489 | 21FLA 33010010 | 2/25/1981 | 1245 | | 10 | | | |
| 489 | 21FLA 33010010 | 2/25/1981 | 1310 | | 10 | | | |
| 489 | 21FLA 33010011 | 2/25/1981 | 1345 | | 530 | | | |
| 489 | 21FLA 33010014 | 2/25/1981 | 1445 | | 10 | | | |
| 489 | 21FLA 33010011 | 8/23/1981 | 825 | | 1,400 | | | |
| 489 | 21FLA 33010013 | 8/23/1981 | 850 | | 1,100 | | | |
| 489 | 21FLA 33010014 | 8/23/1981 | 920 | | 600 | | | |
| 489 | 21FLA 33010040 | 8/23/1981 | 1120 | | 50 | | | |
| 489 | 21FLA 33010013 | 1/5/1982 | 1300 | | 300 | | | |
| 489 | 21FLA 33010010 | 6/22/1982 | 850 | | 190 | | | |
| 489 | 21FLA 33010011 | 6/22/1982 | 1045 | | 280 | | | |
| 489 | 21FLA 33010012 | 6/22/1982 | 1120 | | 400 | | | |
| 489 | 21FLA 33010013 | 6/22/1982 | 1230 | | 200 | | | |
| 489 | 21FLA 33010014 | 6/22/1982 | 1300 | | 190 | | | |
| 489 | 21FLA 33010011 | 2/6/1983 | 945 | | 2,400 | | | |
| 489 | 21FLA 33010040 | 2/6/1983 | 1050 | | 700 | | | |
| 489 | 21FLA 33010011 | 8/7/1983 | 1130 | | 4000 | | | |
| 489 | 21FLA 33010013 | 8/7/1983 | 1120 | | 3 | | | |
| 489 | 21FLA 33010014 | 8/7/1983 | 900 | | 3,500 | | | |
| 489 | 21FLA 33010040 | 8/7/1983 | 936 | | 6,300 | | | |
| 489 | 21FLA 33010011 | 2/5/1984 | 805 | | 200 | | | |
| 489 | 21FLA 33010013 | 2/5/1984 | 830 | | 300 | | | |
| 489 | 21FLA 33010014 | 2/5/1984 | 915 | | 400 | | | |
| 489 | 21FLA 33010040 | 2/5/1984 | 1025 | | 210 | | | |
| 489 | 21FLA 33010011 | 8/5/1984 | 825 | | 2,200 | | | |
| 489 | 21FLA 33010013 | 8/5/1984 | 845 | | 1,900 | | | |
| 489 | 21FLA 33010014 | 8/5/1984 | 925 | | 1,500 | | | |
| 489 | 21FLA 33010011 | 2/5/1985 | 930 | | 3,300 | | | |
| 489 | 21FLA 33010013 | 2/5/1985 | 955 | | 1,500 | | | |
| 489 | 21FLA 33010014 | 2/5/1985 | 1030 | | 900 | | | |
| 489 | 21FLA 33010040 | 2/5/1985 | 1245 | | 370 | | | |
| 489 | 21FLA 33010042 | 5/21/1985 | 1000 | | 200 | | | |
| 489 | 21FLA 33010010 | 5/22/1985 | 910 | | 1,000 | | | |

| WBID | Station | Date | Time | Fecal A-1 (MPN/ 1010mL) (31621) | Fecal Membr (cfu/ 100mL) (31616) | Fecal Tub (MPN/ 100mL) (31614) | Fecal Tube (MPN/ 100mL) (31615) | Other Fecal |
|---|---|---|---|---|---|---|---|---|
| 489 | 21FLA 33010011 | 5/22/1985 | 1015 | | 500 | | | |
| 489 | 21FLA 33010010 | 6/26/1985 | 1020 | | 1700 | | | |
| 489 | 21FLA 33010010 | 6/26/1985 | 1035 | | 200 | | | |
| 489 | 21FLA 33010011 | 6/26/1985 | 1205 | | 100 | | | |
| 489 | 21FLA 33010018 | 6/26/1985 | 1105 | | 100 | | | |
| 489 | 21FLA 33010011 | 8/4/1985 | 710 | | 700 | | | |
| 489 | 21FLA 33010013 | 8/4/1985 | 735 | | 1,200 | | | |
| 489 | 21FLA 33010014 | 8/4/1985 | 810 | | 900 | | | |
| 489 | 21FLA 33010011 | 11/19/1985 | 930 | | 50,000 | | | |
| 489 | 21FLA 33010011 | 2/2/1986 | 730 | | 700 | | | |
| 489 | 21FLA 33010013 | 2/2/1986 | 755 | | 100 | | | |
| 489 | 21FLA 33010014 | 2/2/1986 | 825 | | 200 | | | |
| 489 | 21FLA 33010040 | 2/2/1986 | 925 | | 140 | | | |
| 489 | 21FLA 33010013 | 6/19/1986 | 850 | | 300 | | | |
| 489 | 21FLA 33010011 | 8/3/1986 | 1230 | | 100 | | | |
| 489 | 21FLA 33010013 | 8/3/1986 | 1209 | | 100 | | | |
| 489 | 21FLA 33010014 | 8/3/1986 | 900 | | 100 | | | |
| 489 | 21FLA 33010040 | 8/3/1986 | 1052 | | 100 | | | |
| 489 | 21FLA 33010011 | 2/17/1987 | 1200 | | | | 10 | |
| 489 | 21FLA 33010014 | 4/29/1987 | 1030 | | 600 | | | |
| 489 | 21FLA 33010011 | 5/11/1987 | 1025 | | 10,000 | | | |
| 489 | 21FLA 33010046 | 5/11/1987 | 930 | | 10,000 | | | |
| 489 | 21FLA 33010011 | 8/2/1987 | 830 | | 800 | | | |
| 489 | 21FLA 33010013 | 8/2/1987 | 900 | | 100 | | | |
| 489 | 21FLA 33010014 | 8/2/1987 | 1110 | | 10 | | | |
| 489 | 21FLA 33010040 | 8/2/1987 | 1230 | | 10 | | | |
| 489 | 21FLA 33010013 | 10/20/1987 | 1400 | | 200 | | | |
| 489 | 21FLA 33010013 | 10/26/1987 | 1130 | | 1,000 | | | |
| 489 | 21FLA 33010011 | 2/7/1988 | 925 | | 60 | | | |
| 489 | 21FLA 33010013 | 2/7/1988 | 905 | | 660 | | | |
| 489 | 21FLA 33010014 | 2/7/1988 | 1115 | | 170 | | | |
| 489 | 21FLA 33010040 | 2/7/1988 | 1210 | | 130 | | | |
| 489 | 21FLA 33010098 | 5/9/1988 | 1120 | | 200 | | | |
| 489 | 21FLA 33010105 | 5/9/1988 | 955 | | 500 | | | |
| 489 | 21FLA 33010010 | 5/24/1988 | 1000 | | 10 | | | |
| 489 | 21FLA 33010013 | 6/16/1988 | 1130 | | 110 | | | |
| 489 | 21FLA 33010011 | 8/7/1988 | 815 | | 900 | | | |
| 489 | 21FLA 33010013 | 8/7/1988 | 900 | | 740 | | | |
| 489 | 21FLA 33010014 | 8/7/1988 | 1025 | | 620 | | | |

| WBID | Station | Date | Time | Fecal A-1 (MPN/ 1010mL) (31621) | Fecal Membr (cfu/ 100mL) (31616) | Fecal Tub (MPN/ 100mL) (31614) | Fecal Tube (MPN/ 100mL) (31615) | Other Fecal |
|---|---|---|---|---|---|---|---|---|
| 489 | 21FLA 33010013 | 11/7/1988 | 1310 | | 10 | | | |
| 489 | 21FLA 33010011 | 2/5/1989 | 920 | | 170 | | | |
| 489 | 21FLA 33010013 | 2/5/1989 | 855 | | 120 | | | |
| 489 | 21FLA 33010014 | 2/5/1989 | 955 | | 60 | | | |
| 489 | 21FLA 33010040 | 2/5/1989 | 1215 | | 70 | | | |
| 489 | 21FLBFA 33010011 | 2/5/1989 | 920 | | 170 | | | |
| 489 | 21FLBFA 33010013 | 2/5/1989 | 855 | | 120 | | | |
| 489 | 21FLBFA 33010014 | 2/5/1989 | 955 | | 60 | | | |
| 489 | 21FLBFA 33010040 | 2/5/1989 | 1215 | | 70 | | | |
| 489 | 21FLA 33010011 | 2/9/1989 | 1252 | | 770 | | | |
| 489 | 21FLA 33010011 | 3/13/1989 | 1407 | | 230 | | | |
| 489 | 21FLA 33010010 | 4/13/1989 | 910 | | 60 | | | |
| 489 | 21FLA 33010010 | 4/13/1989 | 1015 | | 10 | | | |
| 489 | 21FLA 33010011 | 4/13/1989 | 1110 | | 30 | | | |
| 489 | 21FLA 33010013 | 4/13/1989 | 1230 | | 100 | | | |
| 489 | 21FLA 33010045 | 4/13/1989 | 910 | | 40 | | | |
| 489 | 21FLA 33010046 | 4/13/1989 | 930 | | 20 | | | |
| 489 | 21FLA 33010011 | 6/12/1989 | 1040 | | 300 | | | |
| 489 | 21FLA 33010045 | 6/12/1989 | 1020 | | 700 | | | |
| 489 | 21FLA 33010046 | 6/12/1989 | 1015 | | 600 | | | |
| 489 | 21FLA 33010045 | 6/29/1989 | 1040 | | 20 | | | |
| 489 | 21FLA 33010011 | 7/25/1989 | 840 | | 10 | | | |
| 489 | 21FLA 33010043 | 8/3/1989 | 1430 | | 240 | | | |
| 489 | 21FLA 33010011 | 8/6/1989 | 920 | | 80 | | | |
| 489 | 21FLA 33010014 | 8/6/1989 | 820 | | 200 | | | |
| 489 | 21FLBFA 33010011 | 8/6/1989 | 920 | | 80 | | | |
| 489 | 21FLBFA 33010014 | 8/6/1989 | 820 | | 200 | | | |
| 489 | 21FLA 33010011 | 10/28/1989 | 1400 | | 10 | | | |
| 489 | 21FLA 33010011 | 11/28/1989 | 838 | | 160 | | | |
| 489 | 21FLA 33010011 | 2/4/1990 | 905 | | 2,000 | | | |
| 489 | 21FLA 33010014 | 2/4/1990 | 1015 | | 1,000 | | | |
| 489 | 21FLBFA 33010011 | 2/4/1990 | 905 | | 2,000 | | | |
| 489 | 21FLBFA 33010014 | 2/4/1990 | 1015 | | 1,000 | | | |
| 489 | 21FLA 33010011 | 3/20/1990 | 1130 | | 230 | | | |
| 489 | 21FLA 33010011 | 4/5/1990 | 1115 | | 4,100 | | | |
| 489 | 21FLA 33010013 | 4/5/1990 | 1035 | | 300 | | | |
| 489 | 21FLA 33010011 | 6/11/1990 | 1603 | | 1,500 | | | |
| 489 | 21FLA 33010011 | 8/5/1990 | 1030 | | 790 | | | |
| 489 | 21FLA 33010014 | 8/5/1990 | 1315 | | 500 | | | |

| WBID | Station | Date | Time | Fecal A-1 (MPN/ 1010mL) (31621) | Fecal Membr (cfu/ 100mL) (31616) | Fecal Tub (MPN/ 100mL) (31614) | Fecal Tube (MPN/ 100mL) (31615) | Other Fecal |
|---|---|---|---|---|---|---|---|---|
| 489 | 21FLBFA 33010011 | 8/5/1990 | 1030 | | 790 | | | |
| 489 | 21FLBFA 33010014 | 8/5/1990 | 1315 | | 500 | | | |
| 489 | 21FLA 33010011 | 9/18/1990 | 1617 | | 200 | | | |
| 489 | 21FLA 33010041 | 9/18/1990 | 1400 | | 290 | | | |
| 489 | 21FLA 33010011 | 10/16/1990 | 1353 | | 140 | | | |
| 489 | 21FLA 33010041 | 1/22/1991 | 1203 | | 300 | | | |
| 489 | 21FLA 33010011 | 2/3/1991 | 1445 | | 50 | | | |
| 489 | 21FLA 33010014 | 2/4/1991 | 1630 | | 90 | | | |
| 489 | 21FLBFA 33010011 | 2/5/1991 | 1445 | | 50 | | | |
| 489 | 21FLBFA 33010014 | 2/6/1991 | 1630 | | 90 | | | |
| 489 | 21FLA 33010011 | 8/4/1991 | 1120 | | 400 | | | |
| 489 | 21FLA 33010014 | 8/4/1991 | 1630 | | 200 | | | |
| 489 | 21FLBFA 33010011 | 8/4/1991 | 1120 | | 400 | | | |
| 489 | 21FLBFA 33010014 | 8/4/1991 | 1630 | | 200 | | | |
| 489 | 21FLA 33010014 | 2/9/1992 | 1420 | | 60 | | | |
| 489 | 21FLBFA 33010014 | 2/9/1992 | 1420 | | 60 | | | |
| 489 | 21FLA 33010011 | 8/2/1992 | 1130 | | 50 | | | |
| 489 | 21FLA 33010014 | 8/2/1992 | 845 | | 390 | | | |
| 489 | 21FLBFA 33010011 | 8/2/1992 | 1130 | | 50 | | | |
| 489 | 21FLBFA 33010014 | 8/2/1992 | 845 | | 390 | | | |
| 489 | 21FLBFA 33010011 | 2/7/1993 | 1000 | | 1,400 | | | |
| 489 | 21FLBFA 33010014 | 2/7/1993 | 1330 | | 600 | | | |
| 489 | 21FLBFA 33010011 | 9/12/1993 | 1150 | | 600 | | | |
| 489 | 21FLBFA 33010014 | 6/12/1993 | 1310 | | 1300 | | | |
| 489 | 21FLBFA 33010011 | 12/5/1993 | 1140 | | 40 | | | |
| 489 | 21FLBFA 33010014 | 12/5/1993 | 1040 | | 240 | | | |
| 489 | 21FLBFA 33010011 | 3/6/1994 | 1100 | | 120 | | | |
| 489 | 21FLBFA 33010014 | 3/6/1994 | 1500 | | 200 | | | |
| 489 | 21FLBFA 33010011 | 6/5/1994 | 1030 | | 60 | | | |
| 489 | 21FLBFA 33010014 | 6/5/1994 | 1200 | | 180 | | | |
| 489 | 21FLBFA 33010011 | 9/11/1994 | 830 | | 200 | | | |
| 489 | 21FLBFA 33010014 | 9/11/1994 | 1200 | | 600 | | | |
| 489 | 21FLBFA 33010011 | 12/2/1994 | 1524 | | 100 | | | |
| 489 | 21FLBFA 33010014 | 12/2/1994 | 1054 | | 170 | | | |
| 489 | 21FLBFA 33010011 | 3/5/1995 | 853 | | 100 | | | |
| 489 | 21FLBFA 33010014 | 3/5/1995 | 1000 | | 90 | | | |
| 489 | 21FLBFA 33010011 | 4/12/1995 | 1715 | | 500 | | | |
| 489 | 21FLBFA 33010011 | 5/10/1995 | 1108 | | 17,500 | | | |
| 489 | 21FLBFA 33010011 | 6/4/1995 | 1400 | | 200 | | | |

| WBID | Station | Date | Time | Fecal A-1 (MPN/ 1010mL) (31621) | Fecal Membr (cfu/ 100mL) (31616) | Fecal Tub (MPN/ 100mL) (31614) | Fecal Tube (MPN/ 100mL) (31615) | Other Fecal |
|---|---|---|---|---|---|---|---|---|
| 489 | 21FLBFA 33010014 | 6/4/1995 | 1450 | | 500 | | | |
| 489 | 21FLBFA 33010011 | 6/14/1995 | 1125 | | 600 | | | |
| 489 | 21FLBFA 33010011 | 7/12/1995 | 1125 | | 400 | | | |
| 489 | 21FLA 33010011 | 8/1/1995 | 715 | | 4,000 | | | |
| 489 | 21FLA 33010011 | 8/7/1995 | 700 | | 1200 | | | |
| 489 | 21FLBFA 33010011 | 8/9/1995 | 1106 | | 100 | | | |
| 489 | 21FLA 33010010 | 8/11/1995 | 715 | | 15,000 | | | |
| 489 | 21FLA 33010011 | 8/14/1995 | 725 | | 5,000 | | | |
| 489 | 21FLA 33010010 | 8/21/1995 | 655 | | 10 | | | |
| 489 | 21FLA 33010011 | 8/22/1995 | 705 | | 10 | | | |
| 489 | 21FLA 33010010 | 8/28/1995 | 650 | | 10 | | | |
| 489 | 21FLA 33010011 | 8/29/1995 | 700 | | 520 | | | |
| 489 | 21FLBFA 33010011 | 9/17/1995 | 936 | | 10 | | | |
| 489 | 21FLBFA 33010014 | 9/17/1995 | 1034 | | 10 | | | |
| 489 | 21FLA 33010010 | 9/18/1995 | 700 | | 1,000 | | | |
| 489 | 21FLA 33010011 | 9/18/1995 | 715 | | 500 | | | |
| 489 | 21FLBFA 33010011 | 9/20/1995 | 1033 | | 240 | | | |
| 489 | 21FLA 33010010 | 10/2/1995 | 705 | | 500 | | | |
| 489 | 21FLA 33010011 | 10/2/1995 | 715 | | 420 | | | |
| 489 | 21FLA 33010010 | 10/11/1995 | 630 | | 400 | | | |
| 489 | 21FLA 33010011 | 10/11/1995 | 645 | | 180 | | | |
| 489 | 21FLBFA 33010011 | 10/11/1995 | 1042 | | 440 | | | |
| 489 | 21FLA 33010010 | 10/16/1995 | 700 | | 110 | | | |
| 489 | 21FLA 33010011 | 10/16/1995 | 715 | | 170 | | | |
| 489 | 21FLA 33010010 | 10/25/1995 | 705 | | 240 | | | |
| 489 | 21FLA 33010011 | 10/25/1995 | 715 | | 330 | | | |
| 489 | 21FLA 33010010 | 10/26/1995 | 730 | | 440 | | | |
| 489 | 21FLA 33010011 | 10/26/1995 | 745 | | 300 | | | |
| 489 | 21FLA 33010046 | 10/26/1995 | 720 | | 200 | | | |
| 489 | 21FLA 33010010 | 10/30/1995 | 835 | | 1080 | | | |
| 489 | 21FLA 33010011 | 10/30/1995 | 855 | | 320 | | | |
| 489 | 21FLA 33010046 | 10/30/1995 | 820 | | 30 | | | |
| 489 | 21FLA 33010046 | 10/30/1995 | 845 | | 170 | | | |
| 489 | 21FLA 33010010 | 10/31/1995 | 920 | | 340 | | | |
| 489 | 21FLA 33010011 | 10/31/1995 | 930 | | 400 | | | |
| 489 | 21FLA 33010046 | 10/31/1995 | 910 | | 170 | | | |
| 489 | 21FLA 33010010 | 11/1/1995 | 845 | | 160 | | | |
| 489 | 21FLA 33010011 | 11/1/1995 | 845 | | 200 | | | |
| 489 | 21FLA 33010046 | 11/1/1995 | 835 | | 140 | | | |

| WBID | Station | Date | Time | Fecal A-1 (MPN/ 1010mL) (31621) | Fecal Membr (cfu/ 100mL) (31616) | Fecal Tub (MPN/ 100mL) (31614) | Fecal Tube (MPN/ 100mL) (31615) | Other Fecal |
|---|---|---|---|---|---|---|---|---|
| 489 | 21FLA 33010010 | 11/7/1995 | 830 | | 610 | | | |
| 489 | 21FLA 33010011 | 11/7/1995 | 845 | | 480 | | | |
| 489 | 21FLA 33010046 | 11/7/1995 | 820 | | 210 | | | |
| 489 | 21FLA 33010010 | 11/8/1995 | 845 | | 1,040 | | | |
| 489 | 21FLA 33010011 | 11/8/1995 | 850 | | 860 | | | |
| 489 | 21FLA 33010046 | 11/8/1995 | 840 | | 670 | | | |
| 489 | 21FLBFA 33010011 | 11/8/1995 | 1002 | | 560 | | | |
| 489 | 21FLA 33010010 | 11/9/1995 | 1100 | | 340 | | | |
| 489 | 21FLA 33010011 | 11/9/1995 | 1115 | | 480 | | | |
| 489 | 21FLA 33010046 | 11/9/1995 | 1050 | | 110 | | | |
| 489 | 21FLA 33010010 | 11/15/1995 | 825 | | 10 | | | |
| 489 | 21FLA 33010046 | 11/15/1995 | 815 | | 180 | | | |
| 489 | 21FLA 33010010 | 11/20/1995 | 840 | | 550 | | | |
| 489 | 21FLA 33010011 | 11/20/1995 | 905 | | 540 | | | |
| 489 | 21FLA 33010046 | 11/20/1995 | 830 | | 80 | | | |
| 489 | 21FLA 33010046 | 11/20/1995 | 850 | | 90 | | | |
| 489 | 21FLA 33010010 | 11/21/1995 | 837 | | 340 | | | |
| 489 | 21FLA 33010011 | 11/21/1995 | 850 | | 320 | | | |
| 489 | 21FLA 33010046 | 11/21/1995 | 832 | | 70 | | | |
| 489 | 21FLA 33010011 | 11/27/1995 | 845 | | 360 | | | |
| 489 | 21FLA 33010011 | 11/27/1995 | 855 | | 220 | | | |
| 489 | 21FLA 33010046 | 11/27/1995 | 840 | | 100 | | | |
| 489 | 21FLA 33010010 | 11/28/1995 | 935 | | 600 | | | |
| 489 | 21FLA 33010011 | 11/28/1995 | 945 | | 360 | | | |
| 489 | 21FLA 33010046 | 11/28/1995 | 930 | | 25 | | | |
| 489 | 21FLA 33010010 | 11/30/1995 | 1035 | | 770 | | | |
| 489 | 21FLA 33010011 | 11/30/1995 | 1045 | | 460 | | | |
| 489 | 21FLA 33010046 | 11/30/1995 | 1030 | | 95 | | | |
| 489 | 21FLBFA 33010011 | 12/3/1995 | 940 | | 3,700 | | | |
| 489 | 21FLBFA 33010014 | 12/3/1995 | 1000 | | 400 | | | |
| 489 | 21FLA 33010010 | 12/4/1995 | 855 | | 3,600 | | | |
| 489 | 21FLA 33010011 | 12/4/1995 | 905 | | 2,000 | | | |
| 489 | 21FLA 33010010 | 12/7/1995 | 1155 | | 2,500 | | | |
| 489 | 21FLA 33010010 | 12/7/1995 | 1157 | | 2,100 | | | |
| 489 | 21FLA 33010011 | 12/7/1995 | 1220 | | 1,300 | | | |
| 489 | 21FLA 33010046 | 12/7/1995 | 1150 | | 440 | | | |
| 489 | 21FLBFA 33010011 | 12/13/1995 | 1027 | | 70 | | | |
| 489 | 21FLA 33010011 | 12/14/1995 | 955 | | 100 | | | |
| 489 | 21FLA 33010046 | 12/14/1995 | 955 | | 230 | | | |

| WBID | Station | Date | Time | Fecal A-1 (MPN/ 1010mL) (31621) | Fecal Membr (cfu/ 100mL) (31616) | Fecal Tub (MPN/ 100mL) (31614) | Fecal Tube (MPN/ 100mL) (31615) | Other Fecal |
|---|---|---|---|---|---|---|---|---|
| 489 | 21FLBFA 33010011 | 1/10/1996 | 1015 | | 60 | | | |
| 489 | 21FLA 33010011 | 2/12/1996 | 930 | | 60 | | | |
| 489 | 21FLBFA 33010011 | 2/14/1996 | 1037 | | 240 | | | |
| 489 | 21FLBFA 33010011 | 3/3/1996 | 1215 | | 180 | | | |
| 489 | 21FLBFA 33010014 | 3/3/1996 | 1100 | | 480 | | | |
| 489 | 21FLBFA 33010011 | 3/13/1996 | 1017 | | 160 | | | |
| 489 | 21FLBFA 33010011 | 6/1/1996 | 905 | | 1,200 | | | |
| 489 | 21FLBFA 33010014 | 6/1/1996 | 820 | | 180 | | | |
| 489 | 21FLBFA 33010011 | 9/8/1996 | 855 | | 5,200 | | | |
| 489 | 21FLBFA 33010014 | 9/8/1996 | 941 | | 1,860 | | | |
| 489 | 21FLBFA 33010011 | 12/1/1996 | 925 | | 800 | | | |
| 489 | 21FLBFA 33010014 | 12/1/1996 | 1005 | | 480 | | | |
| 489 | 21FLBFA 33010011 | 3/9/1997 | 845 | | 40 | | | |
| 489 | 21FLBFA 33010014 | 3/9/1997 | 930 | | 60 | | | |
| 489 | 21FLBFA 33010011 | 6/1/1997 | 1010 | | 580 | | | |
| 489 | 21FLBFA 33010014 | 6/1/1997 | 1135 | | 2,000 | | | |
| 489 | 21FLBFA 33010011 | 8/17/1997 | 1415 | | 20 | | | |
| 489 | 21FLBFA 33010011 | 1/16/1997 | 1245 | | 180 | | | |
| 489 | 21FLBFA 33010011 | 2/15/1998 | 1520 | | 60 | | | |
| 489 | 21FLBFA 33010011 | 5/17/1998 | 1445 | | 440 | | | |
| 489 | 21FLBFA 33010011 | 8/24/1998 | 1240 | | 100 | | | |
| 489 | 21FLGW 3565 | 10/20/1998 | 1245 | 700 | | | | |
| 489 | 21FLGW 3565 | 11/17/1998 | 1415 | 118 | | | | |
| 489 | 21FLBFA 33010011 | 11/23/1998 | 1505 | | 3900 | | | |
| 489 | 21FLGW 3565 | 12/21/1998 | 1030 | 88 | | | | |
| 489 | 21FLGW 3565 | 1/19/1999 | 1630 | 76 | | | | |
| 489 | 21FLBFA 33010011 | 2/15/1999 | 1510 | 20 | | | | |
| 489 | 21FLGW 3565 | 2/16/1999 | 1600 | 21 | | | | |
| 489 | 21FLGW 3565 | 3/15/1999 | 1630 | 270 | | | | |
| 489 | 21FLGW 3565 | 4/20/1999 | 1445 | 320 | | | | |
| 489 | 21FLBFA 33010011 | 5/10/1999 | 1405 | 120 | | | | |
| 489 | 21FLGW 3565 | 5/18/1999 | 1515 | 80 | | | | |
| 489 | 21FLGW 3565 | 6/22/1999 | 615 | 260 | | | | |
| 489 | 21FLGW 3565 | 7/21/1999 | 915 | 100 | | | | |
| 489 | 21FLBFA 33010011 | 8/10/1999 | 1314 | 2800 | | | | |
| 489 | 21FLGW 3565 | 8/17/1999 | 1345 | 900 | | | | |
| 489 | 21FLGW 3565 | 9/22/1999 | 1400 | 131 | | | | |
| 489 | 21FLGW 3565 | 10/19/1999 | 1400 | 170 | | | | |
| 489 | 21FLGW 3565 | 10/19/1999 | 1405 | 150 | | | | |

| WBID | Station | Date | Time | Fecal A-1 (MPN/ 1010mL) (31621) | Fecal Membr (cfu/ 100mL) (31616) | Fecal Tub (MPN/ 100mL) (31614) | Fecal Tube (MPN/ 100mL) (31615) | Other Fecal |
|---|---|---|---|---|---|---|---|---|
| 489 | 21FLBFA 33010011 | 11/7/1999 | 1326 | 100 | | | | |
| 489 | 21FLGW 3565 | 11/8/1999 | 1530 | 106 | | | | |
| 489 | 21FLGW 3565 | 12/16/1999 | 730 | 154 | | | | |
| 489 | 21FLGW 3565 | 1/20/2000 | 700 | 124 | | | | |
| 489 | 21FLBFA 33010011 | 2/6/2000 | 1500 | 50 | | | | |
| 489 | 21FLGW 3565 | 2/23/2000 | 715 | 64 | | | | |
| 489 | 21FLGW 3565 | 3/16/2000 | 700 | 340 | | | | |
| 489 | 21FLGW 3565 | 4/18/2000 | 630 | 46 | | | | |
| 489 | 21FLBFA 33010011 | 5/7/2000 | 1235 | 150 | | | | |
| 489 | 21FLGW 3565 | 5/23/2000 | 615 | 160 | | | | |
| 489 | 21FLGW 3565 | 6/20/2000 | 615 | 440 | | | | |
| 489 | 21FLGW 3565 | 7/26/2000 | 630 | 800 | | | | |
| 489 | 21FLBFA 33010011 | 8/6/2000 | 1305 | 180 | | | | |
| 489 | 21FLGW 3565 | 8/22/2000 | 615 | 2000 | | | | |
| 489 | 21FLGW 3565 | 9/20/2000 | 1815 | 670 | | | | |
| 489 | 21FLGW 3565 | 10/17/2000 | 545 | 290 | | | | |
| 489 | 21FLBFA 33010011 | 11/5/2000 | 1325 | 70 | | | | |
| 489 | 21FLGW 3565 | 11/21/2000 | 715 | 54 | | | | |
| 489 | 21FLGW 3565 | 12/19/2000 | 715 | 170 | | | | |
| 489 | 21FLGW 3565 | 1/24/2001 | 700 | 40 | | | | |
| 489 | 21FLBFA 33010011 | 2/4/2001 | 1250 | 100 | | | | |
| 489 | 21FLGW 3565 | 2/21/2001 | 715 | 340 | | | | |
| 489 | 21FLGW 3565 | 3/20/2001 | 730 | 200 | | | | |
| 489 | 21FLGW 3565 | 4/11/2001 | 630 | 90 | | | | |
| 489 | 21FLBFA 33010011 | 5/6/2001 | 1235 | 70 | | | | |
| 489 | 21FLGW 3565 | 5/22/2001 | 645 | 200 | | | | |
| 489 | 21FLGW 3565 | 6/26/2001 | 615 | 220 | | | | |
| 489 | 21FLGW 3565 | 7/24/2001 | 630 | 320 | | | | |
| 489 | 21FLBFA 33010011 | 8/5/2001 | 1240 | 120 | | | | |
| 489 | 21FLGW 3565 | 8/22/2001 | 601 | 350 | | | | |
| 489 | 21FLGW 3565 | 9/25/2001 | 600 | 580 | | | | |
| 489 | 21FLGW 3565 | 10/16/2001 | 630 | 660 | | | | |
| 489 | 21FLBFA 33010011 | 11/4/2001 | 1320 | 30 | | | | |
| 489 | 21FLBFA 33010011 | 11/4/2001 | 1325 | 30 | | | | |
| 489 | 21FLGW 3565 | 11/20/2001 | 724 | 320 | | | | |
| 489 | 21FLGW 3565 | 12/18/2001 | 743 | 220 | | | | |
| 489 | 21FLGW 3565 | 1/24/2002 | 700 | 160 | | | | |
| 489 | 21FLBFA 33010011 | 2/3/2002 | 1446 | 40 | | | | |
| 489 | 21FLGW 3565 | 2/28/2002 | 2305 | 34 | | | | |

| WBID | Station | Date | Time | Fecal A-1 (MPN/ 1010mL) (31621) | Fecal Membr (cfu/ 100mL) (31616) | Fecal Tub (MPN/ 100mL) (31614) | Fecal Tube (MPN/ 100mL) (31615) | Other Fecal |
|---|---|---|---|---|---|---|---|---|
| 489 | 21FLGW 3565 | 3/19/2002 | 715 | 210 | | | | |
| 489 | 21FLGW 3565 | 4/17/2002 | 745 | 76 | | | | |
| 489 | 21FLBFA 33010011 | 5/5/2002 | 1328 | 40 | | | | |
| 489 | 21FLGW 3565 | 5/21/2002 | 730 | 62 | | | | |
| 489 | 21FLGW 3565 | 6/18/2002 | 700 | 100 | | | | |
| 489 | 21FLGW 3565 | 7/23/2002 | 730 | 1200 | | | | |
| 489 | 21FLBFA 33010011 | 8/4/2002 | 1625 | 220 | | | | |
| 489 | 21FLGW 3565 | 8/20/2002 | 630 | 750 | | | | |
| 489 | 21FLGW 3565 | 9/25/2002 | 730 | 210 | | | | |
| 489 | 21FLGW 3565 | 10/21/2002 | 1345 | 102 | | | | |
| 489 | 21FLBFA 33010011 | 11/3/2002 | 1606 | 300 | | | | |
| 489 | 21FLGW 3565 | 11/20/2002 | 845 | 50 | | | | |
| 489 | 21FLGW 3565 | 12/17/2002 | 740 | 54 | | | | |
| 489 | 21FLGW 3565 | 1/15/2003 | 730 | 82 | | | | |
| 489 | 21FLBFA 33010011 | 2/2/2003 | 1410 | 120 | | | | |
| 489 | 21FLGW 3565 | 2/13/2003 | 700 | 200 | | | | |
| 489 | 21FLGW 3565 | 3/18/2003 | 710 | 200 | | | | |
| 489 | 21FLGW 17366 | 4/2/2003 | 1100 | 1 | | | | |
| 489 | 21FLGW 3565 | 4/16/2003 | 715 | 122 | | | | |
| 489 | 21FLBFA 33010011 | 5/4/2003 | 1415 | 72 | | | | |
| 489 | 21FLGW 17373 | 5/12/2003 | 1345 | 2 | | | | |
| 489 | 21FLGW 3565 | 5/22/2003 | 720 | 310 | | | | |
| 489 | 21FLGW 3565 | 6/17/2003 | 720 | 340 | | | | |
| 489 | 21FLGW 3565 | 7/15/2003 | 720 | 320 | | | | |
| 489 | 21FLBFA 33010011 | 8/4/2003 | 1805 | 320 | | | | |
| 489 | 21FLBFA 33010011 | 8/4/2003 | 1808 | 340 | | | | |
| 489 | 21FLGW 3565 | 8/20/2003 | 720 | 800 | | | | |
| 489 | 21FLGW 3565 | 9/17/2003 | 710 | 870 | | | | |
| 489 | 21FLGW 3565 | 10/9/2003 | 715 | 80 | | | | |
| 489 | 21FLBFA 33010011 | 11/2/2003 | 1410 | 86 | | | | |
| 489 | 21FLGW 3565 | 11/20/2003 | 720 | 60 | | | | |
| 489 | 21FLGW 3565 | 12/16/2003 | 720 | 44 | | | | |
| 489 | 21FLGW 3565 | 1/22/2004 | 715 | 32 | | | | |
| 489 | 21FLBFA 33010011 | 2/1/2004 | 1500 | 38 | | | | |
| 489 | 21FLGW 3565 | 2/18/2004 | 720 | 88 | | | | |
| 489 | 21FLGW 3565 | 3/16/2004 | 720 | 510 | | | | |
| 489 | 21FLGW 3565 | 4/21/2004 | 720 | 162 | | | | |
| 489 | 21FLBFA 33010011 | 5/2/2004 | 1435 | 96 | | | | |
| 489 | 21FLGW 3565 | 5/19/2004 | 730 | 92 | | | | |

| WBID | Station | Date | Time | Fecal A-1 (MPN/ 1010mL) (31621) | Fecal Membr (cfu/ 100mL) (31616) | Fecal Tub (MPN/ 100mL) (31614) | Fecal Tube (MPN/ 100mL) (31615) | Other Fecal |
|---|---|---|---|---|---|---|---|---|
| 489 | 21FLGW 3565 | 6/15/2004 | 730 | 2000 | | | | |
| 489 | 21FLGW 3565 | 7/20/2004 | 715 | 480 | | | | |
| 489 | 21FLBFA 33010011 | 8/1/2004 | 1410 | 90 | | | | |
| 489 | 21FLGW 3565 | 8/17/2004 | 720 | 280 | | | | |
| 489 | 21FLGW 3565 | 9/28/2004 | 1420 | 545 | | | | |
| 489 | 21FLGW 3565 | 10/19/2004 | 1100 | 200 | | | | |
| 489 | 21FLBFA 33010011 | 11/7/2004 | 1500 | 9 | | | | |
| 489 | 21FLGW 3565 | 11/16/2004 | 810 | 200 | | | | |
| 489 | 21FLGW 3565 | 12/15/2004 | 740 | 84 | | | | |
| 489 | 21FLGW 3565 | 1/18/2005 | 1545 | 32 | | | | |
| 489 | 21FLBFA 33010011 | 2/6/2005 | 1410 | 82 | | | | |
| 489 | 21FLBFA 33010011 | 2/6/2005 | 1415 | 118 | | | | |
| 489 | 21FLGW 3565 | 2/16/2005 | 750 | 112 | | | | |
| 489 | 21FLPNS 33010011 | 3/2/2005 | 800 | 45 | | | | |
| 489 | 21FLGW 3565 | 3/15/2005 | 715 | 32 | | | | |
| 489 | 21FLPNS 33010012 | 3/17/2005 | 1020 | 45 | | | | |
| 489 | 21FLPNS 33010013 | 3/17/2005 | 1155 | 2200 | | | | |
| 489 | 21FLPNS 33010105 | 3/17/2005 | 1055 | 51 | | | | |
| 489 | 21FLPNS 330148915 | 3/28/2005 | 1045 | 114 | | | | |
| 489 | 21FLPNS 330148916 | 3/28/2005 | 1150 | 116 | | | | |
| 489 | 21FLPNS 330148917 | 3/28/2005 | 1230 | 520 | | | | |
| 489 | 21FLPNS 330148921 | 3/28/2005 | 1015 | 551 | | | | |
| 489 | 21FLPNS 33010040 | 3/29/2005 | 1215 | 73 | | | | |
| 489 | 21FLGW 3565 | 4/19/2005 | 615 | 40 | | | | |
| 489 | 21FLBFA 33010011 | 5/1/2005 | 1355 | 964 | | | | |
| 489 | 21FLGW 3565 | 5/18/2005 | 620 | 146 | | | | |
| 489 | 21FLPNS 33010011 | 6/14/2005 | 1030 | 350 | | | | |
| 489 | 21FLPNS 33010013 | 6/14/2005 | 915 | 273 | | | | |
| 489 | 21FLGW 3565 | 6/23/2005 | 1815 | 88 | | | | |
| 489 | 21FLGW 3565 | 7/21/2005 | 715 | 180 | | | | |
| 489 | 21FLBFA 33010011 | 8/7/2005 | 1420 | 250 | | | | |
| 489 | 21FLGW 3565 | 8/17/2005 | 735 | 450 | | | | |
| 489 | 21FLPNS 33010013 | 9/12/2005 | 1225 | 146 | | | | |
| 489 | 21FLPNS 33010040 | 9/12/2005 | 1117 | 48 | | | | |
| 489 | 21FLPNS 33010041 | 9/12/2005 | 1100 | 70 | | | | |
| 489 | 21FLPNS 33014895 | 9/12/2005 | 1040 | 42 | | | | |
| 489 | 21FLGW 3565 | 9/27/2005 | 715 | 240 | | | | |
| 489 | 21FLPNS 33010013 | 10/17/2005 | 1045 | 120 | | | | |
| 489 | 21FLGW 3565 | 10/18/2005 | 600 | 78 | | | | |

| WBID | Station | Date | Time | Fecal A-1 (MPN/ 1010mL) (31621) | Fecal Membr (cfu/ 100mL) (31616) | Fecal Tub (MPN/ 100mL) (31614) | Fecal Tube (MPN/ 100mL) (31615) | Other Fecal |
|---|---|---|---|---|---|---|---|---|
| 489 | 21FLBFA 33010011 | 11/6/2005 | 1410 | 36 | | | | |
| 489 | 21FLPNS 33010013 | 12/7/2005 | 1106 | 92 | | | | |
| 489 | 21FLGW 3565 | 12/20/2005 | 730 | 6 | | | | |
| 489 | 21FLPNS 33010011 | 12/20/2005 | 1255 | 64 | | | | |
| 489 | 21FLPNS 33010012 | 12/20/2005 | 1349 | 56 | | | | |
| 489 | 21FLPNS 330148917 | 12/20/2005 | 1235 | 74 | | | | |
| 489 | 21FLGW 3565 | 1/18/2006 | 745 | 1100 | | | | |
| 489 | 21FLBFA 33010011 | 2/5/2006 | 1350 | 82 | | | | |
| 489 | 21FLGW 3565 | 2/23/2006 | 745 | 118 | | | | |
| 489 | 21FLGW 3565 | 3/14/2006 | 750 | 76 | | | | |
| 489 | 21FLGW 3565 | 4/18/2006 | 640 | 52 | | | | |
| 489 | 21FLBFA 33010011 | 5/7/2006 | 1315 | 230 | | | | |
| 489 | 21FLBRA 489-A | 5/16/2006 | 1057 | 12 | | | | |
| 489 | 21FLBRA 489-B | 5/16/2006 | 1234 | 20 | | | | |
| 489 | 21FLBRA 489-C | 5/16/2006 | 1431 | 26 | | | | |
| 489 | 21FLGW 3565 | 5/16/2006 | 630 | 104 | | | | |
| 489 | 21FLPNS 33010011 | 6/12/2006 | 1200 | 1018 | | | | |
| 489 | 21FLPNS 33010013 | 6/12/2006 | 1330 | 109 | | | | |
| 489 | 21FLPNS 33010093 | 6/12/2006 | 1130 | 400 | | | | |
| 489 | 21FLGW 3565 | 6/21/2006 | 645 | 520 | | | | |
| 489 | 21FLBRA 489-A | 6/27/2006 | 1548 | 550 | | | | |
| 489 | 21FLBRA 489-B | 6/27/2006 | 1612 | 140 | | | | |
| 489 | 21FLBRA 489-C | 6/27/2006 | 1458 | 440 | | | | |
| 489 | 21FLBRA 489-D | 6/27/2006 | 1300 | 130 | | | | |
| 489 | 21FLGW 3565 | 7/18/2006 | 700 | 54 | | | | |
| 489 | 21FLBRA 489-A | 8/8/2006 | 1242 | 1500 | | | | |
| 489 | 21FLBRA 489-B | 8/8/2006 | 1311 | 29 | | | | |
| 489 | 21FLBRA 489-C | 8/8/2006 | 1147 | 320 | | | | |
| 489 | 21FLBRA 489-C | 8/8/2006 | 1158 | 290 | | | | |
| 489 | 21FLPNS 33010011 | 8/9/2006 | 1030 | 645 | | | | |
| 489 | 21FLPNS 33010013 | 8/9/2006 | 950 | 1173 | | | | |
| 489 | 21FLPNS 33010093 | 8/9/2006 | 1045 | 800 | | | | |
| 489 | 21FLGW 3565 | 8/17/2006 | 640 | 1000 | | | | |
| 489 | 21FLBRA 489-A | 8/29/2006 | 1248 | 1500 | | | | |
| 489 | 21FLBRA 489-B | 8/29/2006 | 1359 | 67 | | | | |
| 489 | 21FLBRA 489-C | 8/29/2006 | 1214 | 410 | | | | |
| 489 | 21FLBRA 489-A | 10/16/2006 | 1046 | 2500 | | | | |
| 489 | 21FLBRA 489-A | 10/16/2006 | 1059 | 2400 | | | | |
| 489 | 21FLBRA 489-B | 10/16/2006 | 1151 | 4700 | | | | |

| WBID | Station | Date | Time | Fecal A-1 (MPN/ 1010mL) (31621) | Fecal Membr (cfu/ 100mL) (31616) | Fecal Tub (MPN/ 100mL) (31614) | Fecal Tube (MPN/ 100mL) (31615) | Other Fecal |
|---|---|---|---|---|---|---|---|---|
| 489 | 21FLBRA 489-C | 10/16/2006 | 1236 | 2000 | | | | |
| 489 | 21FLBRA 489-A | 10/25/2006 | 909 | 49 | | | | |
| 489 | 21FLBRA 489-A | 10/25/2006 | 916 | 79 | | | | |
| 489 | 21FLBRA 489-C | 10/25/2006 | 1006 | 130 | | | | |
| 489 | 21FLBRA 489-A | 11/27/2006 | 1135 | 120 | | | | |
| 489 | 21FLBRA 489-C | 11/27/2006 | 1216 | 88 | | | | |
| 489 | 21FLBRA 489-C | 11/27/2006 | 1223 | 140 | | | | |
| 489 | 21FLBRA 489-A | 12/7/2006 | 917 | 68 | | | | |
| 489 | 21FLBRA 489-B | 12/7/2006 | 848 | 380 | | | | |
| 489 | 21FLBRA 489-C | 12/7/2006 | 944 | 17 | | | | |
| 489 | 21FLBRA 489-A | 12/15/2006 | 1249 | 130 | | | | |
| 489 | 21FLBRA 489-B | 12/15/2006 | 1300 | 36 | | | | |
| 489 | 21FLBRA 489-C | 12/15/2006 | 1209 | 100 | | | | |
| 489 | 21FLBRA 489-C | 12/15/2006 | 1212 | 96 | | | | |
| 489 | Nicole Kilburn Before Boil | 10/26/1995 | | | | | | 200 |
| 489 | Nicole Kilburn Before Boil | 10/30/1995 | | | | | | 30 |
| 489 | Nicole Kilburn Before Boil | 10/31/1995 | | | | | | 170 |
| 489 | Nicole Kilburn Before Boil | 11/1/1995 | | | | | | 140 |
| 489 | Nicole Kilburn Before Boil | 11/7/1995 | | | | | | 210 |
| 489 | Nicole Kilburn Before Boil | 11/8/1995 | | | | | | 670 |
| 489 | Nicole Kilburn Before Boil | 11/9/1995 | | | | | | 110 |
| 489 | Nicole Kilburn Before Boil | 11/15/1995 | | | | | | 180 |
| 489 | Nicole Kilburn Before Boil | 11/20/1995 | | | | | | 80 |
| 489 | Nicole Kilburn Before Boil | 11/21/1995 | | | | | | 70 |
| 489 | Nicole Kilburn Before Boil | 11/27/1995 | | | | | | 100 |
| 489 | Nicole Kilburn Before Boil | 11/28/1995 | | | | | | 25 |
| 489 | Nicole Kilburn Before Boil | 11/30/1995 | | | | | | 95 |
| 489 | Nicole Kilburn Before Boil | 12/7/1995 | | | | | | 440 |
| 489 | Nicole Kilburn Before Boil | 12/14/1995 | | | | | | 230 |
| 489 | Nicole Kilburn at Boil | 10/11/1995 | | | | | | 400 |
| 489 | Nicole Kilburn at Boil | 10/16/1995 | | | | | | 110 |
| 489 | Nicole Kilburn at Boil | 10/25/1995 | | | | | | 240 |

| WBID | Station | Date | Time | Fecal A-1 (MPN/ 1010mL) (31621) | Fecal Membr (cfu/ 100mL) (31616) | Fecal Tub (MPN/ 100mL) (31614) | Fecal Tube (MPN/ 100mL) (31615) | Other Fecal |
|---|---|---|---|---|---|---|---|---|
| 489 | Nicole Kilburn at Boil | 10/26/1995 | | | | | | 440 |
| 489 | Nicole Kilburn at Boil | 10/30/1995 | | | | | | 1,080 |
| 489 | Nicole Kilburn at Boil | 10/31/1995 | | | | | | 340 |
| 489 | Nicole Kilburn at Boil | 11/1/1995 | | | | | | 160 |
| 489 | Nicole Kilburn at Boil | 11/1/1995 | | | | | | 300 |
| 489 | Nicole Kilburn at Boil | 11/7/1995 | | | | | | 610 |
| 489 | Nicole Kilburn at Boil | 11/8/1995 | | | | | | 1,040 |
| 489 | Nicole Kilburn at Boil | 11/9/1995 | | | | | | 340 |
| 489 | Nicole Kilburn at Boil | 11/15/1995 | | | | | | 4,000 |
| 489 | Nicole Kilburn at Boil | 11/20/1995 | | | | | | 550 |
| 489 | Nicole Kilburn at Boil | 11/21/1995 | | | | | | 340 |
| 489 | Nicole Kilburn at Boil | 11/27/1995 | | | | | | 360 |
| 489 | Nicole Kilburn at Boil | 11/28/1995 | | | | | | 600 |
| 489 | Nicole Kilburn at Boil | 11/30/1995 | | | | | | 770 |
| 489 | Nicole Kilburn at Boil | 12/4/1995 | | | | | | 3,600 |
| 489 | Nicole Kilburn at Boil | 12/7/1995 | | | | | | 2,500 |
| 489 | Nicole Kilburn at Boil | 12/7/1995 | | | | | | 2,100 |
| 489 | Nicole Kilburn at Boil | 12/14/1995 | | | | | | 100 |
| 489 | Nicole Kilburn after Boil | 10/11/1995 | | | | | | 180 |
| 489 | Nicole Kilburn after Boil | 10/16/1995 | | | | | | 170 |
| 489 | Nicole Kilburn after Boil | 10/25/1995 | | | | | | 330 |
| 489 | Nicole Kilburn after Boil | 10/26/1995 | | | | | | 300 |
| 489 | Nicole Kilburn after Boil | 10/30/1995 | | | | | | 320 |
| 489 | Nicole Kilburn after Boil | 10/31/1995 | | | | | | 400 |
| 489 | Nicole Kilburn after Boil | 11/1/1995 | | | | | | 200 |
| 489 | Nicole Kilburn after Boil | 11/7/1995 | | | | | | 480 |
| 489 | Nicole Kilburn after Boil | 11/8/1995 | | | | | | 860 |
| 489 | Nicole Kilburn after Boil | 11/9/1995 | | | | | | 480 |
| 489 | Nicole Kilburn after Boil | 11/15/1995 | | | | | | 2,000 |
| 489 | Nicole Kilburn after Boil | 11/20/1995 | | | | | | 540 |
| 489 | Nicole Kilburn after Boil | 11/21/1995 | | | | | | 320 |
| 489 | Nicole Kilburn after Boil | 11/27/1995 | | | | | | 220 |
| 489 | Nicole Kilburn after Boil | 11/28/1995 | | | | | | 360 |
| 489 | Nicole Kilburn after Boil | 11/30/1995 | | | | | | 460 |
| 489 | Nicole Kilburn after Boil | 12/4/1995 | | | | | | 2,000 |
| 489 | Nicole Kilburn after Boil | 12/7/1995 | | | | | | 1,300 |

| WBID | Station | Date | Fecal Tube (MPN/100mL) (31615) | Fecal Mem Br (cfu/100mL) (31616) | FECAL A-1 (MPN/1010mL ) (31621) |
|---|---|---|---|---|---|
| 489A | 21FLA 33010097 | 5/22/1985 | | 200 | |
| 489A | 21FLA 33010104 | 5/9/1988 | | 90 | |
| 489A | 21FLBFA 33010080 | 8/5/1990 | | 370 | |
| 489A | 21FLBFA 33010080 | 2/3/1991 | | 40 | |
| 489A | 21FLBFA 33010080 | 8/4/1991 | | 50 | |
| 489A | 21FLBFA 33010080 | 2/9/1992 | | 110 | |
| 489A | 21FLBFA 33010080 | 8/2/1992 | | 110 | |
| 489A | 21FLBFA 33010080 | 2/7/1993 | | 1,400 | |
| 489A | 21FLBFA 33010080 | 9/12/1993 | | 1,700 | |
| 489A | 21FLBFA 33010080 | 12/5/1993 | | 400 | |
| 489A | 21FLBFA 33010080 | 3/6/1994 | | 120 | |
| 489A | 21FLBFA 33010080 | 6/5/1994 | | 140 | |
| 489A | 21FLBFA 33010080 | 9/11/1994 | | 640 | |
| 489A | 21FLBFA 33010080 | 12/2/1994 | | 210 | |
| 489A | 21FLBFA 33010080 | 3/5/1995 | | 200 | |
| 489A | 21FLBFA 33010080 | 6/4/1995 | | 260 | |
| 489A | 21FLBFA 33010080 | 9/17/1995 | | 10 | |
| 489A | 21FLBFA 33010080 | 12/3/1995 | | 230 | |
| 489A | 21FLBFA 33010080 | 3/3/1996 | | 150 | |
| 489A | 21FLBFA 33010080 | 6/1/1996 | | 140 | |
| 489A | 21FLBFA 33010080 | 9/8/1996 | | 11,600 | |
| 489A | 21FLBFA 33010080 | 12/1/1996 | | 1,820 | |
| 489A | 21FLBFA 33010080 | 3/9/1997 | | 40 | |
| 489A | 21FLBFA 33010080 | 6/1/1997 | | 240 | |
| 489A | 21FLBFA 33010080 | 8/17/1997 | | 740 | |
| 489A | 21FLBFA 33010080 | 11/16/1997 | | 80 | |
| 489A | 21FLBFA 33010080 | 2/15/1998 | | 20 | |
| 489A | 21FLBFA 33010080 | 5/17/1998 | | 20 | |
| 489A | 21FLBFA 33010080 | 8/24/1998 | | 200 | |
| 489A | 21FLBFA 33010080 | 11/23/1998 | | 8,520 | |
| 489A | 21FLBFA 33010080 | 2/15/1999 | | | 20 |
| 489A | 21FLBFA 33010080 | 5/10/1999 | | | 140 |
| 489A | 21FLBFA 33010080 | 8/10/1999 | | | 6,000 |
| 489A | 21FLBFA 33010080 | 2/6/2000 | | | 10 |
| 489A | 21FLBFA 33010080 | 8/6/2000 | | | 220 |
| 489A | 21FLBFA 33010080 | 2/4/2001 | | | 40 |
| 489A | 21FLBFA 33010080 | 8/5/2001 | | | 155 |
| 489A | 21FLBFA 33010080 | 2/3/2002 | | | 1,600 |
| 489A | 21FLBFA 33010080 | 11/3/2002 | | | 170 |
| 489A | 21FLBFA 33010080 | 2/2/2003 | | | 70 |

| WBID | Station | Date | Fecal Tube (MPN/100mL) (31615) | Fecal Mem Br (cfu/100mL) (31616) | FECAL A-1 (MPN/1010mL ) (31621) |
|---|---|---|---|---|---|
| 489A | 21FLBFA 33010080 | 5/4/2003 | | | 94 |
| 489A | 21FLBFA 33010080 | 8/4/2003 | | | 420 |
| 489A | 21FLBFA 33010080 | 11/2/2003 | | | 700 |
| 489A | 21FLBFA 33010080 | 2/1/2004 | | | 76 |
| 489A | 21FLBFA 33010080 | 5/2/2004 | | | 440 |
| 489A | 21FLBFA 33010125 | 8/1/2004 | | | 320 |
| 489A | 21FLBFA 33010125 | 11/7/2004 | | | 64 |
| 489A | 21FLBFA 33010125 | 2/6/2005 | | | 91 |
| 489A | 21FLPNS 33010125 | 3/2/2005 | | | 18 |
| 489A | 21FLBFA 33010125 | 5/1/2005 | | | 182 |
| 489A | 21FLPNS 33010080 | 5/2/2005 | | | 151 |
| 489A | 21FLPNS 33010103 | 5/2/2005 | | | 207 |
| 489A | 21FLPNS 33010104 | 5/2/2005 | | | 168 |
| 489A | 21FLPNS 33010125 | 5/2/2005 | | | 92 |
| 489A | 21FLPNS 3301489A4 | 5/2/2005 | | | 184 |
| 489A | 21FLPNS 3301489A5 | 5/2/2005 | | | 300 |
| 489A | 21FLBFA 33010125 | 8/7/2005 | | | 250 |
| 489A | 21FLPNS 33010080 | 9/15/2005 | | | 400 |
| 489A | 21FLPNS 33010103 | 9/15/2005 | | | 420 |
| 489A | 21FLPNS 33010104 | 9/15/2005 | | | 320 |
| 489A | 21FLPNS 3301489A4 | 9/15/2005 | | | 691 |
| 489A | 21FLBFA 33010125 | 11/6/2005 | | | 64 |
| 489A | 21FLPNS 33010080 | 12/21/2005 | | | 260 |
| 489A | 21FLPNS 33010103 | 12/21/2005 | | | 129 |
| 489A | 21FLPNS 33010104 | 12/21/2005 | | | 160 |
| 489A | 21FLPNS 33010125 | 12/21/2005 | | | 44 |
| 489A | 21FLPNS 3301489A4 | 12/21/2005 | | | 154 |
| 489A | 21FLPNS 3301489A5 | 12/21/2005 | | | 96 |
| 489A | 21FLBFA 33010125 | 2/5/2006 | | | 91 |
| 489A | 21FLPNS 33010104 | 4/12/2006 | | | 480 |
| 489A | 21FLPNS 33010134 | 4/12/2006 | | | 9 |
| 489A | 21FLBFA 33010125 | 5/7/2006 | | | 153 |
| 489A | 21FLPNS 33010104 | 8/9/2006 | | | 8,400 |
| 489B | 21FLA 33010068 | 2/12/1996 | | 20 | |
| 624 | 21FLA 33010016 | 1/1/1978 | 34 | | |
| 624 | 21FLA 33010016 | 4/2/1978 | 49 | | |
| 624 | 21FLA 33010016 | 7/2/1978 | 490 | | |
| 624 | 21FLA 33010016 | 10/1/1978 | 1,300 | | |
| 624 | 21FLA 33010016 | 1/7/1979 | 7,900 | | |
| 624 | 21FLA 33010016 | 4/1/1979 | 13 | | |
| 624 | 21FLA 33010016 | 8/3/1980 | 93 | | |

| WBID | Station | Date | Fecal Tube (MPN/100mL) (31615) | Fecal Mem Br (cfu/100mL) (31616) | FECAL A-1 (MPN/1010mL ) (31621) |
|---|---|---|---|---|---|
| 624 | 21FLA 33010016 | 2/1/1981 | | 10 | |
| 624 | 21FLA 33010016 | 8/23/1981 | | 1,700 | |
| 624 | 21FLA 33010016 | 1/5/1982 | | 60 | |
| 624 | 21FLA 33010016 | 6/22/1982 | | 20 | |
| 624 | 21FLA 33010016 | 8/7/1983 | | 1,800 | |
| 624 | 21FLA 33010016 | 11/9/1983 | | 60 | |
| 624 | 21FLA 33010016 | 2/5/1984 | | 100 | |
| 624 | 21FLA 33010016 | 8/5/1984 | | 400 | |
| 624 | 21FLA 33010016 | 2/5/1985 | | 110 | |
| 624 | 21FLA 33010016 | 8/4/1985 | | 1,300 | |
| 624 | 21FLA 33010016 | 2/2/1986 | | 100 | |
| 624 | 21FLA 33010016 | 8/3/1986 | | 100 | |
| 624 | 21FLA 33010016 | 8/2/1987 | | 16,000 | |
| 624 | 21FLA 33010016 | 2/7/1988 | | 230 | |
| 624 | 21FLA 33010016 | 8/7/1988 | | 800 | |
| 624 | 21FLA 33010016 | 2/5/1989 | | 40 | |
| 624 | 21FLBFA 33010016 | 2/5/1989 | | 40 | |
| 624 | 21FLA 33010016 | 8/6/1989 | | 170 | |
| 624 | 21FLBFA 33010016 | 8/6/1989 | | 170 | |
| 624 | 21FLA 33010016 | 2/4/1990 | | 300 | |
| 624 | 21FLBFA 33010016 | 2/4/1990 | | 300 | |
| 624 | 21FLA 33010016 | 8/5/1990 | | 10,000 | |
| 624 | 21FLBFA 33010016 | 8/5/1990 | | 10,000 | |
| 624 | 21FLA 33010016 | 2/3/1991 | | 50 | |
| 624 | 21FLBFA 33010016 | 2/3/1991 | | 50 | |
| 624 | 21FLA 33010016 | 8/4/1991 | | 100 | |
| 624 | 21FLBFA 33010016 | 8/4/1991 | | 100 | |
| 624 | 21FLA 33010016 | 2/9/1992 | | 120 | |
| 624 | 21FLBFA 33010016 | 2/9/1992 | | 120 | |
| 624 | 21FLA 33010016 | 8/2/1992 | | 70 | |
| 624 | 21FLBFA 33010016 | 8/2/1992 | | 70 | |
| 624 | 21FLBFA 33010016 | 2/7/1993 | | 1,900 | |
| 624 | 21FLBFA 33010016 | 9/12/1993 | | 450 | |
| 624 | 21FLBFA 33010016 | 12/5/1993 | | 400 | |
| 624 | 21FLBFA 33010016 | 3/6/1994 | | 410 | |
| 624 | 21FLBFA 33010016 | 6/5/1994 | | 160 | |
| 624 | 21FLBFA 33010016 | 9/11/1994 | | 790 | |
| 624 | 21FLBFA 33010016 | 12/2/1994 | | 270 | |
| 624 | 21FLBFA 33010016 | 3/5/1995 | | 90 | |
| 624 | 21FLBFA 33010016 | 6/4/1995 | | 240 | |
| 624 | 21FLBFA 33010016 | 9/17/1995 | | 700 | |

| WBID | Station | Date | Fecal Tube (MPN/100mL) (31615) | Fecal Mem Br (cfu/100mL) (31616) | FECAL A-1 (MPN/1010mL ) (31621) |
|---|---|---|---|---|---|
| 624 | 21FLBFA 33010016 | 12/3/1995 | | 260 | |
| 624 | 21FLBFA 33010016 | 3/3/1996 | | 570 | |
| 624 | 21FLBFA 33010016 | 6/1/1996 | | 1,160 | |
| 624 | 21FLBFA 33010016 | 9/8/1996 | | 700 | |
| 624 | 21FLBFA 33010016 | 12/1/1996 | | 2,120 | |
| 624 | 21FLBFA 33010016 | 3/9/1997 | | 120 | |
| 624 | 21FLBFA 33010016 | 6/1/1997 | | 80 | |
| 624 | 21FLBFA 33010016 | 8/17/1997 | | 140 | |
| 624 | 21FLBFA 33010016 | 11/16/1997 | | 120 | |
| 624 | 21FLBFA 33010016 | 2/15/1998 | | 20 | |
| 624 | 21FLBFA 33010016 | 5/17/1998 | | 60 | |
| 624 | 21FLBFA 33010016 | 8/24/1998 | | 300 | |
| 624 | 21FLBFA 33010016 | 11/23/1998 | | 4,500 | |
| 624 | 21FLBFA 33010016 | 2/15/1999 | | | 50 |
| 624 | 21FLBFA 33010016 | 5/10/1999 | | | 20 |
| 624 | 21FLBFA 33010016 | 8/10/1999 | | | 6,000 |
| 624 | 21FLBFA 33010016 | 2/6/2000 | | | 10 |
| 624 | 21FLBFA 33010016 | 11/5/2000 | | | 590 |
| 624 | 21FLBFA 33010016 | 2/4/2001 | | | 10 |
| 624 | 21FLBFA 33010016 | 11/4/2001 | | | 10 |
| 624 | 21FLBFA 33010016 | 2/3/2002 | | | 260 |
| 624 | 21FLBFA 33010016 | 11/3/2002 | | | 40 |
| 624 | 21FLBFA 33010016 | 5/4/2003 | | | 45 |
| 624 | 21FLBFA 33010016 | 8/4/2003 | | | 725 |
| 624 | 21FLBFA 33010016 | 11/2/2003 | | | 20 |
| 624 | 21FLBFA 33010016 | 2/1/2004 | | | 71 |
| 624 | 21FLBFA 33010016 | 5/2/2004 | | | 390 |
| 624 | 21FLBFA 33010016 | 8/1/2004 | | | 90 |
| 624 | 21FLBFA 33010016 | 11/7/2004 | | | 14 |
| 624 | 21FLBFA 33010016 | 2/6/2005 | | | 18 |
| 624 | 21FLPNS 33010016 | 3/3/2005 | | | 54 |
| 624 | 21FLPNS 33010122 | 3/3/2005 | | | 200 |
| 624 | 21FLBFA 33010016 | 5/1/2005 | | | 495 |
| 624 | 21FLPNS 33010015 | 5/11/2005 | | | 150 |
| 624 | 21FLPNS 33010016 | 5/11/2005 | | | 30 |
| 624 | 21FLPNS 33010113 | 5/11/2005 | | | 52 |
| 624 | 21FLPNS 33010122 | 5/11/2005 | | | 60 |
| 624 | 21FLPNS 33016245 | 5/11/2005 | | | 22 |
| 624 | 21FLBFA 33010016 | 8/7/2005 | | | 41 |
| 624 | 21FLPNS 33010122 | 9/26/2005 | | | 14,091 |
| 624 | 21FLPNS 33010016 | 10/17/2005 | | | 52 |

| WBID | Station | Date | Fecal Tube (MPN/100mL) (31615) | Fecal Mem Br (cfu/100mL) (31616) | FECAL A-1 (MPN/1010mL ) (31621) |
|---|---|---|---|---|---|
| 624 | 21FLBFA 33010016 | 11/6/2005 | | | 27 |
| 624 | 21FLPNS 33010122 | 12/28/2005 | | | 159 |
| 624 | 21FLPNS 33010128 | 12/28/2005 | | | 25 |
| 624 | 21FLBFA 33010016 | 2/5/2006 | | | 226 |
| 624 | 21FLBFA 33010016 | 5/7/2006 | | | 67 |
| 681 | 21FLA 33010019 | 4/6/1980 | 43 | | |
| 681 | 21FLA 33010019 | 8/3/1980 | 93 | | |
| 681 | 21FLA 33010019 | 2/1/1981 | | 10 | |
| 681 | 21FLA 33010019 | 8/23/1981 | | 650 | |
| 681 | 21FLA 33010019 | 2/6/1983 | | 900 | |
| 681 | 21FLA 33010019 | 8/7/1983 | | 700 | |
| 681 | 21FLA 33010019 | 2/5/1984 | | 100 | |
| 681 | 21FLA 33010019 | 8/5/1984 | | 10 | |
| 681 | 21FLA 33010019 | 2/5/1985 | | 130 | |
| 681 | 21FLA 33010019 | 8/4/1985 | | 160 | |
| 681 | 21FLA 33010019 | 2/2/1986 | | 40 | |
| 681 | 21FLA 33010019 | 8/3/1986 | | 100 | |
| 681 | 21FLA 33010019 | 8/2/1987 | | 190 | |
| 681 | 21FLA 33010019 | 2/7/1988 | | 290 | |
| 681 | 21FLA 33010019 | 2/5/1989 | | 20 | |
| 681 | 21FLBFA 33010019 | 2/5/1989 | | 20 | |
| 681 | 21FLA 33010019 | 2/3/1991 | | 40 | |
| 681 | 21FLBFA 33010019 | 2/3/1991 | | 40 | |
| 681 | 21FLA 33010019 | 8/4/1991 | | 2,300 | |
| 681 | 21FLBFA 33010019 | 8/4/1991 | | 2,300 | |
| 681 | 21FLA 33010019 | 2/9/1992 | | 10 | |
| 681 | 21FLBFA 33010019 | 2/9/1992 | | 10 | |
| 681 | 21FLBFA 33010019 | 2/7/1993 | | 1,200 | |

## Beulah Landfill

| Facility ID | Facility Name | Test Site ID | Test Site Name | Sample Date | Fecal Coliform MPN (./100) | Fecal Coliform, Membran-Filter, 44_5 C (./100) | Fecal Coliform MF (./100) (31616) |
|---|---|---|---|---|---|---|---|
| 1685 | Beulah Landfill | 1017A12964 | SW-6 UPGRAD. NE OF SITE IN 11 MILE CR. | 9/21/1994 | | | 220 |
| 1685 | Beulah Landfill | 9102 | SW-6 UPGRAD. NE OF SITE IN 11 MILE CR. | 9/21/1994 | | 220 | |
| 1685 | Beulah Landfill | 1017A12966 | SW-4 COMPLIANCE E OF BMW-2 IN 11 MI. CE, | 9/21/1994 | | | 800 |
| 1685 | Beulah Landfill | SW-4 | | 9/21/1994 | 800 | | |
| 1685 | Beulah Landfill | 9104 | SW-4 COMPLIANCE E OF BMW-2 IN 11 MI. CE, | 9/21/1994 | | 800 | |
| 1685 | Beulah Landfill | 1017A12967 | SW-3 COMP. S OF MW-6 IN 11 MI. CR. | 9/21/1994 | | | 300 |
| 1685 | Beulah Landfill | SW-3 | | 9/21/1994 | 300 | | |
| 1685 | Beulah Landfill | 9105 | SW-3 COMP. S OF MW-6 IN 11 MI. CR. | 9/21/1994 | | 300 | |
| 1685 | Beulah Landfill | 1017A12964 | SW-6 UPGRAD. NE OF SITE IN 11 MILE CR. | 4/19/1995 | | | 300 |
| 1685 | Beulah Landfill | SW-6 | | 4/19/1995 | 300 | | |
| 1685 | Beulah Landfill | SW-6dup | | 4/19/1995 | 110 | | |
| 1685 | Beulah Landfill | 9102 | SW-6 UPGRAD. NE OF SITE IN 11 MILE CR. | 4/19/1995 | | 300 | |
| 1685 | Beulah Landfill | 1017A12966 | SW-4 COMPLIANCE E OF BMW-2 IN 11 MI. CE, | 4/19/1995 | | | 300 |
| 1685 | Beulah Landfill | SW-4 | | 4/19/1995 | 300 | | |
| 1685 | Beulah Landfill | 9104 | SW-4 COMPLIANCE E OF BMW-2 IN 11 MI. CE, | 4/19/1995 | | 300 | |
| 1685 | Beulah Landfill | 1017A12967 | SW-3 COMP. S OF MW-6 IN 11 MI. CR. | 4/19/1995 | | | 80 |
| 1685 | Beulah Landfill | SW-3 | | 4/19/1995 | 80 | | |
| 1685 | Beulah | 9105 | SW-3 COMP. S | 4/19/1995 | | 80 | |

| Facility ID | Facility Name | Test Site ID | Test Site Name | Sample Date | Fecal Coliform MPN (./100) | Fecal Coliform, Membran-Filter, 44_5 C (./100) | Fecal Coliform MF (./100) (31616) |
|---|---|---|---|---|---|---|---|
| | Landfill | | OF MW-6 IN 11 MI. CR. | | | | |
| 1685 | Beulah Landfill | 1017A12964 | SW-6 UPGRAD. NE OF SITE IN 11 MILE CR. | 10/24/1995 | | | 10 |
| 1685 | Beulah Landfill | SW-6 | | 10/24/1995 | 110 | | |
| 1685 | Beulah Landfill | 9102 | SW-6 UPGRAD. NE OF SITE IN 11 MILE CR. | 10/24/1995 | | 10 | |
| 1685 | Beulah Landfill | 1017A12966 | SW-4 COMPLIANCE E OF BMW-2 IN 11 MI. CE, | 10/24/1995 | | | 170 |
| 1685 | Beulah Landfill | SW-4 | | 10/24/1995 | 170 | | |
| 1685 | Beulah Landfill | 9104 | SW-4 COMPLIANCE E OF BMW-2 IN 11 MI. CE, | 10/24/1995 | | 170 | |
| 1685 | Beulah Landfill | SW-3 | | 10/24/1995 | 40 | | |
| 1685 | Beulah Landfill | SW-3 dup | | 10/24/1995 | 20 | | |
| 1685 | Beulah Landfill | 9105 | SW-3 COMP. S OF MW-6 IN 11 MI. CR. | 10/24/1995 | | 40 | |
| 1685 | Beulah Landfill | 1017A12964 | SW-6 UPGRAD. NE OF SITE IN 11 MILE CR. | 4/23/1996 | | | 230 |
| 1685 | Beulah Landfill | SW-6 | | 4/23/1996 | 230 | | |
| 1685 | Beulah Landfill | 9102 | SW-6 UPGRAD. NE OF SITE IN 11 MILE CR. | 4/23/1996 | | 230 | |
| 1685 | Beulah Landfill | 1017A12966 | SW-4 COMPLIANCE E OF BMW-2 IN 11 MI. CE, | 4/23/1996 | | | 40 |
| 1685 | Beulah Landfill | 9104 | SW-4 COMPLIANCE E OF BMW-2 IN 11 MI. CE, | 4/23/1996 | | 40 | |
| 1685 | Beulah Landfill | SW-4 | | 4/23/1996 | 40 | | |
| 1685 | Beulah Landfill | 1017A12967 | SW-3 COMP. S OF MW-6 IN 11 MI. CR. | 4/23/1996 | | | 260 |
| 1685 | Beulah Landfill | SW-3 | | 4/23/1996 | 260 | | |
| 1685 | Beulah Landfill | 9105 | SW-3 COMP. S OF MW-6 IN 11 MI. CR. | 4/23/1996 | | 260 | |
| 1685 | Beulah | 1017A12967 | SW-3 COMP. S | 10/15/1996 | | | 170 |

| Facility ID | Facility Name | Test Site ID | Test Site Name | Sample Date | Fecal Coliform MPN (./100) | Fecal Coliform, Membran-Filter, 44_5 C (./100) | Fecal Coliform MF (./100) (31616) |
|---|---|---|---|---|---|---|---|
| | Landfill | | OF MW-6 IN 11 MI. CR. | | | | |
| 1685 | Beulah Landfill | SW-3 | | 10/15/1996 | 170 | | |
| 1685 | Beulah Landfill | 9105 | SW-3 COMP. S OF MW-6 IN 11 MI. CR. | 10/15/1996 | | 170 | |
| 1685 | Beulah Landfill | SW-6 | | 10/16/1996 | 90 | | |
| 1685 | Beulah Landfill | SW-4 | | 10/16/1996 | 210 | | |
| 1685 | Beulah Landfill | 1017A12966 | SW-4 COMPLIANCE E OF BMW-2 IN 11 MI. CE, | 10/19/1996 | | | 210 |
| 1685 | Beulah Landfill | 9104 | SW-4 COMPLIANCE E OF BMW-2 IN 11 MI. CE, | 10/19/1996 | | 210 | |
| 1685 | Beulah Landfill | SW-6 | | 3/24/1997 | 130 | | |
| 1685 | Beulah Landfill | SW-4 | | 3/24/1997 | 140 | | |
| 1685 | Beulah Landfill | SW-3 | | 3/24/1997 | 80 | | |
| 1685 | Beulah Landfill | SW-6 | | 4/27/1998 | 40 | | |
| 1685 | Beulah Landfill | SW-4 | | 4/27/1998 | 58 | | |
| 1685 | Beulah Landfill | SW-4 | | 4/27/1998 | 58 | | |
| 1685 | Beulah Landfill | SW-3 | | 4/27/1998 | 36 | | |
| 1685 | Beulah Landfill | SW-6dup | | 9/17/1998 | 1,300 | | |
| 1685 | Beulah Landfill | SW-6upstr | | 9/17/1998 | 1,100 | | |
| 1685 | Beulah Landfill | SW-4mids | | 9/17/1998 | <1 | | |
| 1685 | Beulah Landfill | SW-3down | | 9/17/1998 | 650 | | |
| 1685 | Beulah Landfill | SW-4mids | | 3/11/1999 | 70 | | |
| 1685 | Beulah Landfill | SW-3down | | 3/11/1999 | 400 | | |
| 1685 | Beulah Landfill | SW-6upstr | | 4/16/1999 | 42 | | |
| 1685 | Beulah Landfill | SW-6 | | 10/12/1999 | 270 | | |
| 1685 | Beulah Landfill | SW-6 | | 10/14/1999 | 320 | | |
| 1685 | Beulah Landfill | SW-4upgra | | 10/14/1999 | 320 | | |

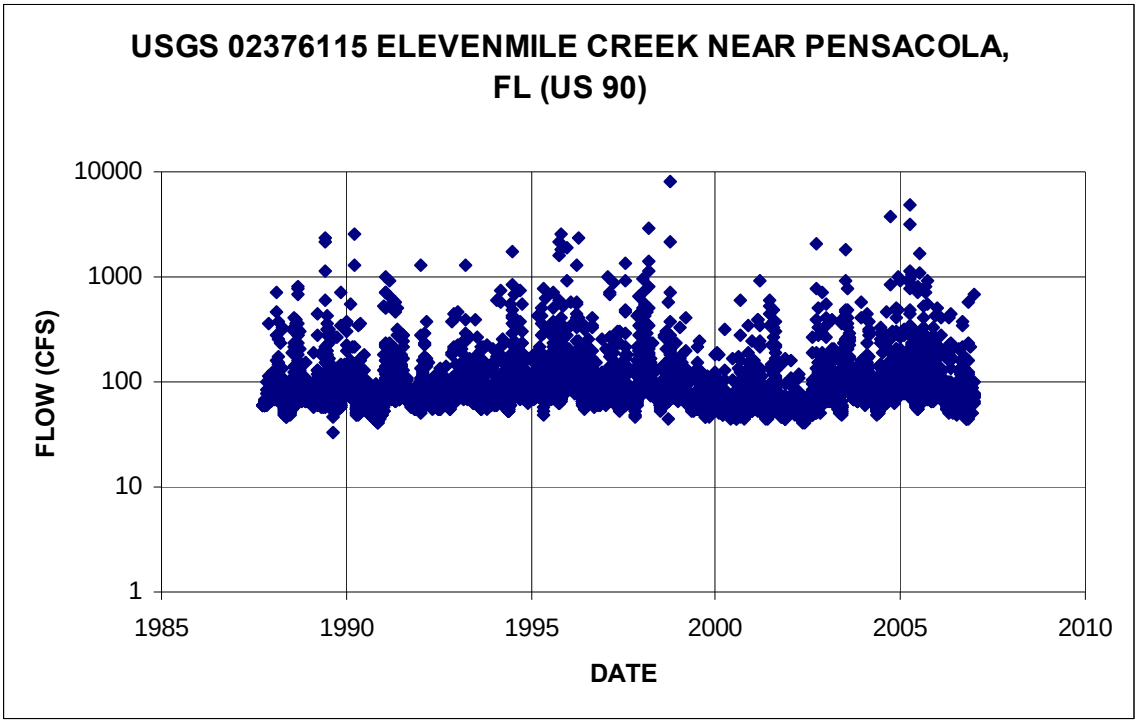
| Facility ID | Facility Name | Test Site ID | Test Site Name | Sample Date | Fecal Coliform MPN (./100) | Fecal Coliform, Membran-Filter, 44_5 C (./100) | Fecal Coliform MF (./100) (31616) |
|---|---|---|---|---|---|---|---|
| 1685 | Beulah Landfill | SW-3 | | 10/14/1999 | 310 | | |
| 1685 | Beulah Landfill | SW-6 | | 4/20/2000 | 70 | | |
| 1685 | Beulah Landfill | SW-4 | | 4/20/2000 | 61 | | |
| 1685 | Beulah Landfill | SW-3 | | 4/20/2000 | 120 | | |
| 1685 | Beulah Landfill | SW-6 | | 10/12/2000 | 230 | | |
| 1685 | Beulah Landfill | SW-3 | | 10/12/2000 | 210 | | |
| 1685 | Beulah Landfill | SW-6 | | 3/20/2001 | 180 | | |
| 1685 | Beulah Landfill | SW-3 | | 3/20/2001 | 170 | | |
| 1685 | Beulah Landfill | SW-6 | | 9/12/2001 | 610 | | |
| 1685 | Beulah Landfill | SW-4 UG | | 9/12/2001 | 640 | | |
| 1685 | Beulah Landfill | SW-3 | | 9/12/2001 | 1,200 | | |
| 1685 | Beulah Landfill | 9102 | SW-6 UPGRAD. NE OF SITE IN 11 MILE CR. | 7/27/2004 | 1,100 | | |
| 1685 | Beulah Landfill | 21263 | SW-4UG | 7/27/2004 | 42 | | |
| 1685 | Beulah Landfill | 21263 | SW-4UG | 7/27/2004 | 40 | | |
| 1685 | Beulah Landfill | 9105 | SW-3 COMP. S OF MW-6 IN 11 MI. CR. | 7/27/2004 | 1,200 | | |
| 1685 | Beulah Landfill | 9102 | SW-6 UPGRAD. NE OF SITE IN 11 MILE CR. | 2/28/2005 | | 110 | |
| 1685 | Beulah Landfill | 9102 | SW-6 UPGRAD. NE OF SITE IN 11 MILE CR. | 2/28/2005 | | 12 | |
| 1685 | Beulah Landfill | 9102 | SW-6 UPGRAD. NE OF SITE IN 11 MILE CR. | 2/28/2005 | | 76 | |
| 1685 | Beulah Landfill | 9104 | SW-4 COMPLIANCE E OF BMW-2 IN 11 MI. CE, | 2/28/2005 | | 4 | |
| 1685 | Beulah Landfill | 9105 | SW-3 COMP. S OF MW-6 IN 11 MI. CR. | 2/28/2005 | | | |
| 1685 | Beulah Landfill | 9102 | SW-6 UPGRAD. NE OF SITE IN 11 MILE CR. | 8/12/2005 | | 830 | |
| 1685 | Beulah Landfill | 21263 | SW-4UG | 8/12/2005 | | 67 | |
| 1685 | Beulah | 9105 | SW-3 COMP. S | 8/12/2005 | | 640 | |

| Facility ID | Facility Name | Test Site ID | Test Site Name | Sample Date | Fecal Coliform MPN (./100) | Fecal Coliform, Membran-Filter, 44_5 C (./100) | Fecal Coliform MF (./100) (31616) |
|---|---|---|---|---|---|---|---|
| | Landfill | | OF MW-6 IN 11 MI. CR. | | | | |
| 1685 | Beulah Landfill | 9102 | SW-6 UPGRAD. NE OF SITE IN 11 MILE CR. | 4/7/2006 | | 27 | |
| 1685 | Beulah Landfill | 21263 | SW-4UG | 4/7/2006 | | 15 | |
| 1685 | Beulah Landfill | 9105 | SW-3 COMP. S OF MW-6 IN 11 MI. CR. | 4/7/2006 | | 37 | |
| 1685 | Beulah Landfill | 9102 | SW-6 UPGRAD. NE OF SITE IN 11 MILE CR. | 8/18/2006 | | 550 | |
| 1685 | Beulah Landfill | 21263 | SW-4UG | 8/18/2006 | | 140 | |
| 1685 | Beulah Landfill | 9105 | SW-3 COMP. S OF MW-6 IN 11 MI. CR. | 8/18/2006 | | 300 | |

# Appendix H: USGS Gage Flow Data

## Elevenmile Creek near Pensacola, FL

| USGS Gage Number | Gage Name | Latitude | Longitude | Daily Streamflow Period of Record | |
|---|---|---|---|---|---|
| | | | | Beginning | End |
| 02376115 | Elevenmile Creek near Pensacola, FL | 302953 | 872009 | 10/1/1987 | 12/31/2006 |

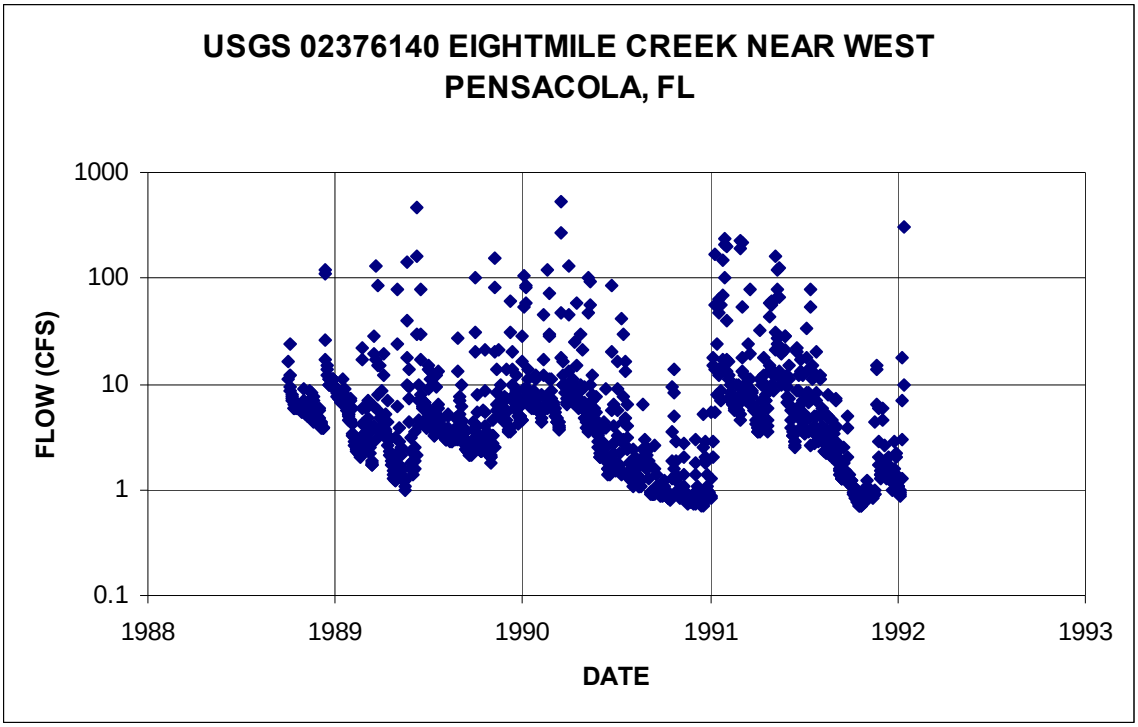


| Year | 02376115 Elevenmile Creek Annual Average Flow (cfs) | 02376115 Elevenmile Creek Annual Average Base (cfs) | 02376115 Elevenmile Creek Annual % Baseflow | 02376115 Elevenmile Creek Annual Average Flow (cfs/mi$^2$) (27.8) | 02376115 Elevenmile Creek Annual Average Base (cfs/mi$^2$) (27.8) |
|---|---|---|---|---|---|
| 1987 | 7.1141E+01 | 5.4281E+01 | 7.6301E-01 | 1.9777E+03 | 1.5090E+03 |
| 1988 | 1.0009E+02 | 6.6350E+01 | 6.6292E-01 | 2.7824E+03 | 1.8445E+03 |
| 1989 | 1.0622E+02 | 6.3528E+01 | 5.9810E-01 | 2.9528E+03 | 1.7661E+03 |
| 1990 | 8.4630E+01 | 5.5751E+01 | 6.5877E-01 | 2.3527E+03 | 1.5499E+03 |
| 1991 | 1.0498E+02 | 6.7371E+01 | 6.4178E-01 | 2.9183E+03 | 1.8729E+03 |
| 1992 | 8.3877E+01 | 6.2094E+01 | 7.4030E-01 | 2.3318E+03 | 1.7262E+03 |
| 1993 | 9.1011E+01 | 6.5435E+01 | 7.1898E-01 | 2.5301E+03 | 1.8191E+03 |
| 1994 | 1.1382E+02 | 6.9714E+01 | 6.1249E-01 | 3.1642E+03 | 1.9381E+03 |
| 1995 | 1.4436E+02 | 7.3427E+01 | 5.0863E-01 | 4.0133E+03 | 2.0413E+03 |
| 1996 | 1.1638E+02 | 7.3633E+01 | 6.3268E-01 | 3.2354E+03 | 2.0470E+03 |
| 1997 | 1.1313E+02 | 6.5102E+01 | 5.7544E-01 | 3.1451E+03 | 1.8098E+03 |
| 1998 | 1.5619E+02 | 7.3184E+01 | 4.6855E-01 | 4.3421E+03 | 2.0345E+03 |
| 1999 | 7.4781E+01 | 5.8796E+01 | 7.8625E-01 | 2.0789E+03 | 1.6345E+03 |
| 2000 | 6.6740E+01 | 5.0745E+01 | 7.6033E-01 | 1.8554E+03 | 1.4107E+03 |
| 2001 | 8.2564E+01 | 5.3818E+01 | 6.5183E-01 | 2.2953E+03 | 1.4961E+03 |
| 2002 | 8.2573E+01 | 5.2262E+01 | 6.3292E-01 | 2.2955E+03 | 1.4529E+03 |
| 2003 | 1.1577E+02 | 7.3505E+01 | 6.3493E-01 | 3.2183E+03 | 2.0434E+03 |
| 2004 | 1.2049E+02 | 6.8357E+01 | 5.6733E-01 | 3.3496E+03 | 1.9003E+03 |
| 2005 | 1.6838E+02 | 7.6277E+01 | 4.5301E-01 | 4.6810E+03 | 2.1205E+03 |
| 2006 | 8.5129E+01 | 5.7022E+01 | 6.6983E-01 | 2.3666E+03 | 1.5852E+03 |

| Year | 2376115 Elevenmile-IP Annual Average Flow (cfs) | 2376115 Elevenmile-IP Annual Average Base (cfs) | 2376115 Elevenmile-IP % Baseflow | 2376115 Elevenmile-IP Annual Average Flow (cfs/mi$^2$) (27.8) | 2376115 Elevenmile-IP Annual Average Base (cfs/mi$^2$) (27.8) |
|---|---|---|---|---|---|
| 1987 | 3.8596E+01 | 2.6262E+01 | 6.8043E-01 | 1.0730E+03 | 7.3008E+02 |
| 1988 | 6.4309E+01 | 3.0733E+01 | 4.7790E-01 | 1.7878E+03 | 8.5439E+02 |
| 1989 | 7.1112E+01 | 2.8628E+01 | 4.0258E-01 | 1.9769E+03 | 7.9587E+02 |
| 1990 | 5.1307E+01 | 2.1761E+01 | 4.2414E-01 | 1.4263E+03 | 6.0497E+02 |
| 1991 | 6.9198E+01 | 3.0989E+01 | 4.4783E-01 | 1.9237E+03 | 8.6150E+02 |
| 1992 | 4.8113E+01 | 2.5328E+01 | 5.2642E-01 | 1.3375E+03 | 7.0411E+02 |
| 1993 | 5.5154E+01 | 2.9559E+01 | 5.3594E-01 | 1.5333E+03 | 8.2175E+02 |
| 1994 | 7.9564E+01 | 3.6199E+01 | 4.5497E-01 | 2.2119E+03 | 1.0063E+03 |
| 1995 | 1.0899E+02 | 3.9026E+01 | 3.5808E-01 | 3.0298E+03 | 1.0849E+03 |
| 1996 | 8.0405E+01 | 3.8398E+01 | 4.7756E-01 | 2.2352E+03 | 1.0675E+03 |
| 1997 | 7.9117E+01 | 3.1028E+01 | 3.9218E-01 | 2.1994E+03 | 8.6257E+02 |
| 1998 | 1.2068E+02 | 3.7490E+01 | 3.1065E-01 | 3.3549E+03 | 1.0422E+03 |
| 1999 | 3.9528E+01 | 2.3674E+01 | 5.9893E-01 | 1.0989E+03 | 6.5814E+02 |
| 2000 | 3.4930E+01 | 1.9098E+01 | 5.4676E-01 | 9.7106E+02 | 5.3094E+02 |
| 2001 | 5.1192E+01 | 2.2409E+01 | 4.3775E-01 | 1.4231E+03 | 6.2298E+02 |
| 2002 | 5.0469E+01 | 2.0316E+01 | 4.0254E-01 | 1.4031E+03 | 5.6478E+02 |
| 2003 | 8.2012E+01 | 3.9904E+01 | 4.8656E-01 | 2.2799E+03 | 1.1093E+03 |
| 2004 | 8.6794E+01 | 3.4763E+01 | 4.0052E-01 | 2.4129E+03 | 9.6640E+02 |
| 2005 | 1.3639E+02 | 4.4426E+01 | 3.2573E-01 | 3.7916E+03 | 1.2351E+03 |
| 2006 | 7.2645E+01 | 3.8003E+01 | 5.2313E-01 | 2.0195E+03 | 1.0565E+03 |

## Eightmile Creek near West Pensacola, FL

| USGS Gage Number | Gage Name | Latitude | Longitude | Daily Streamflow Period of Record | |
|---|---|---|---|---|---|
| | | | | Beginning | End |
| 02376140 | Eightmile Creek near West Pensacola, FL | 302826 | 871959 | 10/1/1988 | 1/13/1992 |



| Year | 0376140 Eightmile Creek Annual Average Flow (cfs) | 0376140 Eightmile Creek Annual Average Base (cfs) | 0376140 Eightmile Creek % Baseflow | 0376140 Eightmile Creek Annual Average Flow (cfs/mi$^2$) (11.2) | 0376140 Eightmile Creek Annual Average Base (cfs/mi$^2$) (11.2) |
|---|---|---|---|---|---|
| 1987 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 1988 | 9.9250E+00 | 5.2857E+00 | 5.3256E-01 | 1.1116E+02 | 5.9199E+01 |
| 1989 | 9.8427E+00 | 2.8102E+00 | 2.8551E-01 | 1.1024E+02 | 3.1474E+01 |
| 1990 | 1.0108E+01 | 2.6500E+00 | 2.6218E-01 | 1.1320E+02 | 2.9680E+01 |
| 1991 | 1.4209E+01 | 3.0728E+00 | 2.1626E-01 | 1.5914E+02 | 3.4415E+01 |
| 1992 | 2.7342E+01 | 4.2170E-02 | 1.5423E-03 | 3.0623E+02 | 4.7230E-01 |
| 1993 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 1994 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 1995 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 1996 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 1997 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 1998 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 1999 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 2000 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 2001 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 2002 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 2003 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 2004 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 2005 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |
| 2006 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 | 0.0000E+00 |

# Appendix I: Ground Water Data in the Perdido Basin

## Coliform and Metals Statistics

GENERATING STATISTICS

| | |
|---|---|
| ANALYTE GROUP: | SRA INDICATORS |
| NETWORK: | ALL |
| WATER RESOURCE: | CONFINED UNCONFINED |
| TMDL BASIN: | PERDIDO |
| COLLECTION DATE: | FROM: 1-JAN-1980 TO: 4-MAY-2006 |
| RESULTS: | MAX PER WELL |

| Parameter Name | Coliform, Fecal (MF) | Iron, Total | Manganese, Total |
|---|---|---|---|
| Parameter Code | 31616 | 1045 | 1055 |
| Units | #/100ml | ug/L | ug/L |
| Total Wells | 31 | 32 | 32 |
| Number BDLs | 27 | 0 | 3 |
| Number MCL/GCL Exceedances | NA | 24 | 14 |
| % MCL/GCL Exceedances | NA | 75% | 43.80% |
| Minimum | 0 | 30 | 5 |
| 1st Quartile | 0 | 290 | 20 |
| Median | 0 | 2100 | 41 |
| 3rd Quartile | 1 | 4725 | 84.5 |
| Maximum | 80 | 15000 | 350 |
| Interquartile Range | 1 | 4435 | 64.5 |
| Mean | 3.452 | 3421.562 | 66.563 |
| Standard Deviation | 14.426 | 3947.731 | 73.172 |
| Relative Standard Deviation | 417.90% | 115.38% | 109.93% |
| Standard Error | 2.591 | 697.867 | 12.935 |
| Variance | 208.123 | 15584581 | 5354.125 |
| Coefficient of Skewness | 717.871 | 2068.197 | 2168.712 |
| Number Risk Indicators | 2 | NA | NA |
| % Risk Indicators | 6.50% | NA | NA |
| Number SRA Indicators | 0 | 24 | 7 |
| % SRA Indicators | 0% | 75% | 21.90% |

Individual Results

QA Results

Show Map

## Appendix J: Modeling Studies in the Perdido Basin

Dr. Richard A. Snyder, of the University of West Florida's Center for Environmental Diagnostics and Bioremediation, conducted a study on Bayous Chico, Grande, and Texar for the Escambia County Health Department (FDOH). Published in September 2006, the purpose of this study was to determine possible sources of fecal contamination in the three bayous. Using a total of 893 samples taken at 42 sampling points on Bayou Chico, a trend of decreasing fecal bacteria was identified along the system's salinity gradient. It was suggested in the report that this trend indicates the freshwater and residential areas of Bayou Chico as sources of fecal contamination to the system, and that septic tanks installed in low-lying areas during older residential development are likely sources.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