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Sent via ePost

May 26, 2016

Shauna Jones
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3363 West Park Place
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Subject: Escambia County Municipal Separate Storm Sewer System (MS4)
NPDES Permit Nos. FLS000019 (Cycle 3)
Escambia County Revision Request of Bacteria Pollution Control Plan
Approval of Revision of Elevenmile-Tenmile Creeks (WBIDs 489 & 489A) BPCP

The Florida Department of Environmental Protection has reviewed and approved the county's request for the revision of the Elevenmile-Tenmile Creeks previously approved (9/19/14) BPCP. The requested revision of the BPCP consists of replacing fecal coliform bacteria as the indicator organism monitored with the DEP proposed new freshwater indicator organism of *Escherichia coli*. This is in anticipation of formal implementation of *Escherichia coli* by DEP in July as the revised bacteriological water quality indicator organism.

If you have any questions or need any assistance, please contact me at (850) 245-8568 or Stephen.Cioccia@dep.state.fl.us

Sincerely,

A handwritten signature in blue ink that reads "Stephen Cioccia".

Stephen Cioccia
NPDES Stormwater Program

Addressee: Joy Blackmon, P.E., Escambia County

Ccs: Shauna Jones, Escambia County
Taylor (Chips) Kirschenfeld, Escambia County

Escambia County Phase I NPDES Permit No. FLS000019-003
Approval of Revision of Elevenmile-Tenmile Creeks (WBIDs 489 & 489A) BPCP
May 26 2016

Dana Morton, Escambia County
Borja Crane-Amores, DEP

BACTERIA POLLUTION CONTROL PLAN

ELEVENMILE CREEK (WBID 489)

AND

TENMILE CREEK (WBID 489A)

Revised May 2016

Escambia County MS4 Permit

Permit Number FLS000019-003

Co-Permittees:

Escambia County

Florida Department of Transportation, District Three

Town of Century

City of Pensacola

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LIST OF ACRONYMS

BARC: Bay Area Resource Council
BMPs: Best Management Practices
BPCP: Bacteria Pollution Control Plan
cfu/100mL: colony forming units per 100 milliliters
ECHD: Escambia County Health Department
ECUA: Emerald Coast Utility Authority
FDEP: Florida Department of Environmental Protection
FDOT: Florida Department of Transportation
GIS: Geographic Information System
IWR: Impaired Waters Rule
MEP: Maximum Extent Possible
MS4: Municipal Separate Storm Sewer System
NPDES: National Pollutant Discharge Elimination System
NFWFMD: Northwest Florida Water Management District
SSO: Sanitary Sewer Overflow
STORET: STOrage and RETrieval database
TMDL: Total Maximum Daily Load
WWTP: Waste Water Treatment Plant
WBID: Water Body ID
UWF: University of West University

EXECUTIVE SUMMARY

Escambia County and its co-permittees have revised the TMDL Prioritization Report. The revised report was approved by FDEP on June 4 2015. The revised report better meets permit requirements for co-permittees, specifically: FDOT District 3, the City of Pensacola and Escambia County. The Elevenmile-Tenmile Creek BCPC now is ranked number three behind Carpenter Creek and Bayou Texar in the revised TMDL Prioritization Report. Escambia County plans to continue implementation of the monitoring portion of the BPCP and currently funded ongoing bacterial load reducing activities.

In anticipation of the new bacteriological quality rule approval, *Escherichia coli*, will replace fecal coliform bacteria as the indicator organism monitored.

The Elevenmile Creek watershed is comprised of: Elevenmile Creek (WBID 489), Tenmile Creek (WBID 489A), Eightmile Creek (WBID 626), Coffee Creek (WBID 489B) and Hurst Branch (WBID 681). Both Elevenmile and Tenmile Creeks have been verified as impaired for fecal coliform bacteria. In 2008 FDEP adopted a fecal coliform TMDL for both of the impaired creeks. Fecal coliform reductions assigned to the waterways range from approximately 43 to 66 percent. With the cooperation of FDEP and area stakeholders the BPCP will: establish a water quality monitoring program for all Elevenmile tributaries, assess the watershed using a “Walk the WBID” field assessment approach, identify and track existing projects with potential to reduce fecal coliform loading, identify new projects to reduce fecal coliform loading, track water quality and project implementation, meet as needed and make regular reports.

Chapter 1: Plan Purpose and Approach

Escambia County has performed a TMDL Prioritization as required in the County's MS4 Permit Number FLS000019-003. The purpose of the requirement is to select a waterbody which is impaired with a TMDL, yet has no BMAP. The permittee is required to essentially develop a plan to implement the TMDL. In the instance of waterbodies that are impaired for fecal coliform bacteria the recommended strategy is to prepare a "Bacteria Pollution Control Plan" (BPCP). The goal of the BPCP is to bring the impaired waterbody into compliance, i.e., meeting its designated use criteria. At a minimum the BPCP will address, as appropriate, the following elements:

- a. Identification of potential sources of bacteria discharged from the MS4 system.
- b. Bacteria source tracking or other assessment techniques, including monitoring, to better refine the identification of bacterial sources to the MS4 system and prioritize them for implementation of activities to reduce *Escherichia coli* loadings.
- c. Adoption and implementation of a pet waste management ordinance or program.
- d. Implementation of an educational program directed at reducing bacterial pollution.
- e. Identification of additional structural or nonstructural BMPs or program activities needed to reduce bacterial loadings discharged from the MS4 into water bodies with an adopted fecal coliform TMDL to the MEP. This shall include a summary of BMPs and other activities to be implemented, the schedule for their implementation, and the anticipated load reductions from the implemented activities.
- f. The permittee shall include in each NPDES/MS4 annual report a status report on the implementation of the requirements in this section of the permit and on the estimated load reductions that have occurred.

Plan Scope

Escambia County and its co-permittees have revised the TMDL Prioritization Report. The revised report was approved by FDEP on June 4 2015. The revised report better meets permit requirements for co-permittees, specifically: FDOT District 3, the City of Pensacola and Escambia County. The Elevenmile-Tenmile Creek BCPC is ranked number three behind Carpenter Creek and Bayou Texar in the revised TMDL Prioritization Report. Escambia County plans to continue implementation of the monitoring portion of the BPCP and currently funded ongoing bacterial load reducing activities.

The Elevenmile Creek watershed has a 47.97-square-mile (mi²) drainage area that reaches from Cantonment to Perdido Bay (**Figure 1.1**). Elevenmile Creek is about 13 miles long. The TMDL and this BPCP primarily address Elevenmile Creek. However, tributaries to this creek, including, Tenmile Creek (WBID 489A), Coffee Creek/ (WBID 489B), Eightmile Creek (WBID 624), and

Hurst Branch (WBID 681), are also addressed in the BPCP.

Escambia County's approach to preparing the BPCP will be to use the framework provided by the FDEP in the "Fecal Coliform TMDL Guidance On-Line Tool Kit". Escambia County will tailor efforts to meet the unique and specific needs for each of the waterbodies addressed by the plan. The BPCP will:

- Utilize stakeholder expertise and involvement;
- Evaluate existing data and look for data gaps;
- Employ the "walk the WBID" approach to accurately assess potential sources of fecal coliform contamination;
- Build on existing structural and non-structural BMPs to reduce concentrations of *Escherichia coli* bacteria;
- Track implementation of BMPs; and
- Design and implement an effective water quality monitoring program to determine the effectiveness of the BPCP.

Stakeholder Involvement

Escambia County is committed to assembling the appropriate group of watershed stakeholders to successfully implement this BPCP. The list of stakeholders may include but not be limited to:

- Escambia County
- Florida Department of Environmental Protection (FDEP)
- Escambia County Health Department (ECHD)
- Florida Department of Transportation (FDOT)
- Emerald Coast Utility Authority (ECUA)
- Northwest Florida Water Management District (NFWFMD)
- Bay Area Resource Council (BARC)
- University of West University (UWF)
- Industry representatives (International Paper, etc.)
- Agriculture representatives
- Private Utilities

Ideally stakeholders will be represented by "executive" members with the authority required to commit resources to specific BMPs. Additionally, there will be "working group" members that will have hands-on knowledge and technical resources specific to their areas of responsibility.

TMDL(s) Being Implemented

Escambia County's BPCP will be implementing the fecal coliform TMDLs for Elevenmile and Tenmile Creeks, WBIDs 489 and 489A respectively. For the current FDEP water quality assessment cycle, January 1, 2004 – June 30, 2012, Elevenmile Creek has 38 exceedances of the 400 cfu/100 mL limit out a total of 130 samples. This is a 29 percent violation rate. When a waterbody exceeds 10 percent violations, it is designated as impaired.

The fecal coliform TMDL prepared for Elevenmile and Tenmile Creeks assigns the following reductions.

- Elevenmile Creek at U.S. 90: 62.8% reduction
- Elevenmile Creek at S.R. 297A: 65.9% reduction
- Tenmile Creek 42.9% reduction

Assumptions and Considerations for TMDL Implementation

The water quality benefits of TMDL implementation are based on several fundamental assumptions about the targeted pollutants, modeling approaches, waterbody response, and natural processes. In addition, there are a number of important assumptions and considerations to keep in mind about the nature of the BMAP and its long-term implementation. The BPCP is a less formal means of implementing a TMDL specifically for bacteria. It is hoped for and anticipated that stakeholders will be as committed to implementing the BPCP as is required for the BMAP process. A BPCP is very similar to a BMAP; therefore similar assumptions will be made during implementation of this BPCP. These assumptions include:

- Load reductions for stormwater discharges are typically expressed as a percent reduction because it is difficult to quantify the loads from MS4s (given the numerous discharge points) and to distinguish MS4 loads from other nonpoint sources (given the diffuse nature of stormwater transport).
- Bacteria loads from specific sources cannot be quantified because they are highly variable and not well understood. Thus it is not possible to calculate a specific bacterial load for a specific source. Rather, a percent reduction in load, calculated from stream load, not source to stream, is the best way to quantify the necessary reduction.
- The technical stakeholders will evaluate the known sources of bacteria contributing to the impairment in each waterbody and whether there is strong evidence of responsibility. Affected stakeholders will then determine which projects would help to address the problems and include these projects in the BPCP.
- In cases where the sources were unknown, stakeholder groups determine appropriate assessment programs to investigate the sources of bacteria loadings.
- Due to a lack of literature values and high variability, it is difficult to determine the quantitative load reductions expected from management actions to decrease fecal coliform; therefore, the

benefits of these actions will be evaluated on a qualitative basis by matching elimination, reduction, and prevention activities to known or potential sources.

- Flood control projects are included as BPCP activities because these projects help to reduce flooding after a storm event, decreasing the amount of fecal coliform loading to nearby waterbodies through stormwater runoff. Programs such as Adopt-A-Highway, drainage connection permits, and street sweeping and inspection programs are also important because they remove trash, sediment, debris, and pollutants from roadways and conveyance systems that would otherwise be transported to stormwater systems and surface waters. Fecal coliform can be transported in sediments and debris, and these materials can also create a breeding ground for bacteria. Therefore, flood control projects and roadway clean-up programs will be given credit in this BPCP as actions that may reduce fecal coliform.
- The penetration of ultraviolet (UV) light into waters and sediments may aid fecal coliform die-off and prevent bacteria regrowth. Therefore, attention will be paid to any restoration efforts that included the maintenance of stormwater ditches, ponds, and closed conveyance systems. Activities such as preventing the accumulation of debris, removing vegetation or dense tree canopy, and controlling sediment erosion help to eliminate conditions that would encourage the growth of potential new sources of fecal coliform bacteria.

This BPCP will ask stakeholders to implement projects and programs to achieve fecal coliform load reductions as soon as practicable. While project funding can be an issue, such limitations do not affect TMDL implementation requirements; thus, stakeholders or entities will be asked to make *every* reasonable effort to secure funding and implement the activities listed in the BPCP. Since BPCP implementation is a long-term process, the TMDL targets established for the watershed may not be achieved in the next five years. It is understood that all waterbodies can respond differently to the implementation of reduced loadings in order to meet applicable water quality standards. Regular follow-up and continued coordination and communication by stakeholders will be essential to ensure the implementation of management strategies and assessment of their incremental effects. Any additional management actions required to meet the target load fecal coliform reductions in the TMDL will, if necessary, be developed as part of BPCP follow-up.

As part of this BPCP, stakeholders will be asked to commit to a wide variety of management actions/projects. Generally, the projects or activities fall into the following categories:

- Public education and outreach;
- Wastewater infrastructure management, including sanitary sewer expansion programs;
- Stormwater management and the installation of new or retrofitted stormwater treatment;
- Regulations, ordinances, and guidelines (including local, state, and federal);
- Restoration, land acquisition, and water quality improvements; and
- Special studies, planning, monitoring, and assessment.

Future Growth in the Watershed

Much of the Elevenmile Creek watershed remains undeveloped. Based on 1995 NFWFMD land use coverage, 36.2% is in the “Urban and Built-up” category, while 38.6% remains in the Upland Forests land-use category. Thus there is the possibility for significant growth in the watershed.

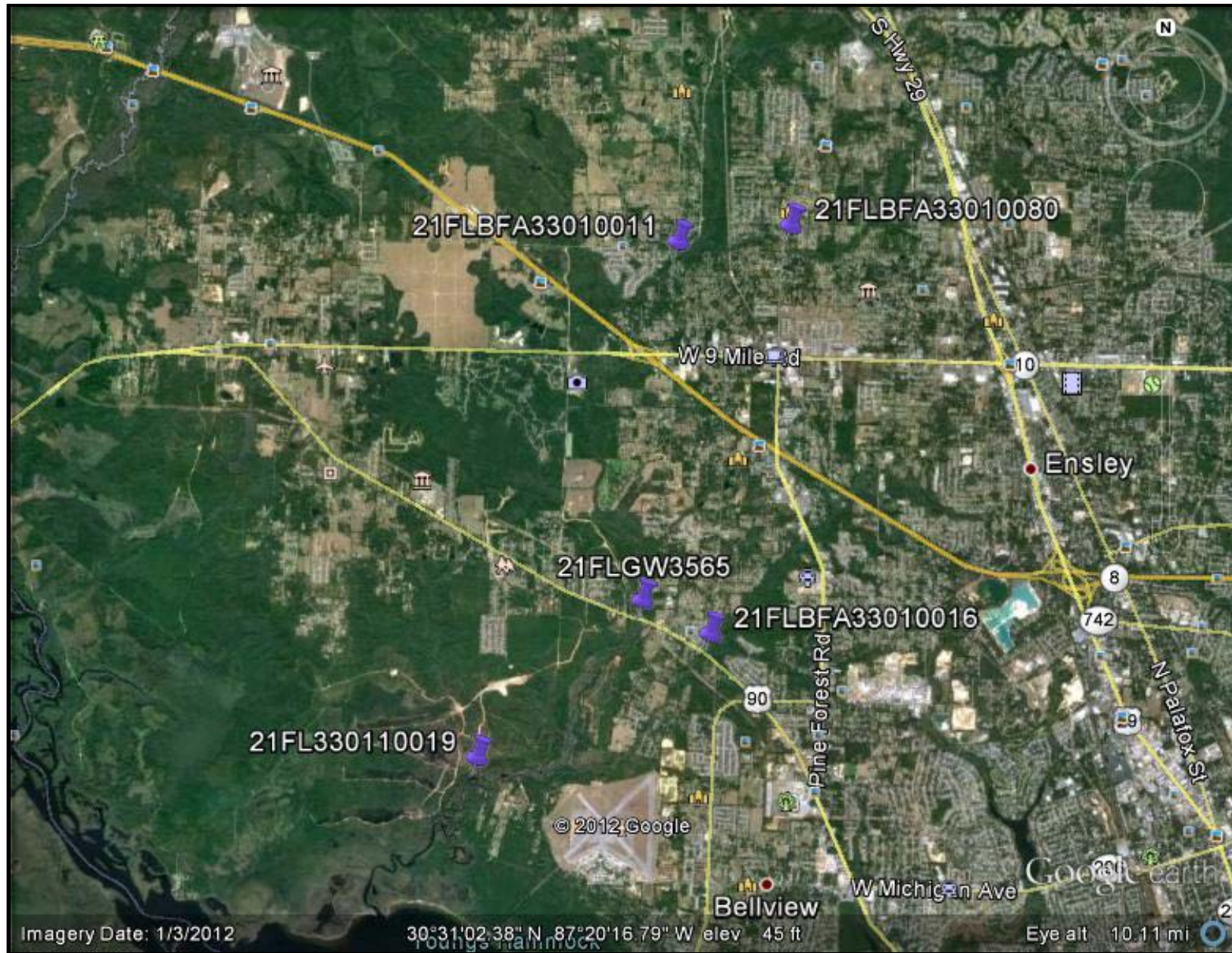
To minimize the creation of future pollution sources, the BPCP will:

- Encourage sanitary sewer to be provided for new development.
- Where sanitary sewer service is not available, ECHD will be asked to review septic tank plans and evaluate sites before issuing new permits, so that the new systems are correctly designed, placed, and operated to prevent further fecal coliform loading.
- All new development will also have to meet all local, state, and federal requirements for stormwater management.

Chapter 2: Water Quality Trends and Anticipated Outcomes

Figure 2 below is a map of the Elevenmile Creek watershed and its four tributaries: Tenmile Creek WBID 489A, Coffee Creek WBID 489B, Eightmile Creek WBID 624 and Hurst Branch WBID 681. Figure 3 is a satellite image with five water quality monitoring stations for four of the five tributaries which comprise the Elevenmile Creek watershed. Maps, data and discussion for these WBIDs follow.

Figure3. Elevenmile Creek and associated WBIDs. Five of the more frequently monitored water quality stations.

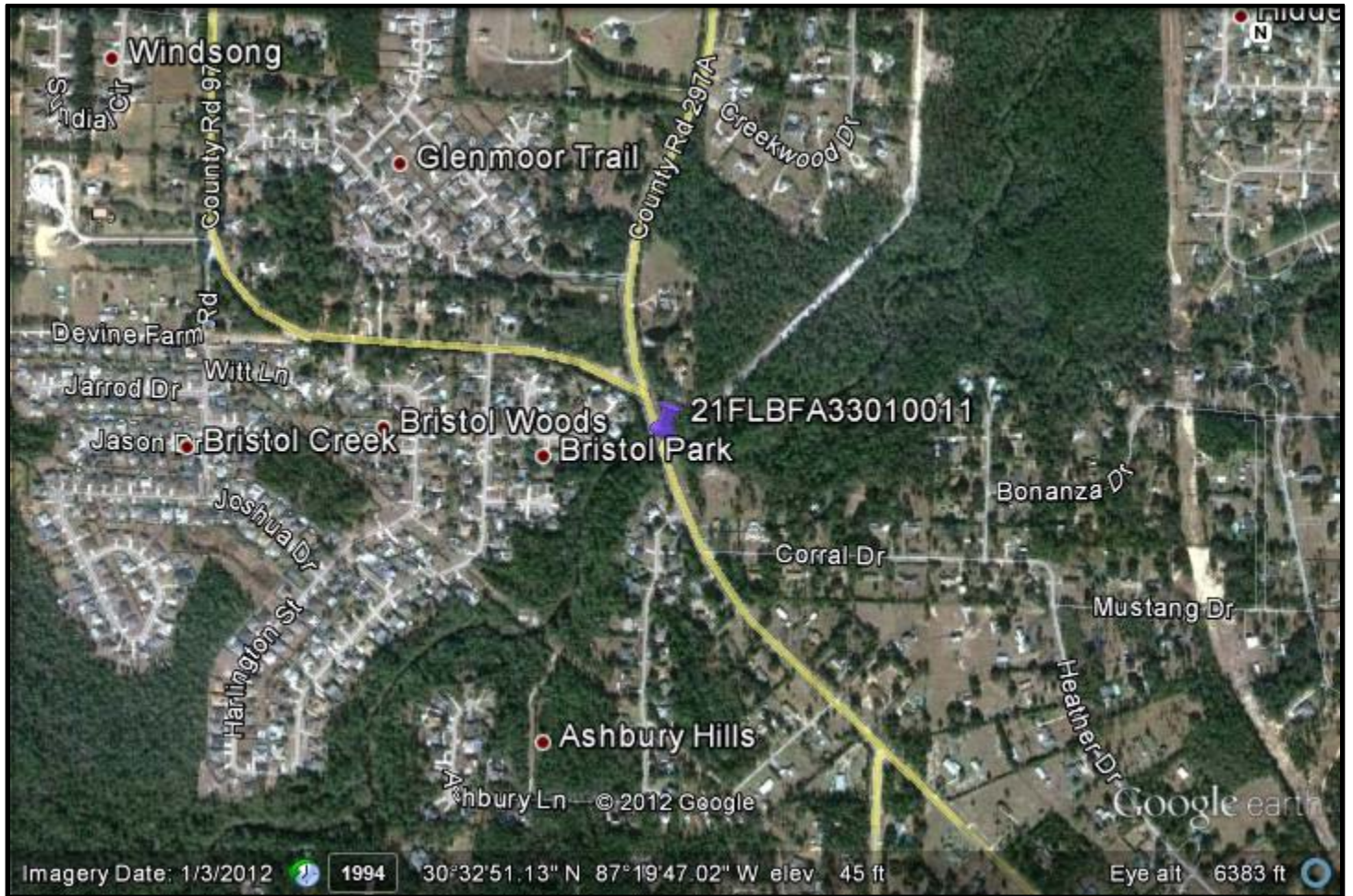


Elevenmile Creek WBID 489

Much of the fecal coliform data for Elevenmile Creek comes from two stations.

Station 21FLBFA33010011 is located at the County Road 297A crossing fairly high up in the water shed. Figure 4 is a satellite image of the station from Google Earth. Figure 5 presents approximately ten years of fecal coliform data from 1999 through 2009. Forty-one observations are presented with a fecal coliform geometric mean of 106 colony forming units (cfu)/100mL. Ten percent of the fecal coliform levels exceeded the state standard of 400 cfu/100mL

Figure 4. Elevenmile Creek at CR 297A. Station 21FLBFA33010011.



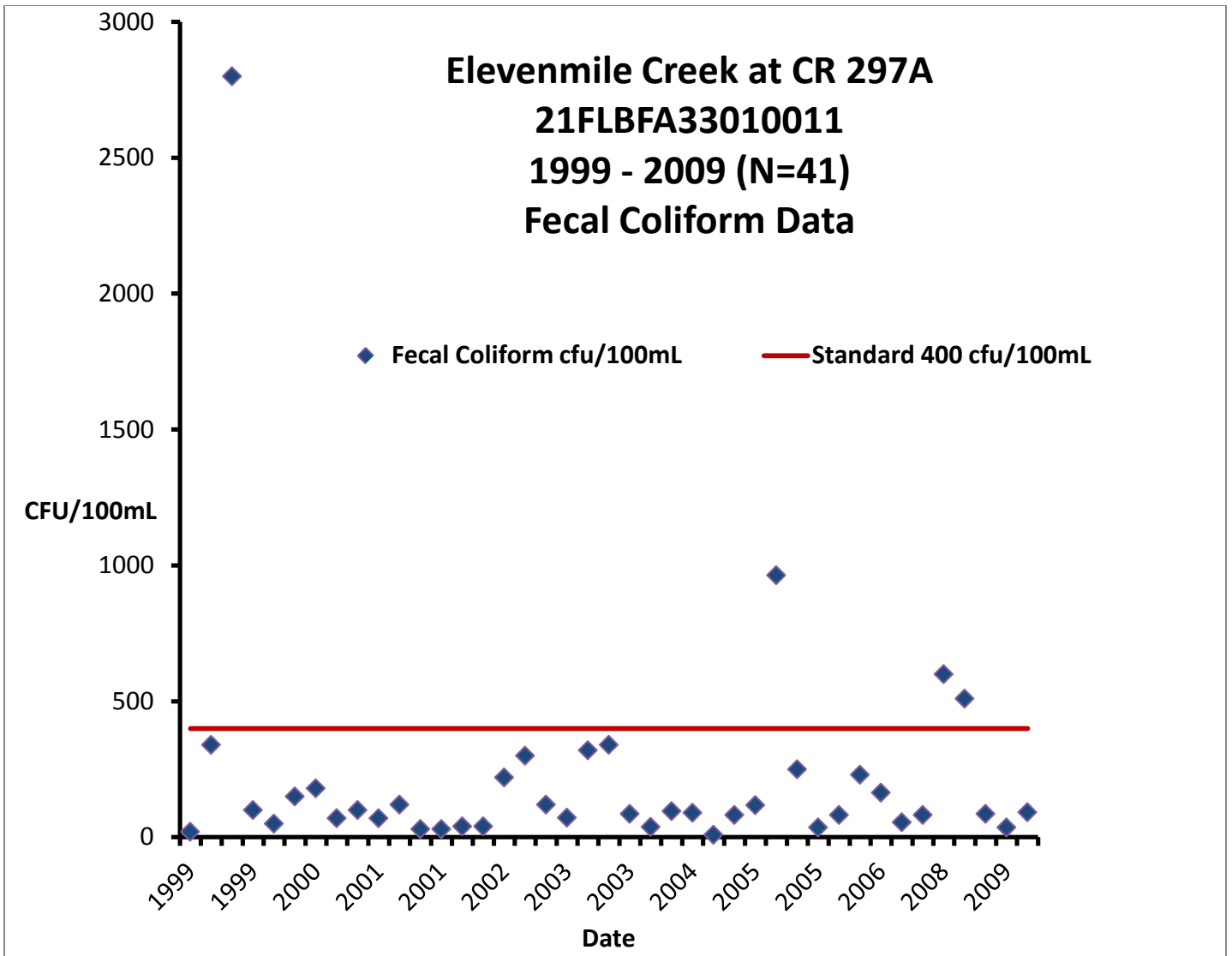


Figure 5. Fecal coliform data for Elevenmile Creek at County Road 297A

Station 21FLGW3565 is located at the Elevenmile Creek and Hwy 90 crossing further downstream in the watershed. Figure 6 is a satellite image of the station from Google Earth. Figure 7 presents 152 observations for approximately twelve years of fecal coliform data from 2000 through 2012. The fecal coliform bacteria geometric mean for the last ten years of data (2002 – 2012) is 183 cfu/100mL. Twenty-seven percent of the fecal coliform levels exceeded the state standard of 400 cfu/100mL. The data clearly indicate deteriorating water quality further downstream in the Elevenmile Creek watershed. The percent of samples exceeding the 400 cfu/100mL standard rises from 10% to 27%. The fecal coliform geometric mean also increases from 106 to 183 cfu/100mL. It is worth noting that this station is the only station with data that is current.

Figure 6. Elevenmile Creek at Hwy 90. Station 21FLGW3565.

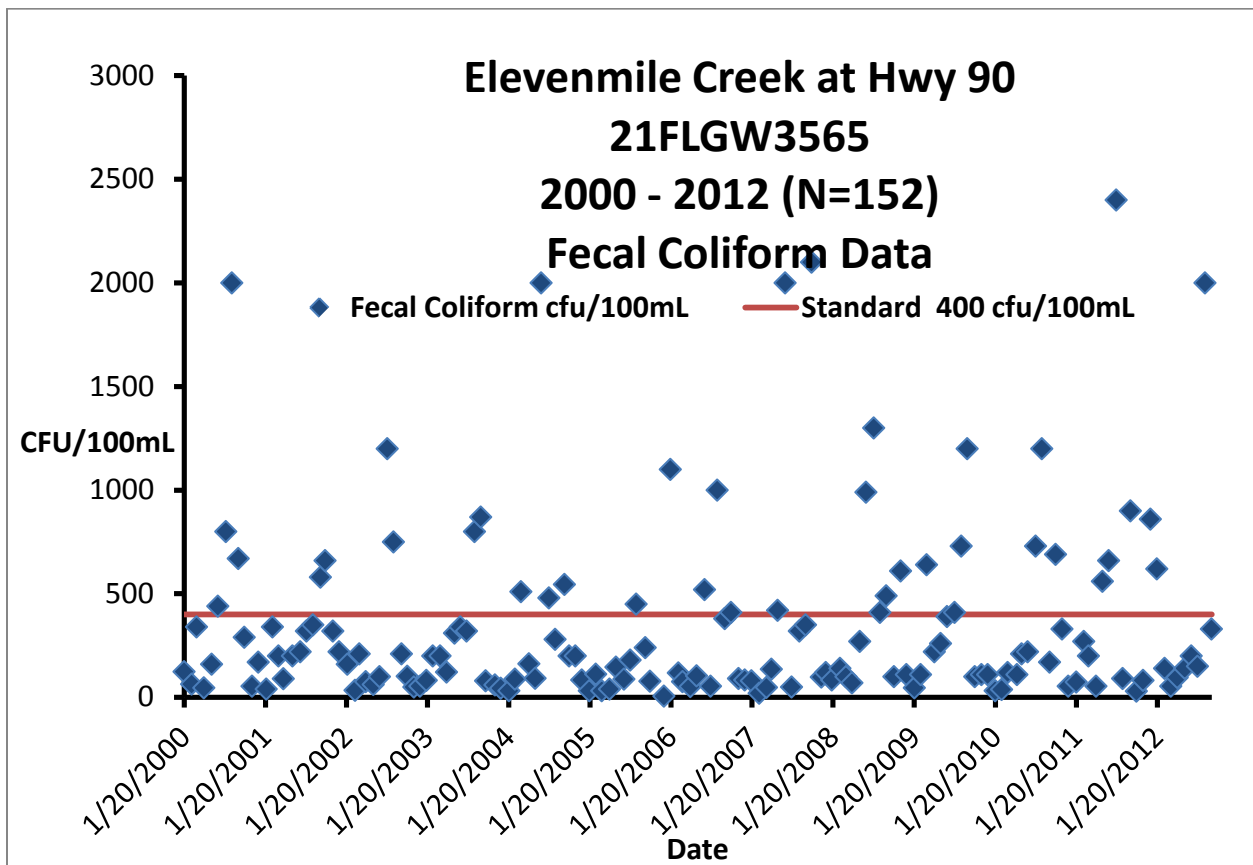
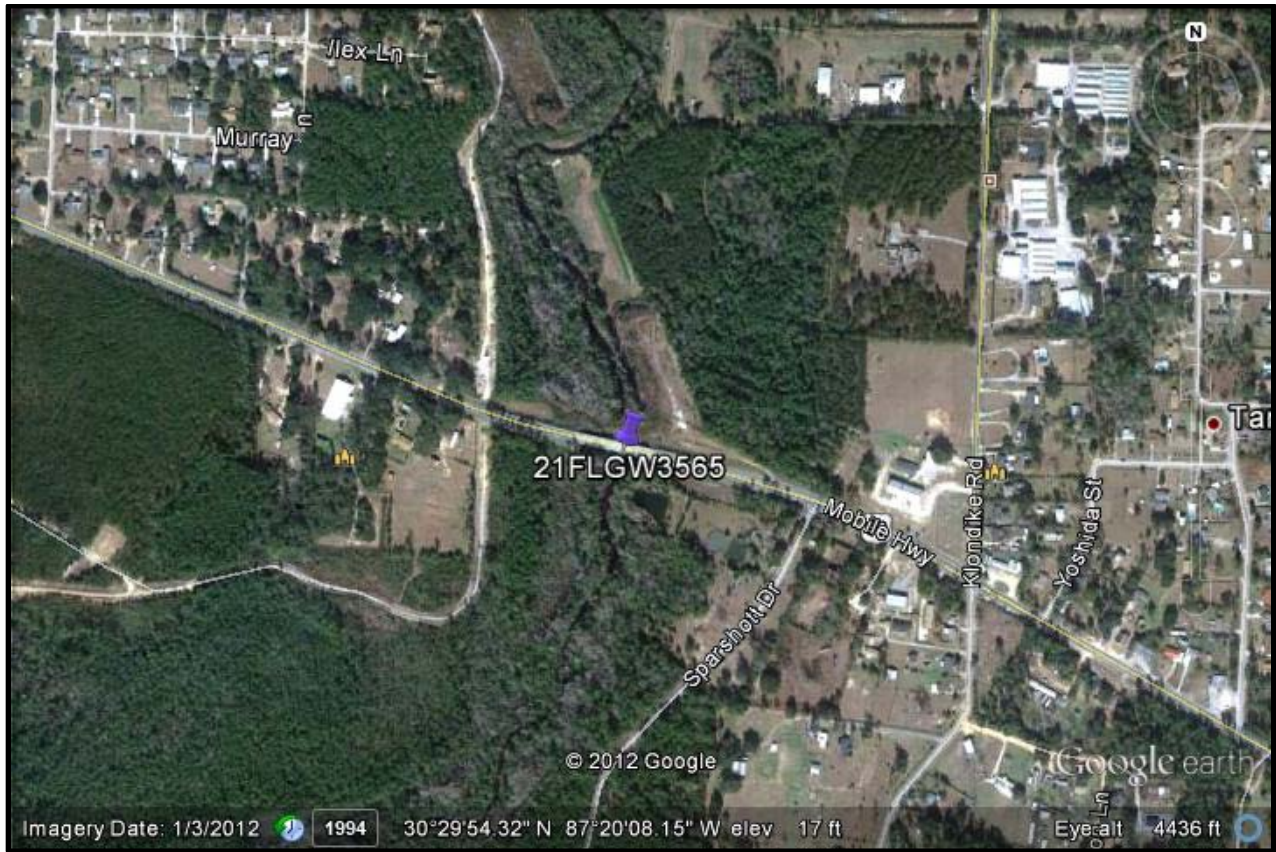
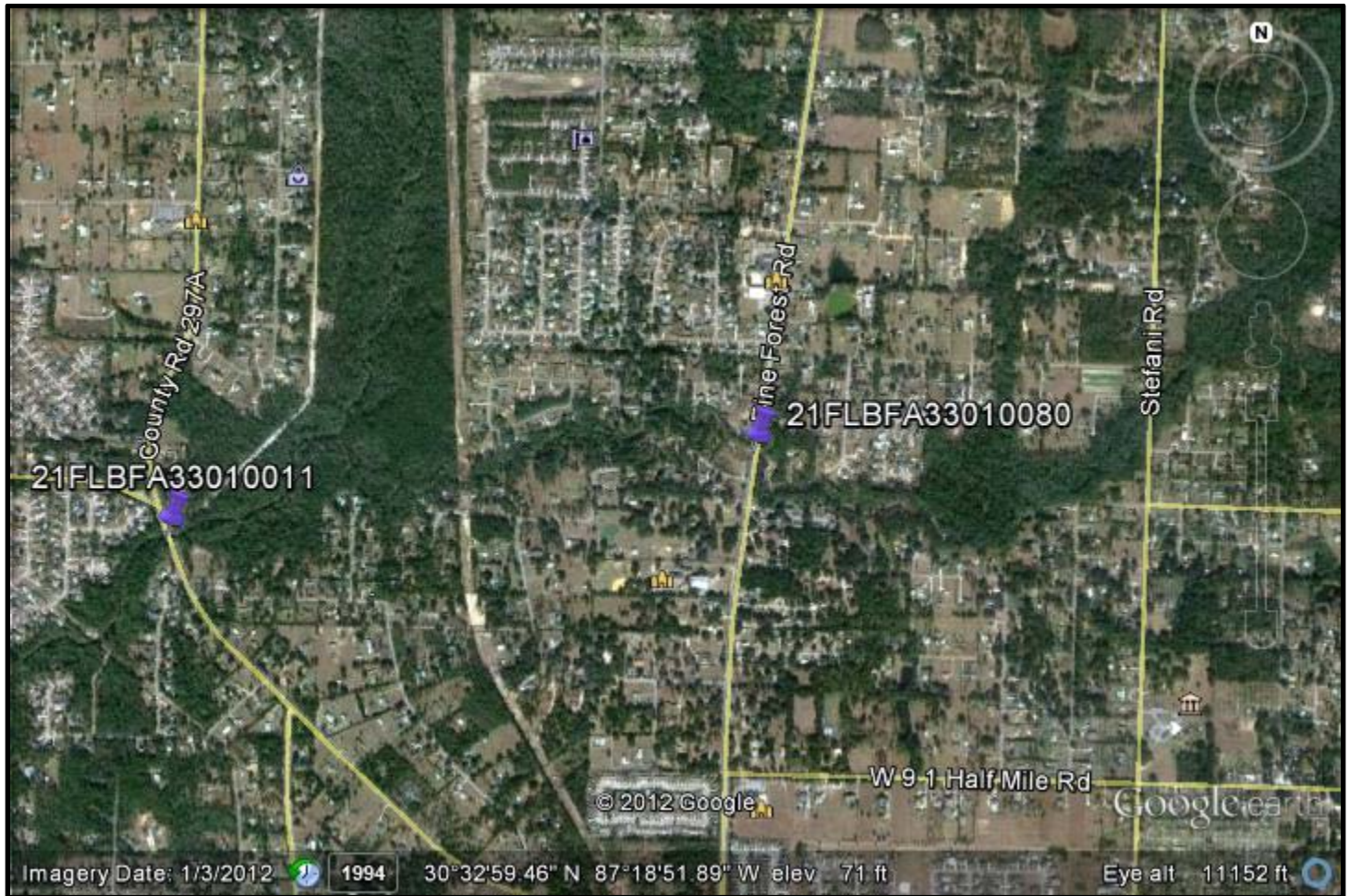


Figure 7. Fecal coliform data for Elevenmile Creek at Hwy. 90.

Tenmile Creek (WBID 489A)

Tenmile Creek lies on the northeastern boundary of Elevenmile Creek. The confluence with Elevenmile Creek is just upstream of CR 297A and station 21FLBFA33010011. Most of the data available for Tenmile Creek is collected at station 21FLBFA33010080, where the creek crosses under Pine Forest Road. Figure 8 is a Google Earth satellite image of the station and surrounding area. Figure 9 presents approximately 14 years of fecal coliform data collected between 1985 and 2009. Eighty-one data points are plotted; their geometric mean is 177 cfu/100mL. Twenty percent of the fecal coliform data exceeded the state standard of 400 cfu/100mL.

Figure 8. Tenmile Creek at Hwy 297 (Pine Forest Road). Station 21FLBFA33010080.



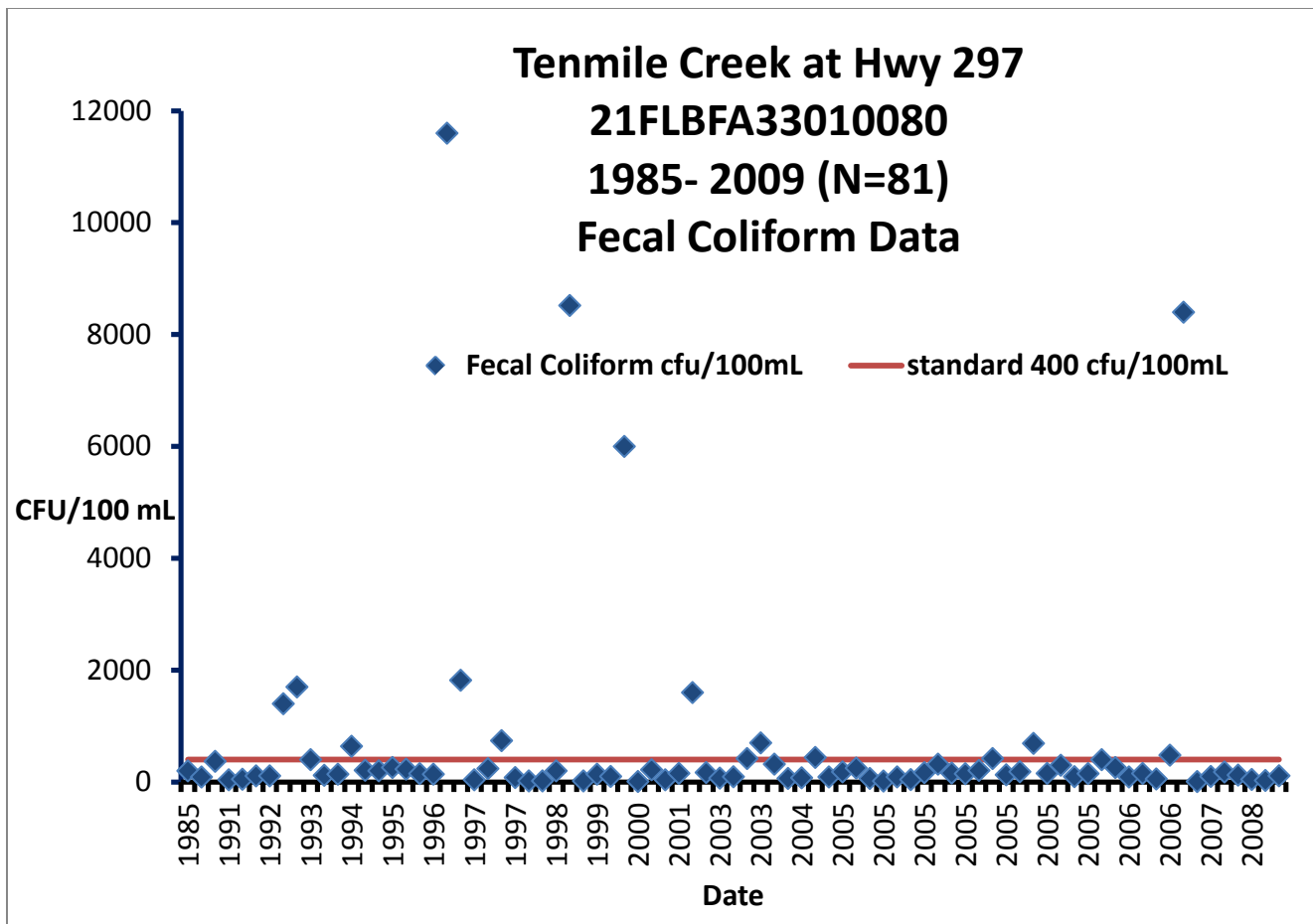
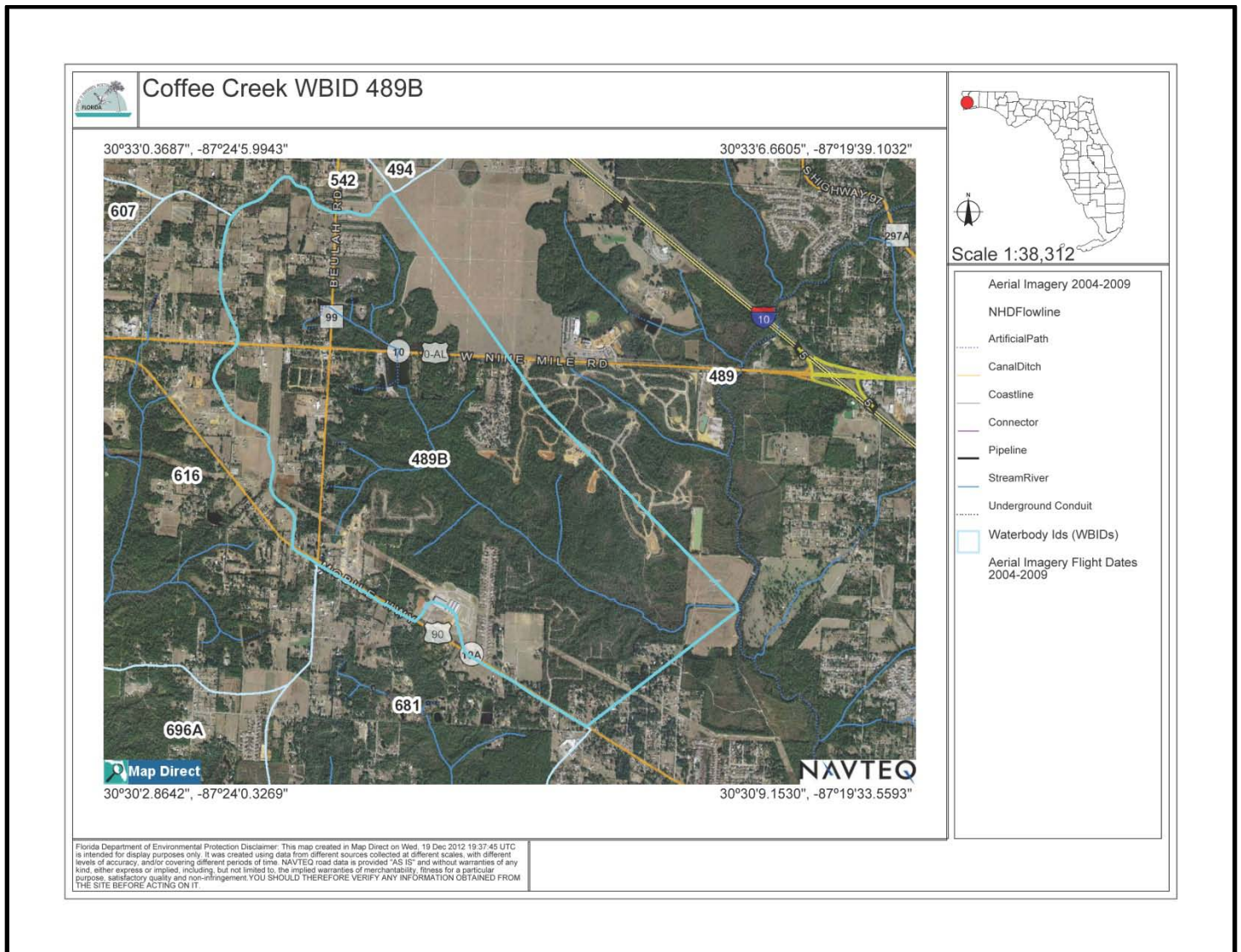


Figure 9. Fecal coliform data for Tenmile Creek at Hwy. 297

Coffee Creek WBID 489B

Coffee Creek lies on the north western border of Elevenmile Creek. The confluence with Elevenmile Creek is upstream of the Elevenmile Creek and Hwy 90 crossing. One of the distinguishing features in the watershed is the closed Escambia County owned Beulah landfill. Coffee Creek actually crosses between two landfill cells and enters Elevenmile Creek essentially on the landfill property. Extremely little data for Coffee Creek has made its way into the STORET or IWR databases. No data is presented in this report. However, a potential source of data may be the Escambia County Solid Waste Department required surface water monitoring data from the landfills permit. Figure 10 is a FDEP GIS map of the Coffee Creek WBID. The Beulah landfill can be clearly seen in the lower eastern corner of the WBID.

Figure 10. Coffee Creek WBID 489B



Hurst Branch WBID 681

Hurst Branch is located on the southwestern border of the Elevenmile Creek basin. The confluence with Elevenmile Creek is well downstream of Hwy 90 and due west of Saufley Air Field in Pensacola. Of potential water quality significance is the fact that the newly constructed wetlands for the International Paper discharge is immediately adjacent or partially within the Hurst Creek basin. Fecal coliform data is limited for the basin, with most of the data coming from one station 21FLA33010019. This station is in Hurst Branch just upstream of the confluence with Elevenmile Creek. Figure 11 is a Google Earth satellite image of the station and surrounding area. Figure 12 presents approximately thirteen years of fecal coliform data collected between 1980 and 1993. Nineteen data points are plotted; their geometric mean is 116 cfu/100mL. Twenty-six percent of the fecal coliform data exceeded the state standard of 400 cfu/100mL.

Figure 11. Hurst Branch, WBID 681. Station 21FLA330110019.

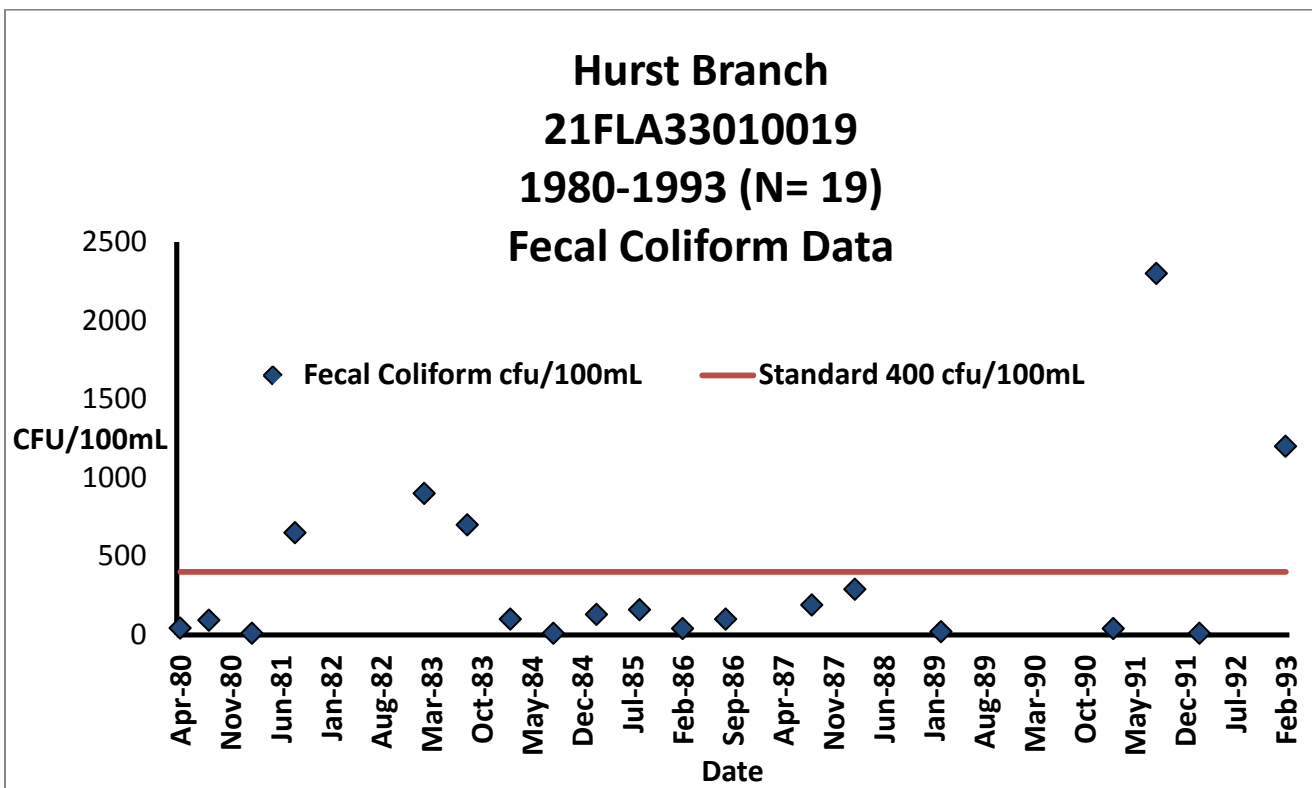
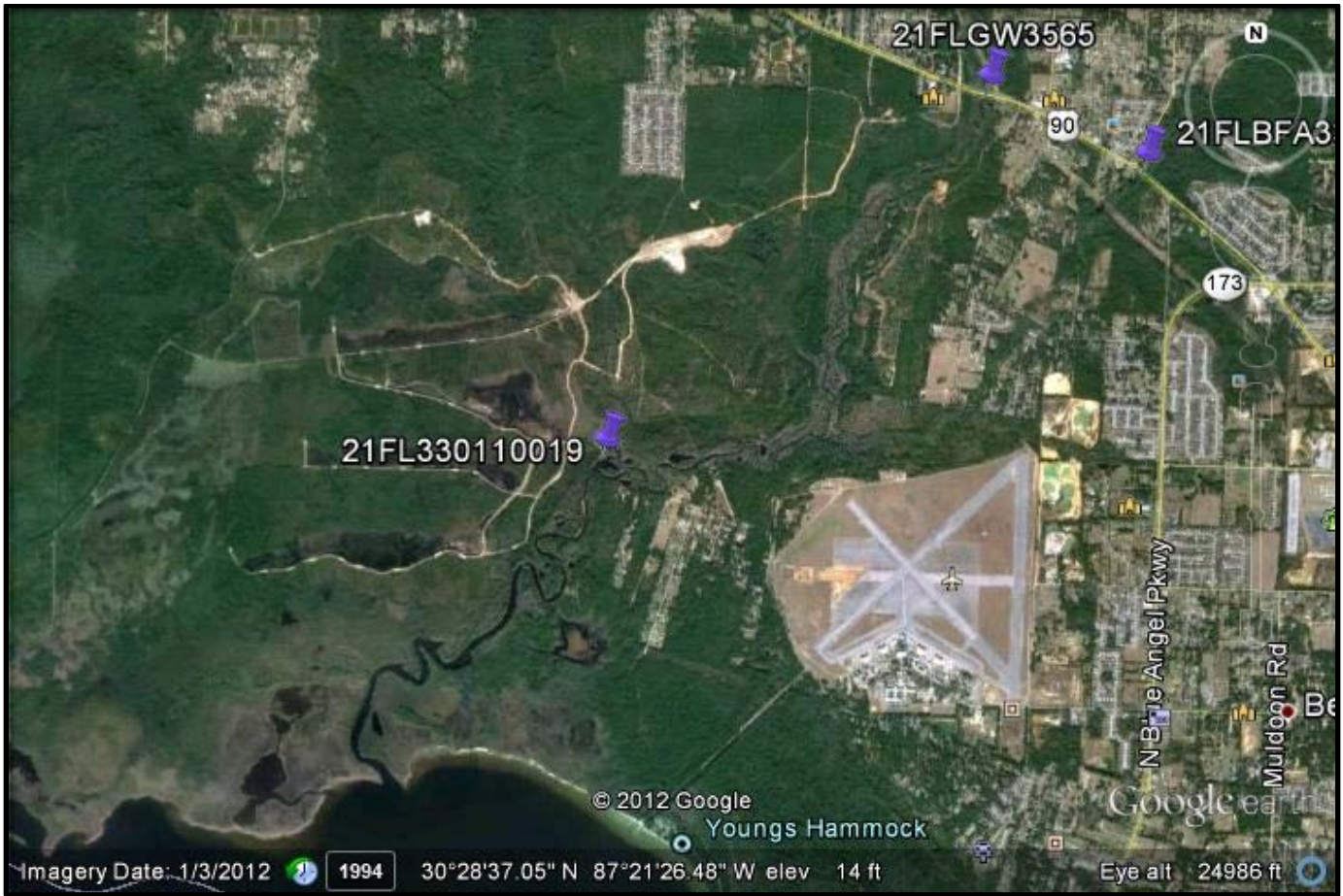
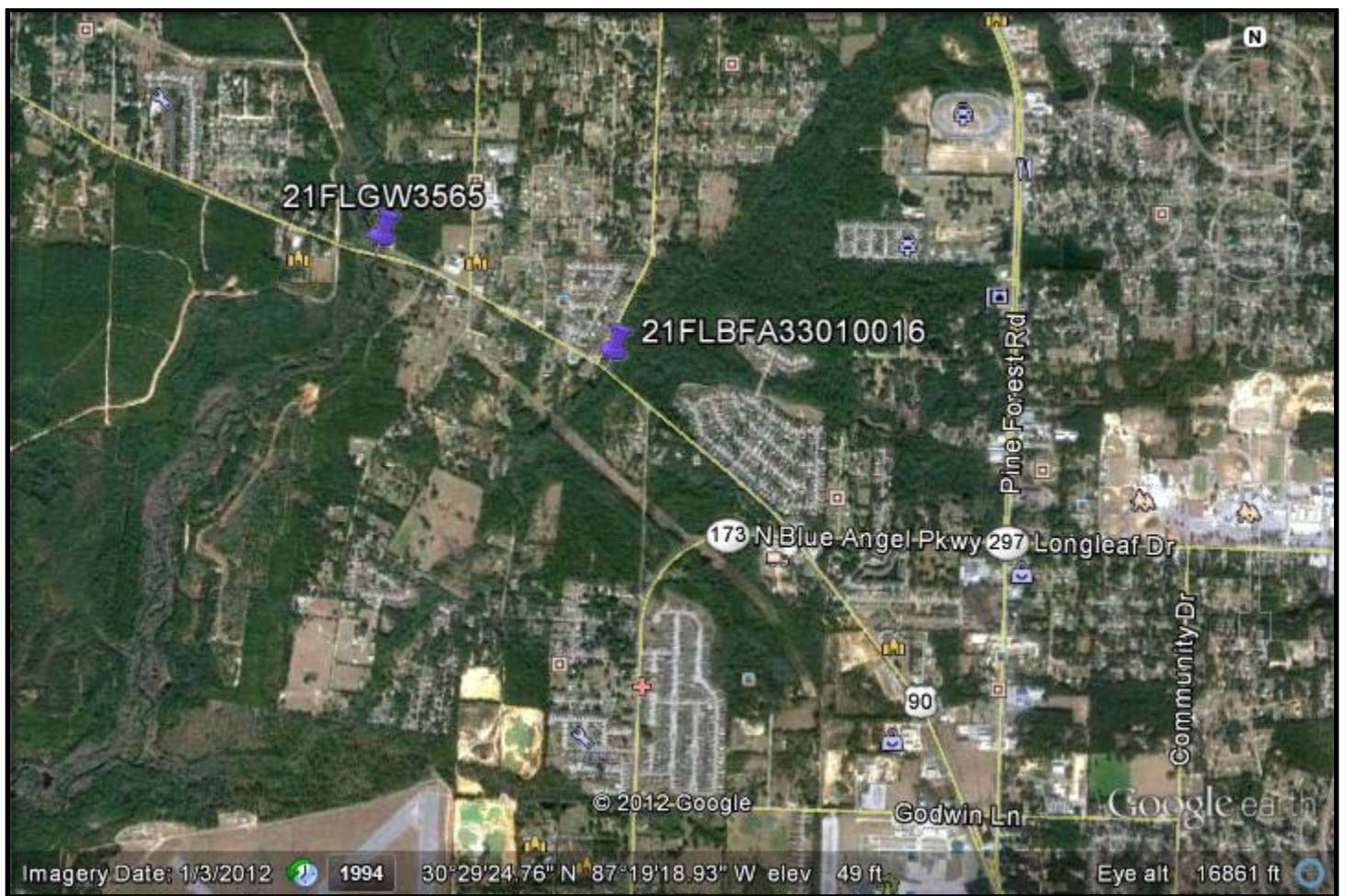


Figure 12. Fecal coliform data for Hurst Branch.

Eightmile Creek WBID 624

Eightmile Creek is located on the southeastern border of the Elevenmile Creek basin. The confluence with Elevenmile Creek is well downstream of Hwy 90 and due north of Saufley Air Field in Pensacola. The Eightmile Creek basin is the largest of the four tributaries flowing into Elevenmile Creek. The basin is also well developed with 51 percent in the “Urban and Built-up” category. Fecal coliform data is limited for the basin, with most of the data coming from one station 21FLBFA33010016. This station is at the Hwy 90 crossing of Eightmile Creek. Figure 13 is a Google Earth satellite image of the station and surrounding area. Figure 14 presents approximately thirty-one years of fecal coliform data collected between 1978 and 2009. One-hundred and eight data points are plotted; their geometric mean is 143 cfu/100mL. Twenty-four percent of the fecal coliform data exceeded the state standard of 400 cfu/100mL.

Figure 13. Eightmile Creek, WBID 624. Station 21FLBFA33010016



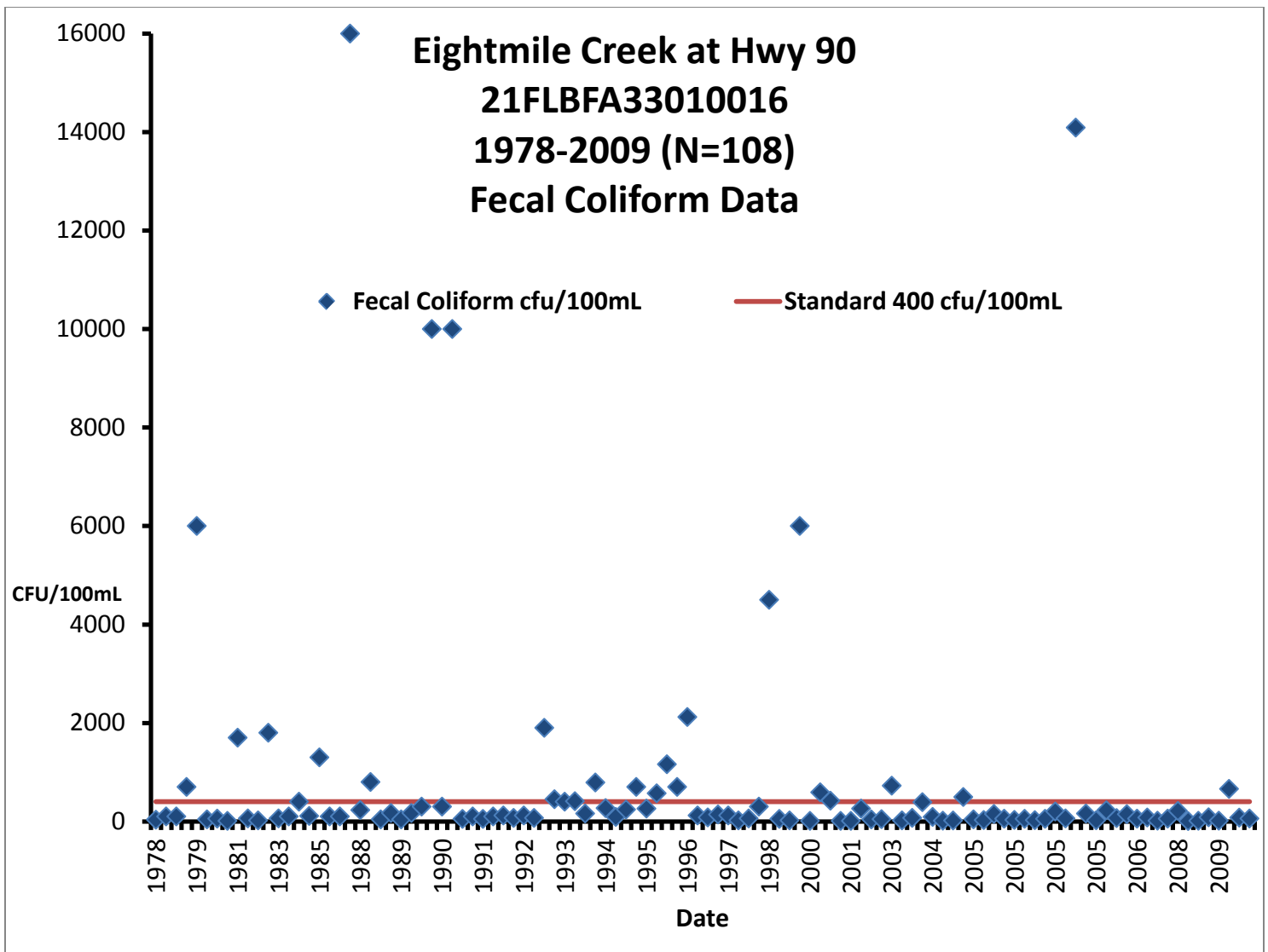


Figure 14. Fecal coliform data for Eightmile Creek.

Water Quality Summary:

Table 1 summarizes the available data for the primary water quality stations in the Elevenmile Creek watershed. Interestingly, Elevenmile Creek had both the best and worst fecal coliform data in the basin. Well upstream in Elevenmile Creek at the CR297A crossing, the percent over the 400 cfu/100mL was only 10%, with a geometric mean of 106 cfu/100mL. Approximately 3.5 miles downstream, the percent over 400 cfu/100mL is 27% with a geometric mean of 183 cfu/100mL.

Hurst Branch had the second highest percentage of exceedances over the state standard at 26%. The geometric mean was the second lowest at 116. This basin has the lowest percent of the watershed in the “Urban and Built-up” category at only 15%. These conditions would lead to a likely source of wildlife to the fecal coliform in this basin.

The available data show no clear fecal coliform concentration trends. There may be a slight trend of decreasing fecal coliform levels, but it is not significant. As is typical of most fecal coliform data, the typically lower levels are punctuated with occasional high values.

It is anticipated that fully implementing the proposed BPCP will result in a reduction in fecal coliform levels, returning the basin to meeting its designated use category.

Table 1. Elevenmile Creek basin fecal coliform summary.

NAME/WBIB	STATION	DESCRIPTION	LATITUDE	LONGITUDE	Number Samples	% > 400 cfu/100mL	F C Geomean cfu/100mL
Elevenmile Creek (489)	21FLBFA33010011	at CR 297A	30°32'51.20"N	87°19'48.30"W	41	10	106
Elevenmile Creek (489)	21FLGW3565	at Hwy 90	30°29'53.23"N	87°20'9.13"W	152	27	183
Tenmile Creek (489A)	21FLBFA33010080	at Hwy 297	30°32'59.20"N	87°18'43.60"W	81	20	177
Hurst Branch (681)	21FLA330110019	at Elevenmile Cr	30°28'35.16"N	87°21'44.49"W	19	26	116
Eightmile Creek (624)	21FLBFA33010016	at Hwy. 90	30°29'36.70"N	87°19'30.10"W	108	24	143

Table 2. Stations Currently Sampled for Elevenmile Creek BPCP.

NAME/WBIB	STATION	DESCRIPTION	LATITUDE	LONGITUDE
Elevenmile Creek (489)	21FLBFA33010011	at CR 297A	30°32'51.20"N	87°19'48.30"W
Elevenmile Creek (489)	21FLPNS33010013	at Hwy 90	30°29'53.23"N	87°20'9.13"W
Tenmile Creek (489A)	21FLBFA33010080	at Hwy 297	30°32'59.20"N	87°18'43.60"W
Hurst Branch (681)	21FLPNS33010017	at IP road crossing	30°28'53.60"N	87°21'43.50"W
Eightmile Creek (624)	21FLBFA33010016	at Hwy. 90	30°29'36.70"N	87°19'30.10"W
Coffee Creek (489B)	21FLPNS33010062	at confl. w Elevenmile Cr	30°30'57.97"N	87°20'34.00"W

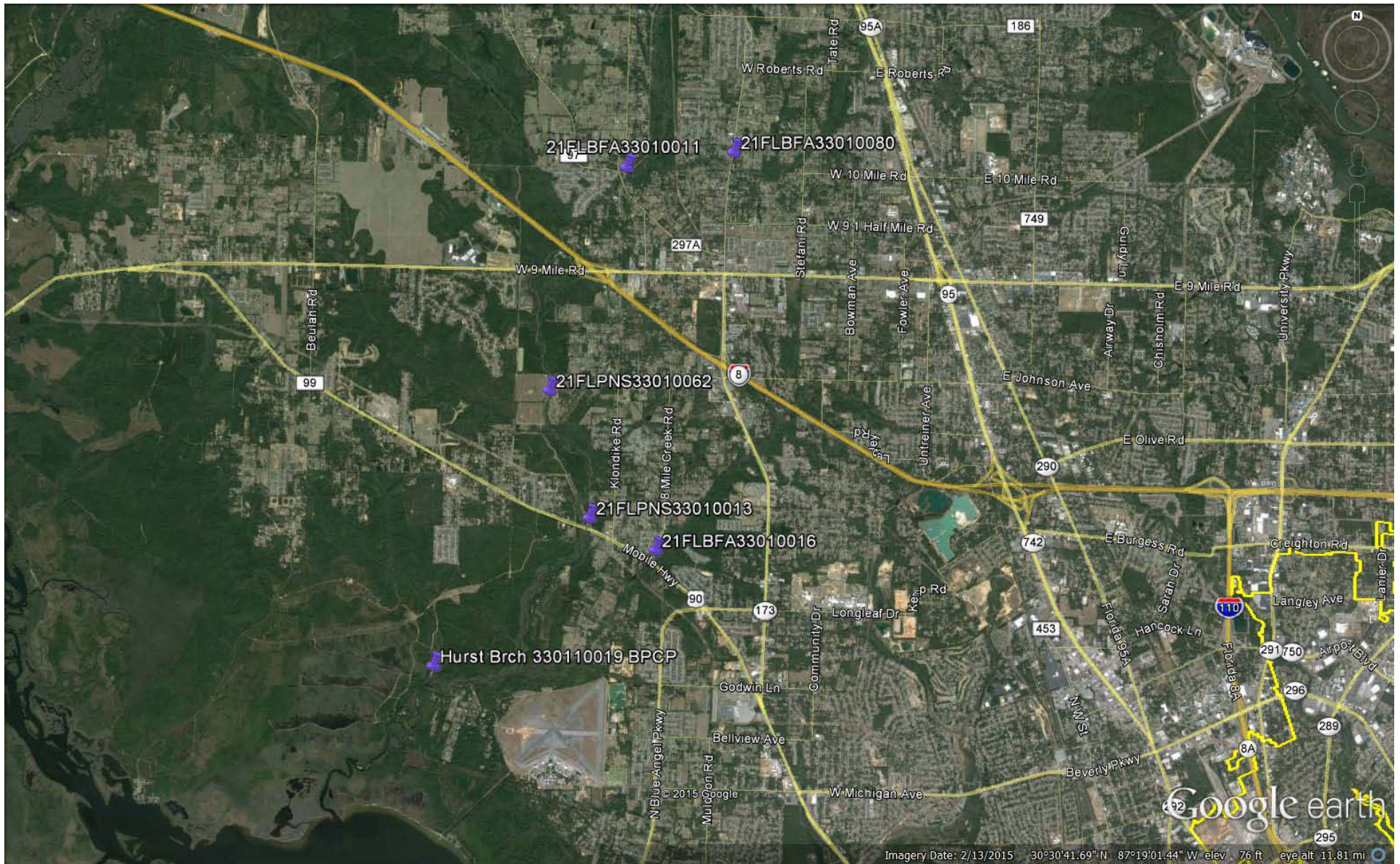


Figure 15. Elevenmile Creek BPCP water quality monitoring stations.

Chapter 3: Assessing Progress and Making Changes

Six monitoring stations are currently sampled, Table 2 and Figure 15. The sampling frequency is monthly, with follow-up sampling within 24 hours for samples exceeding 5000 cfu/100mL.

Field Parameters will include:

Air Temperature (°C)

Cloud Cover

Rainfall

Tide Stage

Canopy Cover

Water Flow Condition

Wind

Field-Measured Parameters:

Conductivity (micromhos per centimeter [umhos/cm])

Dissolved Oxygen (milligrams per liter [mg/L])

Dissolved Oxygen Saturation (%)

pH (standard units [SU])

Salinity (parts per thousand [ppt])

Temperature (°C)

Laboratory parameters will include:

Escherichia coli bacteria (colony forming units (cfu)/100mL)

Turbidity nephelometric turbidity units (NTU)

QUALITY ASSURANCE/QUALITY CONTROL

Through cooperation on TMDL-related data collection, FDEP and stakeholders have consistently used similar standard operating procedures (SOPs) for field sampling and lab analyses. This consistency will continue into the future to ensure that data can be used not only for tracking BPCP progress but also for future TMDL evaluations and other purposes. Water quality data will be collected in a manner consistent with FDEP's SOPs for quality assurance/quality control (QA/QC). The most current version of these procedures can be downloaded from <http://www.dep.state.fl.us/water/sas/sop/sops.htm>. All stakeholders contributing data in support of the BPCP will agree to follow these SOPs.

DATA MANAGEMENT AND ASSESSMENT

To be useful in support of the BPCP, data collected as part of this monitoring plan will need to be tracked, compiled, and analyzed. The Florida STORET database will serve as the primary resource for storing ambient data and providing access for all stakeholders, in accordance with Section 62-40.540, F.S. Stakeholders will be asked to upload data to STORET in a timely manner, after the appropriate QA/QC checks have been completed. All applicable data collected by the entities responsible for monitoring will be uploaded to STORET regularly, but at least quarterly. FDEP will be responsible for data storage and retrieval from the STORET database. STORET uploads are only appropriate for data that represent ambient conditions. Data that are collected to follow up on fecal coliform water quality exceedances should not be uploaded to STORET.

Chapter 4: Stakeholder Commitment to Plan Implementation

The Elevenmile Creek BPCP has been approved. Escambia County plans to continue implementation of the monitoring portion of the BPCP and currently funded ongoing bacterial load reducing activities.

Escambia County will invite stakeholders to a “kick-off” meeting to discuss the plan and establish a regular meeting schedule. Meetings will be held at least once every twelve months after plan adoption to discuss assessment results and project implementation. A “bi-annual” report will be prepared to discuss water quality trends and project implementation status.

Stakeholders will be asked to prepare specific project lists for currently planned and recently implemented projects. Projects listed should be those which may contribute to the reduction of *Escherichia coli* levels. In years 3-5, as a more thorough understanding of *Escherichia coli* the watershed is developed, stakeholders may consider implementation of more projects to reduce *Escherichia coli* levels.

Chapter 5: TMDL Implementation Plan

POTENTIAL SOURCES

After the initial kick-off meeting, working group members will be asked to convene and discuss a strategy for a “Walk the WBID” style assessment of selected WBIDs in the Elevenmile Creek watershed. This effort will begin with a “maps on the table” roundtable discussion of recent fecal coliform data and areas of known or suspected sources of fecal coliform bacteria. Follow-up field investigations for each WBID will be scheduled. Participants will include stakeholder working group members with knowledge and authority to investigate potential sources and conveyances within their respective jurisdictions. Investigations of this nature are often valuable in identifying or confirming sources of fecal coliform bacteria.

Point Sources

There is one actively discharging permitted point source in the Elevenmile Creek watershed. International Paper has a permitted discharge into Elevenmile Creek just upstream of the Kingsfield Road crossing. However, effluent data collect by FDEP and presented in the TMDL report indicate a good record of fecal coliform bacteria compliance.

Non-Point Sources

SANITARY SEWR SYSTEMS

A sanitary sewer system (i.e., public and privately owned sewer infrastructure) may contribute fecal coliform pollution to the environment through the slow and continuous leakage of sanitary sewer infrastructure, treatment failure in WWTPs, and sanitary sewer overflows “SSOs”. Common causes of SSOs may include the following:

1. Heavy rainfall resulting in the inflow of stormwater or infiltration of ground water into sewer lines;
2. Breaks or blockages in sewer lines due to aging infrastructure or the accumulation of grease; and
3. Malfunctioning equipment and pumps (possibly due to power failures).

It is not clear how much leaking sewer infrastructure below ground may contribute to surface water contamination. Although there is evidence that in some soils, bacteria may not be readily transported to nearby surface waters, there are no known local data related to bacterial transport in the soil types and

ground water conditions in the Elevenmile Creek watershed. Underground sanitary sewer pipes can leak. When ground water levels are low or the pressure in the sanitary sewer pipes is greater than the surrounding pressure of ground water, it is possible that wastewater in the sanitary sewer pipes can exfiltrate out through the leaks in the pipes and into the surrounding ground water, and potentially migrate to adjacent surface waters. When ground water levels are high, ground water surrounding the pipes can infiltrate into the leaks in the sanitary sewer pipes. Surface water associated with flooding also can inflow into the sanitary sewer pipes when stormwater pipes are connected illegally to the sanitary sewer pipes. In addition, surface water and/or ground water can inflow into the sanitary sewer pipes when the caps are off sanitary sewer laterals or when there are holes or breakages in sanitary sewer pipes. In older infrastructure areas, manholes and lift stations may have “over flow” pipes. When a blockage or equipment failure occurs the sewage levels rises to the illegal over flow pipe, discharging into the stormwater system or directly into surface waters.

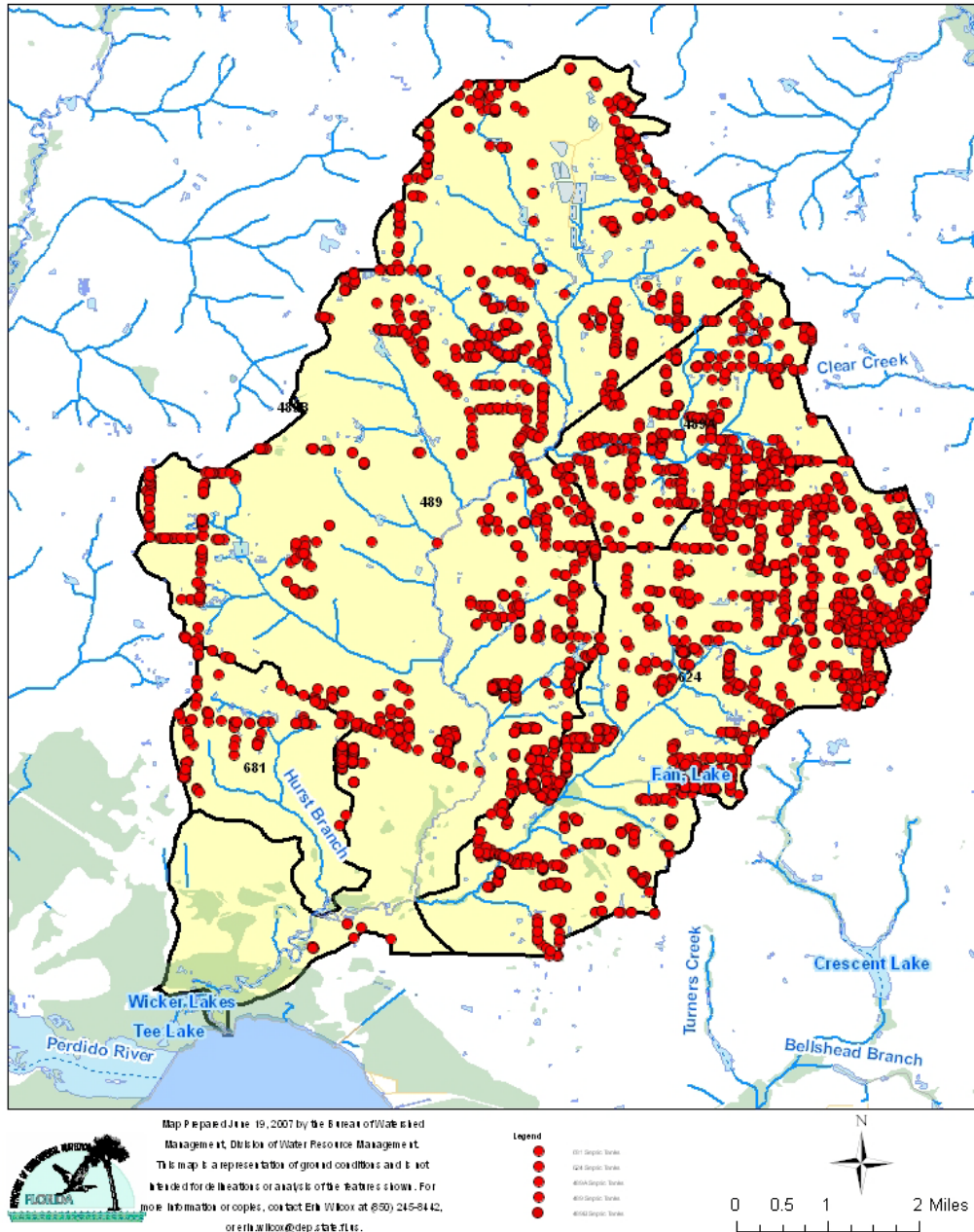
In Escambia County the Emerald Coast Utilities Authority (ECUA) owns and maintains the sanitary sewer system that serves the Elevenmile Creek watershed. In 2012 ECUA entered into a consent order with FDEP as a result of several sanitary sewer overflows. The consent order requires the development of a “Comprehensive Evaluation Plan” followed up with the implementation of a “Corrective Action Plan”. It is anticipated the Elevenmile Creek will see water quality improvements as a result of the full implementation of the Corrective Action Plan when it is approved.

OSTDS

On-site sewage treatment disposal systems (OSTDS) including septic tanks are an effective means of treating sanitary waste when “off-site” treatment at a wastewater treatment facility is not an option. However, OSTDS’s can become another potential source of fecal coliform bacteria if not properly maintained or installed. It has been estimated that there may be as many as 10,247 OSTDS’s in the Elevenmile Creek watershed. Figure 15 is a 2007 map of septic tanks in the Elevenmile Creek watershed.

Figure 16. Septic Tanks in Elevenmile Creek Watershed.

Elevenmile Creek Basin Septic Tanks



STORMWATER

The term “nonpoint sources” is used to describe intermittent, rainfall-driven, diffuse sources of pollution (e.g., stormwater runoff) associated with everyday human activities, including runoff from

urban land uses, agriculture, silviculture, and mining activities; discharges or overflow from failing septic systems; and atmospheric deposition. Additional nonpoint sources may include areas with concentrated wildlife (e.g., bird sanctuaries) or domestic animals (e.g., dog parks or improper pet waste disposal). While there are no known dog parks in the watershed, a number of county parks could be used by residents who walk their dogs and who may improperly dispose of pet waste.

Sediments in streambeds or stormwater conveyance systems can act as reservoirs for contamination as bacteria persist and possibly regrow in the sediments. These sediment bacteria sources can periodically result in the influx of high levels of bacteria to receiving waters. Bacteria from sediments could potentially be an issue in certain areas of Tenmile and Eightmile Creeks, where the majority of the watershed (more than 50%) is highly urbanized and stormwater runoff is managed through stormwater treatment systems or conveyances.

Illicit connections to stormwater conveyance systems can also contribute to fecal coliform loading. Escambia County and FDOT have ongoing programs to identify illicit discharges to MS4 conveyances and to waterbodies. As part of this program, Escambia County, the city of Pensacola, and FDOT can verify discharges to the MS4 and remove illicit connections through their existing regulatory programs. The number of open illicit discharge cases for Escambia County and FDOT is unknown, but the results of any investigations into illicit discharges are typically reported in the MS4 annual monitoring information and will also be reported in BPCP progress reports.

AGRICULTURE

It is estimated that approximately 9.3 percent of the Elevenmile Creek watershed is in the land-use category “agriculture”. Runoff from agricultural areas containing animals (e.g., livestock grazing, dairies, cattle farms, or concentrated animal feeding operations [CAFOs]) can contribute a significant amount of fecal contamination to surface waters. The FDEP TMDL report for Elevenmile and Tenmile Creeks attributes 55.1% of the internal loading of fecal coliform bacteria to livestock. Livestock includes but is not limited to: cattle, hogs/pigs, poultry, sheep/lambs, horses, goats and ducks or geese. Clearly the BPCP will need to address this potential source if significant reductions are to be made.

WILDLIFE

Wildlife contributions to fecal coliform are often divided into eight categories: deer, raccoons, muskrats, beavers, geese, ducks, wild turkeys, and other. The tributaries that comprise the Elevenmile Creek watershed are relatively small. These conditions magnify the impacts of wildlife fecal coliform loading due to the lack of dilution. The FDEP TMDL report has estimated total load from wildlife at 9.08 percent of the total.

PROJECTS TO REDUCE *ESCHERICHIA COLI* COLIFORM LOADING

Projects to reduce *Escherichia coli* loading will be categorized to the potential source categories mentioned in the previous section. These are: sanitary sewer, OSTDS, stormwater and agriculture. Wildlife sources will not be addressed in this BPCP.

The “Stakeholder Project Tables” are found in Appendix 1. These tables will be completed by stakeholders after the initial “kick-off” meeting. As stated previously, projects to be listed at this time are those projects that have been: recently completed (last 5 years), planned projects with funding for implementation or ongoing

efforts. New projects will be considered by stakeholders after the “walk the WBIDs” exercise and first two years of monthly sampling has been completed and evaluated.

SUMMARY OF RESTORATION EFFORTS AND SUFFICIENCY OF EFFORT

The preliminary list of recent Escambia County stormwater projects in the Elevenmile Creek watershed has the potential to have significantly reduced *Escherichia coli* loading. Only one of the five water quality stations has data more recent than 2009. Therefore, improvements are not reflected in most of the available data. A more thorough summary and evaluation of level of effort will be prepared in an updated BPCP after stakeholder input.

References

1. Florida Department of Environmental Protection. 2011. Implementation Guidance for the Fecal Coliform Total Maximum Loads Adopted by the Florida Department of Environmental Protection.
2. Florida Department of Environmental Protection. 2011. Basin Management Action Plan for the Implementation of the Total Maximum Daily Loads for Fecal Coliform Adopted by the Florida Department of Environmental Protection in “Bayou Chico (Pensacola Basin)”.
3. Florida Department of Environmental Protection. 2008. TMDL Report Fecal Coliform TMDL for Elevenmile Creek, WBID 489 and Tenmile Creek WBID 489A.

Appendix 1: Stakeholder Projects to Reduce Fecal Coliform Loading

Table 2. Stakeholder Projects and Activities to Reduce Fecal Coliform Loadings from Sanitary Sewer Sources.

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
To be filled out at a later time by stakeholder						

Table 3. Stakeholder Projects and Activities to Reduce Fecal Coliform Loadings from OSTDS Sources.

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
To be filled out at a later time by stakeholder						

Table 4. Stakeholder Projects and Activities to Reduce Fecal Coliform Loadings from Stormwater Sources.

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
Escambia County-1	Ten Mile Creek East Stream Restoration Project	Restoration of approximately 2,700 linear feet of Ten Mile Creek and adjacent riparian areas using natural channel design techniques.	Restoration of highly eroded incised stream channel and adjacent riparian areas to stabilize the stream banks, create additional floodplain capacity, and improve wildlife habitat.	\$1,000,000	Escambia County, Florida Forever Program	Completed
Escambia County-2	Ten Mile Creek West Stream Restoration Project	Restoration of approximately 3,400 linear feet of Ten Mile Creek and adjacent riparian areas using natural channel design techniques.	Restoration of highly eroded incised stream channel and adjacent riparian areas to stabilize the stream banks, create additional floodplain capacity, and improve wildlife habitat.	\$1,000,000	Escambia County, Florida Forever Program	Completed
Escambia County-3	Blue Pit Stormwater Retrofit Project	Stormwater Pond and Drainage Improvements	Conversion of a barrow pit into a stormwater treatment train.	\$250,000	Escambia County, Florida Forever Program	Completed
Escambia County-4	Maplewoods Stormwater Retrofit Project	Stormwater Pond and Drainage Improvements	Construction of a stormwater treatment system and associated wetland restoration	\$2,500,000	Escambia County, Hazard Mitigation Grant Program	Completed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
Escambia County-5	Brookhollow Stormwater Project	Stormwater Pond and Drainage Improvements	Construction of a stormwater treatment system and associated wetland restoration efforts.	\$300,000	Escambia County	Under construction
Escambia County and FDOT-6	Illicit Discharge Detection	Carry out inspections associated with NPDES permit	Sampling to assess conditions and identify sources. Enforcement action taken if illicit discharges identified	\$50,000	Escambia County	Ongoing
Escambia County-7	Stormwater Pond Inspection and Maintenance Program	County maintains and inspects > 300 ponds countywide	Stormwater inspections and maintenance continually ongoing	\$300,000	Escambia County	Ongoing
Escambia County and BARC-8	Public Education and Outreach	Carry out miscellaneous public education activities	Stormwater and pollution prevention brochures and information distributed to public in Elevenmile Creek watershed	\$10,000	Escambia County	Ongoing
Escambia County-9	Pet Waste Ordinance, Part 1, Article 1, Section 10-11(f)	Pass ordinance to define the handling and removal of domestic pet waste	Countywide, ongoing	Unknown	Escambia County	Completed

		countywide				
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Table 4 (continued). Stakeholder Projects and Activities to Reduce Fecal Coliform Loadings from Stormwater Sources.

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
More projects to be added						

Table 5. Stakeholder Projects and Activities to Reduce Fecal Coliform Loadings from Agricultural Sources.

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
To be filled out at a later time by stakeholder						